



TO: PARKS AND RECREATION COMMISSION

FROM: DAREN ANDERSON DEPARTMENT: COMMUNITY SERVICES

DATE: May 26, 2015

SUBJECT: BYXBEE PARK HILLS INTERIM PARK CONCEPTS

Recommendation

Staff recommends that the Parks and Recreation Commission recommend that Council adopt the Park Improvement Ordinance (Attachment A) for the improvements identified in the Byxbee Park Hills Interim Park Concepts (Attachment B).

Background

In 1978, Council approved the Baylands Master Plan and adopted the Environmental Impact Report, which included a principal element of converting the now closed Palo Alto Landfill to a pastoral park after closure. In 1989, the Council approved the Byxbee Landfill Park Master Plan and Phase I Park development.

The park has been developed and opened to the public in phases. Phase I contains 29 acres located in the northeastern part of the Landfill, and it is currently developed as a passive park with trails, restrooms, and art features. Phase IIA and IIB covers 46 acres immediately to the south of Phase I and have been capped and opened to the public. Twenty-seven acres of the 51 acres in Phase IIC were opened to the public on April 18, 2015, in celebration of Earth Day.

Staff is completing the cap construction for the final 24 acres of Phase IIC to comply with regulatory requirements and to safely open up all of Byxbee Park Hills to the public by the end of 2015.

The initial landscape design for Byxbee Park was completed by Hargreaves and Associates in 1991 to accompany the *Amended Baylands Master Plan Summary Report (1991)*. The Hargreaves design was implemented in Phase I and included trail design, habitat mounds (hillocks), public art (wind wave, chevrons, and pole field), and other park amenities (signage, parking, and restrooms). In 2008 the landfill's engineered closure plans were reviewed by Hargreaves and Associates for conformance with the 1991 Master Plan which was then subsequently slightly revised, incorporating minor grading revisions into the final Baylands Master Plan.

Council approved the final landfill closure plans on June 10, 2013 (Council Staff Report #3768), which included the use of an evapo-transpirative (ET) cap, a preliminary configuration for dual-use trails (i.e. paths for landfill maintenance vehicles and park visitors), habitat island concepts,

and other park amenities. The Landfill is a closed Class III refuse disposal site with a permitted footprint of 137 acres. The landfill began receiving waste in the early 1930s and operated as a Class III solid waste landfill. Landfill closure and final land use were addressed in the Baylands Master Plan and Environmental Impact Report. The Landfill has been capped in phases as refuse disposal capacity was reached. Phases I, IIA and IIB of the Landfill have been completed and were closed in accordance with permit requirements. Phase IIC is now being capped in accordance with State regulations.

Discussion

The City entered into a contract with TRA Environmental Sciences, Inc. (now MIG/TRA Environmental Sciences, Inc.), in March 2014 to prepare an interim park plan for Byxbee Park Hills. The purpose of the Interim Byxbee Park Hills Plan is to provide guidance on: improving and managing the habitat, managing for burrowing owls, a trail system that allows safe public access that doesn't impact the wildlife, and ensure that the closed landfill can meet all of its regulatory requirements. The Plan documents the existing park areas currently open to the public, proposes an adaptive management maintenance regime, and identifies opportunities for interpretive signage. The habitat islands identified in the Plan also employ adaptive management techniques to identify the water and maintenance needs to provide the most robust and sustainable habitat.

In addition to the habitat islands, the Plan designates three areas that can be designed to enhance burrowing owl habitat. While the City believes that this habitat type will be beneficial to the Park and the neighboring Baylands by providing valuable habitat for the Western Burrowing Owl and other wildlife, CalRecycle has expressed concerns about the potential for the burrows and the burrowing animals to damage the landfill cap. The City will only be able to enhance these burrowing owl areas if permission is granted by all of the regulatory agencies including CalRecycle. The City will continue to seek permission from CalRecycle to construct the burrowing owl habitat areas.

The Plan also designates new trail configurations designed to improve the park-users' experience, integrate the soon-to-be opened Phase IIC area, allow for landfill maintenance (leachate and gas well monitoring), and protect habitat areas. Most of the trails have been designed to comply with the Americans with Disabilities Act (ADA) (except a few small sections of trail where the slope cannot be adjusted due to drainage requirements) while providing connectivity throughout the Park through trail loops as well as to the larger trail system in the Baylands. The Plan identifies locations for park benches, interpretive signs, and wayfinding signs.

On July 10, 2014, staff met with a group of Baylands stakeholders representing general park users, bicyclists, hikers, and environmentalists. Based on the feedback received, the initial trail design was modified to reduce impacts to wildlife by eliminating some trail segments. The stakeholders also expressed an interest in better signage connecting the regional trail system to

the proposed trails at Byxbee Park Hills. As a result of this feedback, additional wayfinding signs were added to the design.

Stakeholders also noted that the Plan should include bench sites located at scenic lookouts, which was incorporated into the design. Though some stakeholders advocated for a larger parking lot, no changes have been recommended to modify the existing parking lot as a part of this design. A larger parking lot would require a more substantial and lengthy environmental and planning review, as well as exceed the allocated budget for this interim project. Parking, final maintenance plans, and other structures like covered lookout areas, will be considered in a future master planning effort for Byxbee Park Hills or incorporated into the Baylands Comprehensive Conservation Plan, which staff proposes as a future capital improvement project slated for 2017.

Staff presented a draft of the Byxbee Park Hills Interim Concepts to the Parks and Recreation Commission (Commission) on September 23, 2014, and to a Commission subcommittee on October 7, 2014. The Architecture Review Board (ARB) reviewed and approved the Interim Concepts on November 20, 2014. Staff has modified and clarified many aspects of the Interim Concepts. Section 3.2.1 of the Byxbee Park Hills Conceptual Plan and Narrative details the modifications based on the comments from the meetings. Key modifications include:

- Adjusting the Mowing/ Weed Management regime
- Redefining Vegetation Planting and Management with vegetated islands, low-mowed grassland, mid-mowed grassland, and untended grassland
- Delineating Management of Burrowing Owls and Squirrels areas
- Reducing the number of trails to protect larger habitat areas by 1,400 linear feet
- Minimizing habitat impact from maintenance vehicles
- Modifying the size of the rock swales on the map
- Improved recommendations for park signage to keep people on trails and away from habitat areas

On March 9, 2015, the Commission Ad Hoc Committee recommended reducing the size of the gathering node “compass rose” at the highest point of Byxbee Park Hills because it seemed too large for the area. Staff reduced the size of the group gathering node from 50 feet in diameter to 35-feet in diameter (Attachment C). Staff concurred that a 35’ diameter area is an adequate size to accommodate the special events and volunteer groups who may use the area. The gathering node has bench seating for 12 people with vistas of the entire South San Francisco Bay.

The Ad Hoc Committee also noted that certain sections of trails near the group gathering node would be better if they were narrower. The trail system on Byxbee Park Hills was designed to serve as trails for bicyclists, hikers, and the occasional service vehicles that maintain the methane gas lines, the leachate lines, and other maintenance requirements. The trails are ten

feet wide to accommodate the vehicles. Narrowing the trails would result in heavy vehicles leaving deep ruts during wet times of the year. Staff and the Ad Hoc Committee agreed that the trails could be narrowed by allowing vegetation to grow in on the edge of the trail, which can narrow the look of the trail by one to two feet on each side.

Resource Impact

The interim plan and the implementation of the plan will be funded from the existing Byxbee Park CIP (PE 13020)

Timeline

27 acres of Phase IIC opened to the public	April 2015
Council Approval of Byxbee Park Hills Interim Concepts	July 2015
Final 24 acres of Phase IIC. Park area opened to the public	January 2016
Complete Construction on Interim Concept Features	Summer 2016

Policy Implications

This project is consistent with the *Palo Alto Baylands Master Plan 2008* and the 2013 landfill closure plan.

Environmental Review

This plan is component of the Palo Alto Landfill closure activities covered by a Mitigated Negative Declaration (State Clearinghouse number 2013082019) issued on September 11, 2013.

Attachments

- Attachment A: Park Improvement Ordinance
- Attachment B: Byxbee Park Hills Conceptual Plan and Narrative
- Attachment C: 35-foot Diameter Group Gathering Node Schematic

NOT YET APPROVED

Ordinance No. _____
Ordinance of the Council of the City of Palo Alto Approving and
Adopting a Plan of Improvement for Byxbee Park Hills

The Council of the City of Palo Alto does ORDAIN as follows:

SECTION 1. Findings. The City Council finds and declares that:

(a) Article VIII of the Charter of the City of Palo Alto and Section 22.08.005 of the Palo Alto Municipal Code require that, before any substantial building, construction, reconstruction or development is commenced or approved, upon or with respect to any land held by the City for park purposes, the Council shall first cause to be prepared and by ordinance approve and adopt a plan therefor.

(b) Byxbee Park Hills is dedicated to park purposes.

(c) The City intends to authorize construction of certain park improvements within Byxbee Park Hills, as shown at Exhibit "A". The improvements include, without limitation, the following:

- (1) Construction of new trails;
- (2) Construction of native habitat islands;
- (3) Construction of pedestrian bridge;
- (4) Construction of group gathering node;
- (5) Installation of new park benches;
- (6) Installation of new interpretive and way-finding signs; and
- (7) Construction of burrowing owl habitat areas (pending regulatory approval)

(d) The improvements do not require removing any trees.

(e) The improvements described above and as more specifically described at Exhibit "A" are consistent with park and conservation purposes.

(f) The Council desires to approve the project's improvements described above and as more specifically described at Exhibit "A".

SECTION 2. The Council hereby approves the plan for construction of improvements within the Byxbee Park Hills and hereby adopts the Byxbee Park Hills Interim Park Concepts, attached hereto at Exhibit "A" as part of the official plan for the construction of improvements within Byxbee Park Hills.

SECTION 3. The Council finds that the plan for construction improvements identified in the Byxbee Park Hills Interim Park Concepts is categorically exempt from environmental

NOT YET APPROVED

review under the California Environmental Quality Act (CEQA), per Section 15303 *New Construction or Conversion of Small Structures*.

SECTION 4. This ordinance shall be effective on the thirty-first day after the date of its adoption.

INTRODUCED:

PASSED:

AYES:

NOES:

ABSENT:

ABSTENTIONS:

ATTEST:

City Clerk

Mayor

APPROVED AS TO FORM:

APPROVED:

Senior Asst. City Attorney

City Manager

Director of Community Services

Director of Administrative Services



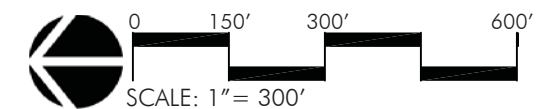
KEYNOTE LEGEND

- ACCESSIBLE TRAIL
- MAINTENANCE PATH
- EXISTING BAYSHORE TRAIL
- ① GROUP GATHERING NODE

- ② PROPOSED BRIDGE
- ③ BENCH(ES) LOCATION
- ④ PROPOSED VEGETATIVE ISLAND(S)
- ⑤ POSSIBLE FUTURE VEGETATIVE ISLANDS (PENDING PILOT EVALUATION)

- ⑥ POTENTIAL BURROWING OWL HABITAT LOCATION
- ⑦ ROCK-LINED DRAINAGE SWALES
- ⑧ MEASURE E AREA (+/- 10 ACRES)
- ⑨ EXISTING BRIDGE TO REMAIN

A SIGN TYPE, REFER TO SHEET L-3 FOR ADDITIONAL INFORMATION



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BYXBEE PARK HILLS INTERIM PARK CONCEPTS PALO ALTO, CALIFORNIA

CONCEPTUAL LANDSCAPE PLAN SITE AMENITIES AND SIGNAGE LAYOUT

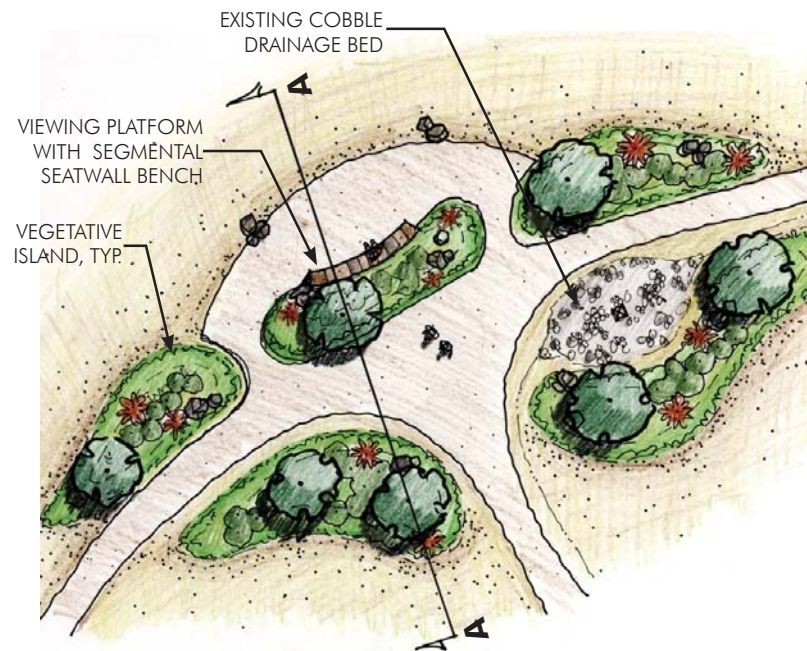


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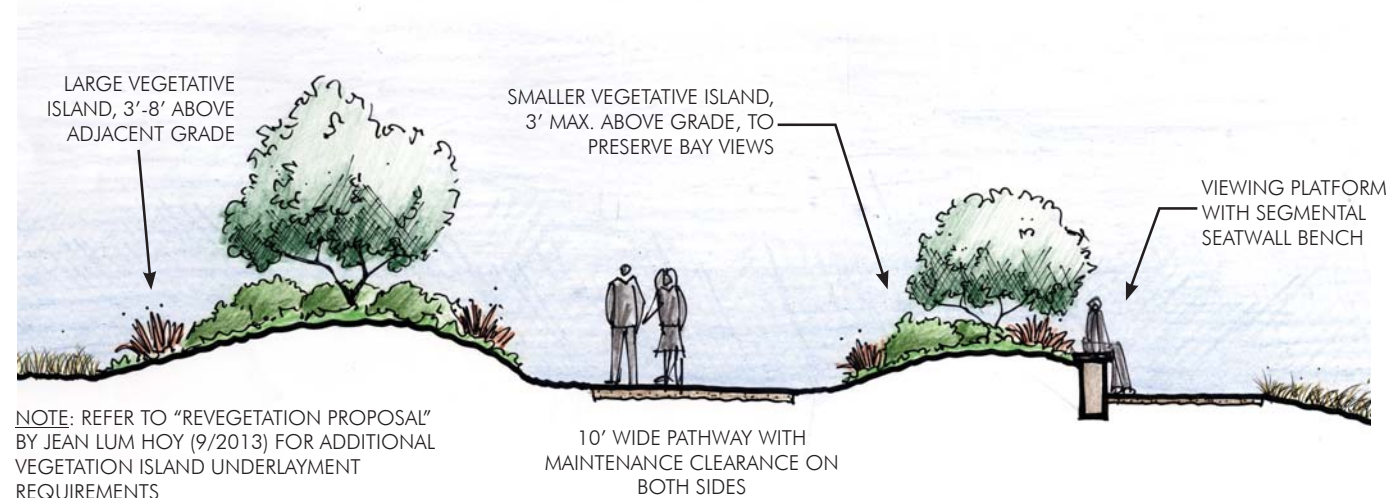


**OASIS
ASSOCIATES**
LANDSCAPE ARCHITECTURE
• PLANNING

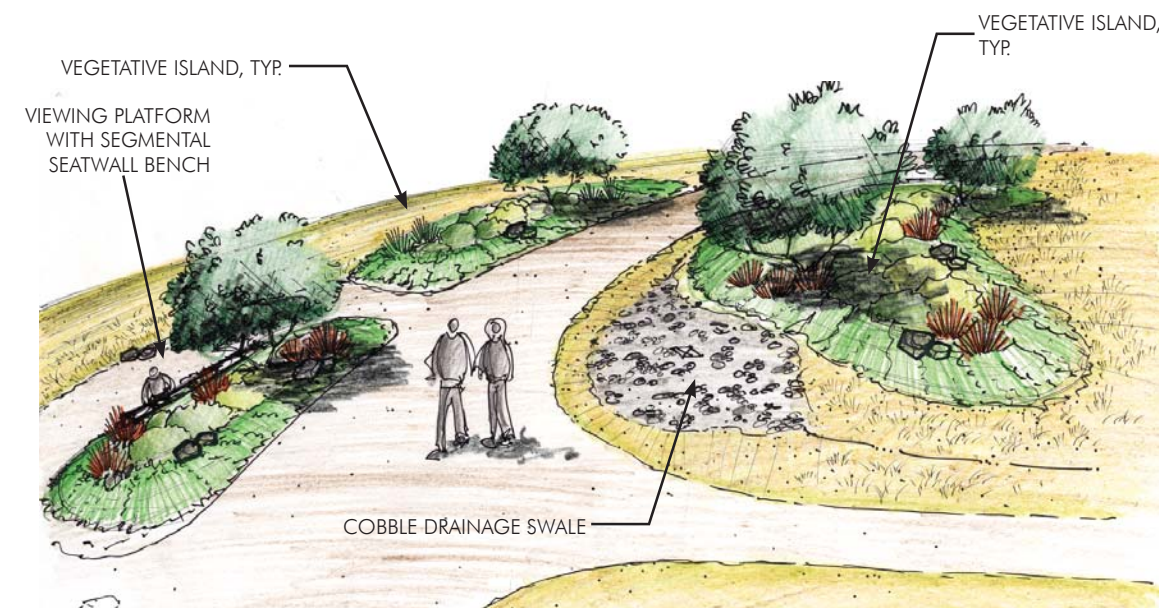
L-1
FEBRUARY 18, 2015



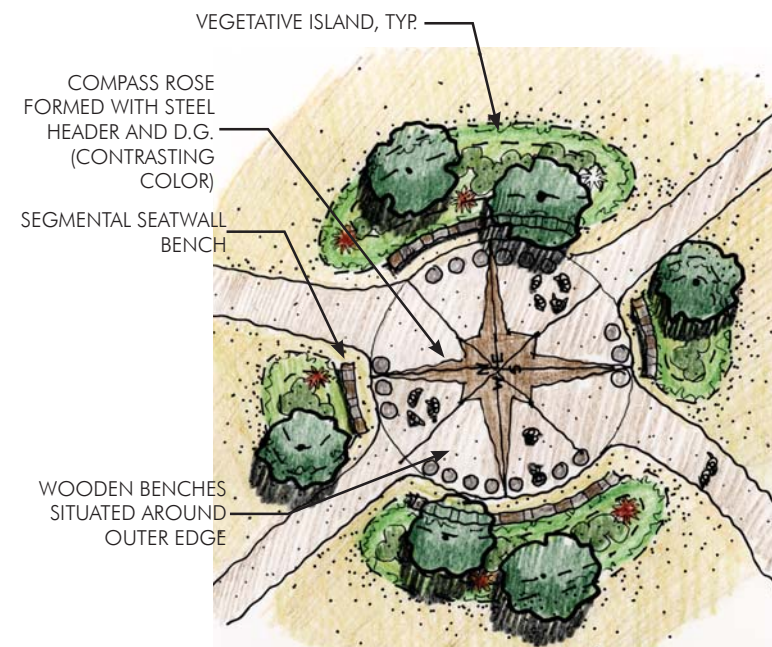
PLAN 'A': VEGETATIVE ISLAND GROUPING WITH VIEWING AREA



SECTION 'A': THROUGH VEGETATIVE ISLAND GROUPING AND VIEWING PLATFORM



PERSPECTIVE 'A': VEGETATIVE ISLAND GROUPING



PLAN 'B': GROUP GATHERING NODE



PROPOSED BENCH
WOODEN SLATS ON CURVED STEEL FRAME,
WITH OPTIONAL DEDICATION PLAQUE



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**PALO
ALTO**

BYXBEE PARK HILLS INTERIM PARK CONCEPTS
PALO ALTO, CALIFORNIA

CONCEPTUAL LANDSCAPE PLAN
VIGNETTE SKETCHES AND PHOTOS OF AMENITIES



TRA ENVIRONMENTAL
SCIENCES

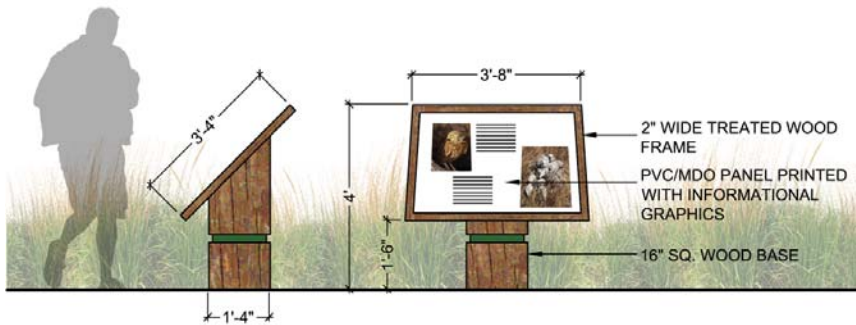


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ASSOCIATES**
LANDSCAPE ARCHITECTURE
+ PLANNING

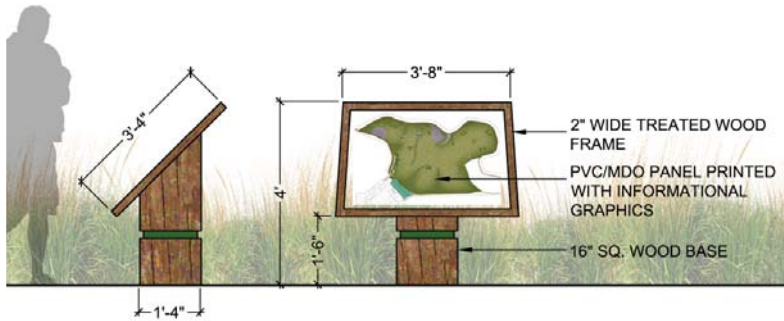
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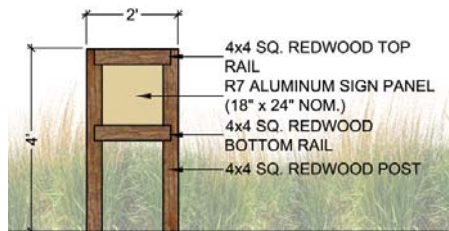
A PARK ENTRY SIGNAGE



B PARK INTERPRETIVE SIGNAGE
TO BE USED AS AN EDUCATIONAL TOOL TO INTERPRET UNIQUE NATURAL, CULTURAL, HISTORIC FEATURES, AND MANAGEMENT ACTIVITIES FOR PARK VISITORS.



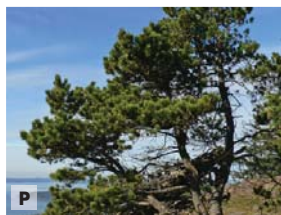
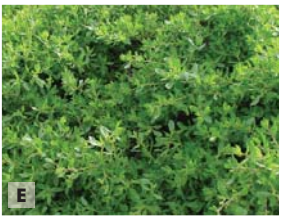
C TRAIL MARKER SIGN
INDICATES WHERE USER IS LOCATED AT ON AN ILLUSTRATIVE SITE MAP. SHOWS ALL TRAILS AND THEIR DISTANCES, AND SITE AMENITIES.



D PARK REGULATION SIGN
INDICATES IMPORTANT PARK-SPECIFIC REGULATIONS.

VEGETATIVE ISLANDS PLANT LIST

SPECIES	COMMON NAME
A <i>Artemisia californica</i>	California Sagebrush
B <i>Arctostaphylos 'Pacific Mist'</i>	Pacific Mist Manzanita
C <i>Arctostaphylos 'Pumila'</i>	Dune Manzanita
D <i>Atriplex lentiformis brewerii</i>	Coastal Quailbush
E <i>Baccharis pilul. 'Pigeon Point'</i>	Coyote Bush
F <i>Ceanothus maritimus</i>	Bluff Lilac
G <i>Ceanothus thyrsiflorus</i>	Blue Blossom Lilac
H <i>Eriogonum fasciculatum</i>	California Buckwheat
I <i>Eriogonum nudum</i>	Naked Buckwheat
J <i>Eriophyllum staechadifolium</i>	Yellow Yarrow
K <i>Limonium perezii</i>	Sea Lavender
L <i>Leymus cond. 'Canyon Prince'</i>	Canyon Prince Wild Rye
M <i>Lupinus chamaissonis</i>	Coastal Silver Lupine
N <i>Mimulus aurantiacus</i>	Sticky Monkey Flower
O <i>Muhlenbergia rigens</i>	Deer Grass
P <i>Pinus contorta v. contorta</i>	Shore Pine
Q <i>Salvia mellifera</i>	Black Sage



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BYXBEE PARK HILLS INTERIM PARK CONCEPTS
PALO ALTO, CALIFORNIA

CONCEPTUAL LANDSCAPE PLAN
PARK SIGNAGE DETAILS AND PROPOSED VEGETATION ISLAND PLANT MATERIAL

L-3
FEBRUARY 18, 2015



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LANDSCAPE ARCHITECTURE
PLANNING

Palo Alto Baylands Preserve

Byxbee Park Hills

Conceptual Landscape Plan and Narrative



February 2015

City of Palo Alto Public Services Department, Open Space Division
City of Palo Alto Public Works Department

Palo Alto Baylands Preserve
Byxbee Park Hills
Interim Park Concepts Narrative

February 2015

Prepared by

City of Palo Alto Public Services Department, Open Space Division

City of Palo Alto Public Works Department

Oasis Associates Landscape Architects

MIG|TRA Environmental Sciences

**Palo Alto Baylands Preserve
Byxbee Park Hills
Interim Park Concepts Narrative**

Table of Contents

1.0 Summary and Introduction	1
2.0 Physical and Biological Setting	3
3.0 How the Park Concepts were Developed	5
3.1 Site History	5
3.2 Public Participation in the Interim Park Concepts Plan	5
3.2.1 Specific Comments and Responses	6
3.3 Existing Park Facilities and Activities	11
3.3.1 Park Amenities	11
3.3.2 Hours of Operation and Typical Park Use	11
3.4 Current Landfill Monitoring and Maintenance	11
3.5 Existing Park Operation and Maintenance	12
4. Proposed Interim Park Concepts	14
4.1 Park Amenities	14
4.2 Burrowing Owl Management Plan	15
4.3 Park Operation and Maintenance Activities and Best Management Practices	19
4.4 Interim Park Plan Evaluation Schedule and Future Planning	21
5.0 Compliance with Baylands Master Plan Goals	21
Appendix A: Figures	23
Appendix B: Regulatory Information	36
Appendix C: Burrowing Owl Management Plan	40

Palo Alto Baylands Preserve Byxbee Park Hills Interim Park Concepts Narrative

1.0 Summary and Introduction

The Palo Alto Landfill is owned, monitored and maintained by the City of Palo Alto. It is located in the 1,940-acre Baylands Nature Preserve, which is part of the Baylands Planning Area (see Figure 1 in Appendix A). The landfill operated from the 1930's to 2011 and is now in the closure/post-closure phase. The landfill was built in phases. Phases I, IIA and IIB were completed and closed and are currently open for park use. Phase IIC is anticipated to be completed and closed in 2015, then the interim park concepts plan will be implemented over the entire landfill except for the Measure E area¹.

By law, the City is required to monitor the landfill for a minimum of 30 years to assure it does not pose a safety hazard resulting from refuse settlement, the release of landfill gas, or the creation/release of leachate, which is liquid that has come into contact with the buried refuse. The integrity of the landfill is monitored by the Palo Alto Public Works Department, using a system of groundwater, leachate and gas monitoring wells. The post-closure activities, including those that are related to the end use as a park, are approved and overseen by state agencies, including CalRecycle and its Local Enforcement Agency (Santa Clara County), the Bay Area Air Quality Management District, and the Regional Water Quality Control Board.

The long-planned end use of the landfill is parkland. It is part of the Byxbee Park Master Plan, and portions of it have already been closed and developed for park use. In accordance with the City of Palo Alto Comprehensive Plan the landfill will eventually be converted to park use (with the possible exception of the Measure E area), and is called the Byxbee Park Hills. Byxbee Park activities and maintenance, including the Byxbee Park Hills, are under the supervision of the Open Space Division of the City of Palo Alto Community Services Department. The park is used predominantly by pedestrians, but also dog-walkers, and bicyclists².

The park design concepts described in this narrative and shown in the attached drawings (Figures 2 and 3 in Appendix A) will be tested before a final park plan is developed. The concepts address trail locations, vegetation types and management methods, irrigation, benches and signs, and burrowing owl (*Athene cunicularia hypugae*) nesting and forage habitat. The existing art features will be left in place. Ongoing maintenance of the closed landfill by Public Works and of the park landscape and amenities by Community Services will be necessary after the site is converted to park use. Public Works may need to periodically close portions of the park for landfill maintenance or repair.

¹ Measure E was passed by the electorate to study the use of a portion of the closed landfill for a waste-to-energy facility. That study is in process, and the Measure allows 10 years for the study to be completed. The earliest the area will be available for park use is 2021, depending on the outcome of the study. The Measure E area is shown on the plans as a square on the landfill near the wastewater treatment plant.

² A recent survey of 117 Byxbee Park Hills patrons indicate that 57 percent were pedestrians, 24 percent were cyclists, and 19 percent were dog walkers (R. Bicknell, pers. Comm.)

The concepts reflect a balance among many factors: providing high-quality wildlife habitat, protection of special-status wildlife species, public safety and compliance with the state and federal regulations that govern the landfill, and public desires for park amenities. The concepts for each amenity are summarized as follows:

Trails: trails have been designed with three primary considerations: 1) combining trails and landfill maintenance access roads; 2) providing loops; and 3) providing Americans with Disabilities Act (ADA) access. Based on past management experience at this park, installing dead end or destination trails has resulted in the creation of undesirable “renegade” or “volunteer” trails. Renegade trails adversely impact aesthetics and wildlife habitat, and increase park maintenance costs. Thus, dead end/destination trails have been avoided in favor of loop trails with nodes for viewing wildlife and the surrounding area.

Benches: The design includes simple wooden slat benches on a curved steel frame. Benches are placed to take advantage of surrounding views and provide opportunities to stop and view wildlife. Seating is also proposed at the vegetative island groupings (up to 5 locations) and the group gathering node (up to 2 locations). There are currently 15 benches along the bayshore trail and 2 benches on higher slopes. The concepts plan proposes 4 benches in the Phase I area, 4 in the Phase IIA area, 2 in the Phase IIB area, and 4 in the Phase IIC area in addition to the seating associated with the islands and nodes. All bench locations provide a view of the surrounding environment.

Signs: the interim park concepts plan includes three types of signs. In addition to the entrance sign, the plan includes wayfinding and interpretive signs to help park users understand where they are and what is special about the preserve. The signs have been designed and placed to minimize visual intrusion and maintenance costs, and to adhere to the Baylands Site Design Guidelines.

Vegetation: revegetation of a landfill is limited to plants that do not have deep roots. Plants with deep roots can compromise the final cover of the landfill and create routes for water to enter the buried waste or for gas from the buried waste to escape. The regulatory agencies are sensitive to these issues and tend to restrict the use of shrubs or trees that have deeper roots than annual grasses and wildflowers. Erosion control is also necessary. Because of these concerns, the park vegetation is dominated by grassland species, which provide erosion control and do not penetrate the one-foot clay cap. If approved by the agencies, vegetation also could include shallow-rooted shrub species that have been documented as compatible with landfill covers. This may be more feasible on the evapotranspirative cover in the Phase IIC area, which is four feet deep. The interim park concepts plan also includes vegetation islands in order to provide more variety in vegetation types and heights for both wildlife value and aesthetics (see next paragraph). In addition, the proposed maintenance plan incorporates mowing practices that will result in different vegetation heights across the open areas of the park. This will promote a diverse vegetative structure of low and medium height that will benefit wildlife with a variety of cover and forage opportunities. The landfill lacked vegetation while it was active, and the Interim Park Plan proposes plantings that are compatible with landfill regulatory requirements and wildlife needs.

Due to the public’s desire for more variation in vegetation in the park for aesthetic interest, shade, and habitat value, the park concepts include islands of shrub-sized vegetation in the previously closed areas. These islands will be built above the landfill cover, and are lined to prevent root penetration into the landfill cover. As a result of being lined, these islands cannot

support the root system required for shade trees. Furthermore, shade trees are not natural to the baylands environment and are not encouraged for ecological reasons. Raptors (e.g., hawks) use trees to hunt. Introducing shade trees could adversely impact species native to the baylands, including special status species such as the salt marsh harvest mouse, Ridgeway (California clapper) rail, black rail, and western burrowing owl. The interim park concepts plan includes eight locations for vegetative islands. A pilot project of one to three islands will be installed first to assure they are successful, and to prepare any design changes before funds are spent on all eight islands.

Burrowing Owl: The interim park concepts plan includes areas set aside for potential burrowing owl nesting habitat, a scarce resource for this special-status species. The nesting habitat is delineated from human use by a low berm and would be located in areas of the landfill where the cover will be deep enough to allow burrow activity without compromising the integrity of the landfill cover. The nesting habitat will include artificial burrows and will be seeded with grasses to create the type of habitat conducive to burrowing owl nesting. The installation of this habitat, however, will require approval from the landfill regulatory agencies. Agency staff may not approve this concept because it involves burrows.

The remainder of the landfill and the surrounding area will provide forage for burrowing owl. In order to enhance forage opportunities for the owl across the landfill, some of the areas of the landfill will be mowed to a different height, or left unmowed, and rock piles and mulch mounds will be installed to create habitat for insects. The tentative locations of these are shown in Figure 2. The Burrowing Owl Management Plan is attached as Appendix C.

2.0 Physical and Biological Setting

Landfilling started in the salt marsh adjacent to San Francisco Bay in the 1930's before the ecological value of the salt marsh wetland and the potentially hazardous nature of landfills were recognized. The landfill now consists of a hilly area rising to a maximum of 60 feet in elevation above sea level in an area that was historically flat. Its height is reflected in its name as the Byxbee Park Hills.

The area surrounding the Byxbee Park Hills contains fresh and saltwater wetlands, the wastewater treatment plant, the Palo Alto airport, office buildings, the golf course, the duck pond, the Environmental Volunteers center and the Baylands Nature Interpretive Center.

The Palo Alto Baylands provides habitat for a wide variety of common birds, including both aquatic and upland species such as ducks, herons, sparrows, and blackbirds. Common mammal species include mice (*Mus* sp.; *Peromyscus* sp.), vole (*Microtus* sp.), ground squirrel (*Spermophilus beecheyi*), brush rabbit (*Sylvilagus bachmani*), black-tailed hare (*Lepus californicus*), raccoon (*Procyon lotor*), and gray fox (*Urocyon cinereoargenteus*), among others. All of these species are expected to occur in the Byxbee Park Hills. Special status species are discussed below.

The Baylands Preserve historically and currently provides habitat for special-status species associated with salt marsh habitat (Table 1); species known to occur in the vicinity of the Byxbee Park Hills, include the salt marsh harvest mouse, Ridgeway (California clapper) rail, snowy egret, northern harrier, white-tailed kite, and western burrowing owl.

Table 1. Special-status species

Common Name	Scientific Name
Plants	
Point Reyes bird's-beak	<i>Cordylanthus maritimus</i>
Akali milk-vetch	<i>Astragalus tener</i> var. <i>tener</i>
Hoover's button celery	<i>Eryngium aristulatum</i> var. <i>hooveri</i>
California seablite	<i>Suaeda californica</i>
Congdon's tarplant	<i>Hemizonia parryi</i> ssp. <i>congdonii</i>
Animals	
Longfin smelt	<i>Spirinchus thaleichthys</i>
California clapper rail	<i>Rallus longirostris obsoletus</i>
California black rail	<i>Laterallus jamaicensis</i> ssp. <i>coturniculus</i>
Western snowy plover	<i>Charadrius alexandrinus nivosus</i>
Snowy egret	<i>Egretta thula</i>
Double-crested cormorant	<i>Phalacrocorax auritus</i>
California least tern	<i>Sternula antillarum</i>
Northern harrier	<i>Circus cyaneus</i>
American peregrine falcon	<i>Falco peregrine anatus</i>
White-tailed kite	<i>Elanus leucurus</i>
Burrowing owl	<i>Anthene cunicularia hypugaeae</i>
Alameda song sparrow	<i>Melospiza melodia pusillula</i>
Saltmarsh common yellowthroat	<i>Geothlypis trichas sinuosa</i>
Saltmarsh harvest mouse	<i>Reithrodontomys raviventris</i>

Changes in the baylands habitat occurred over time as the salt marsh was gradually filled and upland vegetation became established. As a result the Baylands now also provides habitat for the western burrowing owl, a species of special concern, and roosting habitat for herons, protected by California Fish and Game Code and the Migratory Bird Treaty Act.

When the Palo Alto Baylands was a saltmarsh³ it did not provide burrow habitat for the western burrowing owl, however, because of the gradual loss of its grassland habitat in areas located between the bay wetlands and the forested foothills, and the gradual increase in filled areas in the baylands that now contain grassland and ground squirrels this species has found refuge in these areas, including at landfills, airports, and golf courses. Because this owl species is likely to be extirpated in the south bay region due to the significant reduction in its habitat, passive park uses around the south bay have been identified in the Santa Clara Valley Habitat Conservation Plan as particularly important for protecting this species.

The vegetation in the baylands includes species tolerant of salt-water, salt in the soil, and salt in the wind that blows from the bay. As a result, the native vegetation is typically low-growing except for a few shrub species. The creeks that led to the bay provided freshwater habitat for trees, but native California trees do not tolerate salt water, and were not historically present in the baylands. Tree species currently found in the area are predominantly eucalyptus species.

Wildlife uses open space for food and cover, and wildlife habits are adapted to the physical features in the environment. The animals that use the baylands are adapted to an environment

³ About 100 years ago the saltmarshes around San Francisco Bay were much more extensive. In this area the marsh extended to US 101.

that does not include trees. A significant change in vegetative structure would affect the dynamics, and potentially harm protected species. For example, trees introduced into the baylands may provide an opportunity for predators (e.g., raptors such as hawks, owls) to establish hunting territories they could not have established before. That opportunity could significantly affect the special-status species that both provide a food source (i.e., salt marsh harvest mouse, Ridgeway [California clapper] rail, Western burrowing owl) and that are impacted by the competition for a food source (i.e., Western burrowing owl).

3.0 How the Park Concepts were Developed

The Byxbee Park Hills Interim Park Concepts were developed with input from the City of Palo Alto Public Works Department regarding the landfill, the City of Palo Alto Community Services Department regarding park use and maintenance, and the public. The project team looked at the site history, the regulatory requirements, current features and uses, and the biological resources, particularly burrowing owl. All of the information collected from these sources was used to develop the concepts that are presented in Figure 2.

3.1 Site History

The landfill began receiving waste in the early 1930s and operated as a Class III non-hazardous waste landfill. In 1978 the Palo Alto City Council approved the Baylands Master Plan and adopted the Environmental Impact Report, which included a principal element of converting the landfill to a pastoral park after closure. In 1989, the Council approved the Byxbee Landfill Park Master Plan and Phase I Park development.

The park has been developed and opened to the public in several phases. Phase I contains 29 acres located in the northeastern part of the Landfill, and it is currently developed as a passive park with trails, restrooms, and art features. Phase IIA and IIB covers 46 acres immediately to the south of Phase I and have been capped and opened to the public. Phase IIC (51 acres) will be ready for park development in 2015. A Final Closure and Postclosure Maintenance Plan for each phased closure of Phases IIA, IIB and IIC were approved by the Regional Water Quality Control Board, the California Integrated Waste Management Board (now called CalRecycle), and the Local Enforcement Agency (the Santa Clara County Department of Environmental Health). A final Closure and Postclosure Maintenance Plan was approved in January 2014.

The landfill reached refuse capacity in late July 2011 and is now in the process of closure, which is expected to be completed in 2015.

3.2 Public Participation in the Interim Park Concepts Plan

On July 10, 2014, City staff met with a group of Baylands stakeholders at the site, including community members in support of parks and representatives from Canopy, Acterra, and the Audubon Society. The draft concepts for Byxbee Park Hills were presented for discussion. The primary concerns raised by stakeholders during the meeting related to impacts to wildlife, regional connections, trail surfaces, and signage. The plan was subsequently modified to reduce the number of trails to the minimum necessary for landfill maintenance and safety.

On September 23, 2014, City staff presented the revised plan to the Parks and Recreation Commission at a regular hearing. Comments received at that time included concerns about the

trail surface being easy to navigate (smaller rock), avoiding the use of roundup and mowing, providing connectivity between the habitat islands for wildlife, using smaller vehicles in the park if possible, having less art at the park, adding shade but not necessarily adding trees, providing a variety of vegetation heights, providing a trail connection to Faber Place, including stairs for runners to use as a fitness tool, and adding dead-end trails for wildlife viewing. These comments are addressed below.

3.2.1 Specific Comments and Responses

The following issues were raised by the Parks and Recreation Commission, various stakeholders, and by members of the public who attended the Parks and Recreation Commission hearing.

Mowing/Roundup/Weed Management. Additional details were requested regarding where mowing will occur, and how it will impact wildlife and their habitat.

Mowing has two functions: weed control and habitat enhancement for burrowing owls. Because optimal nesting habitat for burrowing owls consists of grasses less than about six inches in height around the nest burrow, the “burrow habitat” shown on Figure 8 of the Management Plan for the Western Burrowing Owl Byxbee Park Hills (Appendix C) will be mowed at a frequency to maintain grass height at six inches or less, except when there are active nests. Optimal foraging habitat for burrowing owls consists of a mosaic of different vegetation heights along with features such as rock, brush and mulch piles that provide habitat for a variety of prey species including invertebrates (earwigs and Jerusalem crickets) and small mammals (field mice, voles). Mowing in areas of the landfill that are not set aside for burrow habitat will occur at a frequency sufficient to suppress invasive weeds, and will provide “forage habitat” (see Figures 8 and 9 of the Management Plan for the Western Burrowing Owl Byxbee Park Hills).

Generally speaking, the areas that are mowed to a height of 6 inches or less provide less vegetative cover for small mammals, so these species will be expected to forage and breed at a higher frequency in the forage habitat than in the burrow habitat. Similarly, invertebrate and small mammal species are expected to be more numerous in forage habitat areas where mulch, brush and rock piles have been added and where less frequent mowing will allow dense vegetative cover to develop. Portions of the graded landfill cover with 25 percent or greater slope will be left largely natural, unless vegetation management is absolutely necessary due to fire safety or other regulations.

Integrated Pest Management (IPM) is an approach used to minimize risk to people and the environment during pest control activities. It focuses on long-term solutions that prevent new pest species from being introduced, careful tailoring of pest management to determine the most effective strategy, and combining management techniques to maximize effectiveness. Staff will explore all other reasonable efforts to control pests and weeds before using pesticides, in accordance with City’s IPM policy. Techniques attempted thus far have included hand pulling weeds, solarization, flaming, and applying natural herbicides such as apple cider vinegar. While these techniques have met with some success, in limited situations herbicide is the only way to address the weed issue. For example, herbicide has been the only effective technique for removing weeds from trails in the Byxbee Park Hills.

Vegetation Planting and Management. Various parties were concerned about what plant species could be included in the habitat island areas as well as throughout the rest of the park. Specific concerns raised include protection of the landfill cap and leachate management, shade,

aesthetics, public access to vegetation islands, connectivity between vegetation islands, and connectivity between the park and other natural habitat areas.

Phases I, IIA, and IIB have a compacted clay cap that is one foot deep in some areas with a topsoil dressing of an inch or two for planting erosion control grasses. Landfill regulations addressing the integrity of the cap restrict the type of vegetation that can be planted on closed landfills to plants that are shallow rooted and provide erosion control, typically grasses and forbs. The Interim Park Concepts includes vegetation islands that have an additional three to five feet of cover so that plants with roots up to five feet deep can be grown. This will benefit both wildlife by providing more diverse habitat and also park users by adding aesthetic elements to the park. Plant species identified in the Interim Park Concepts were chosen on the basis of root depth. Because most shade trees have deep roots, smaller trees and shrubs such as shore pine, buckeye and manzanita, which provide less shade, were selected. Plants with roots deeper than one foot cannot be allowed to grow outside of the vegetation islands with the exception of Phase IIC, which will have a three-foot evapo-transpirative cap that allows for plants with deeper roots, such as shrubs. Thus, while shallow rooted perennials that invade landfill areas outside of the vegetated islands and the Phase IIC area may be left in place, shrubs and trees with deeper root systems will be removed to maintain the integrity of the landfill cover. Grasses and forbs can and will be planted anywhere throughout the landfill because their root systems are shallow.

The Interim Park Concepts Plan includes a palette of plant species and management methods that will create habitat diversity for wildlife. It includes vegetated islands, low-mowed grassland, mid-mowed grassland, and untended grassland. All of the common wildlife species that are expected to occur at Byxbee Park Hills will take advantage of these habitats. Park users will benefit by having aesthetically pleasing plantings in the park; it is not expected that park users will enter the vegetated islands, due to poor access and dense vegetation.

The vegetated islands are connected by grassland areas. The common wildlife in the Palo Alto Baylands area actively move between habitat types, and the vegetated islands are close enough to each other to be accessible to wildlife. They will be part of a mosaic of natural habitat in the Baylands Preserve locally, and around the edges of the south bay in a regional sense. None of the amenities proposed in the Interim Park Concepts present a barrier to wildlife movement.

Management of Burrowing Owls and Squirrels. Stakeholders raised various concerns about how to best manage both burrowing owls and ground squirrels. Specific topics include how squirrel management will impact the ecosystem, artificial burrow and burrow habitat maintenance, how close trails should be to burrow habitat to minimize impacts on burrowing owl behavior, and if burrow habitat could be fenced.

Ground squirrels occur in the lands immediately surrounding the landfill, so if squirrels are managed inside the park, their predators (primarily hawks, but also foxes) can find ground squirrel prey in the Baylands Preserve around Byxbee Park Hills. Rodent predators typically have a hunting range of several miles, and have not depended on the landfill for prey, with the exception of seagulls, because the landfill to date has provide limited habitat for small mammal prey species. The predators will likely still forage inside the park in the absence of squirrels because they also feed on other small mammals and reptiles that will forage and breed in the park once the vegetation is established.

Ground squirrels primarily consume plant material while they are feeding, and in doing so, account for a significant amount of natural weed suppression. The weed suppression will not occur in areas where squirrels are removed, but a mowing plan is in place for weed control. In the absence of ground squirrels, it will also be necessary to construct artificial nest burrows for burrowing owls. Park staff would have to regularly clean accumulated debris from the artificial burrows in order to mimic the task that is performed by squirrels. In the absence of any maintenance, burrows will fall into disrepair, the entrances will be blocked, and the burrow will not be used by burrowing owls. Human clearing of owl burrows is not as desirable as ground squirrel clearing because there may be subtleties associated with ground squirrel co-habitation that cannot be mimicked by human management, it adds expense, and it could disturb resident owls. However, if the regulatory agencies prohibit ground squirrel use in portions of the landfill where burrowing owl nesting habitat is installed, the next best approach is for humans to keep the burrow entrances clear.

Other maintenance activities for owls include mowing and clearing of burrow habitat. Shrubs can be left in the forage habitat, but should be removed in the burrow habitat. Burrowing owls prefer open foraging areas, so fewer shrubs are optimal habitat. Shrubs also provide cover and perching sites for burrowing owl predators such as feral cats and raptors, so are not beneficial to areas set aside as burrow habitat.

The Interim Byxbee Park Hills Concepts Plan will establish wildlife in an area where almost none exists at the moment. Flushing distances are meaningful in situations where extremely sensitive wildlife are already established and where a new disturbing activity is being undertaken. At Byxbee Park Hills a baseline of human activity has been established, and wildlife that can function within that baseline level will colonize the area, while disturbance-sensitive species may not. Shoreline Park is an excellent example that burrowing owls will become established in areas with the level of activity that can be expected at Byxbee Hills Park. Adaptive management strategies, including the addition of perimeter mounds or fencing to decrease disturbance to wildlife, can be undertaken if it becomes obvious that they are needed.

Other Wildlife. Stakeholders asked what wildlife could be expected to occur in the park if burrowing animals are disallowed. Audubon requested that the City build nests or nesting areas for swallows.

In the absence of squirrels, and potentially burrowing owls, once grasslands and other vegetation become established, the typical grassland suite of species will quickly begin to appear. These include invertebrates, field mice, deer mice and voles, gopher snakes and western fence lizards, song birds such as black phoebe, sparrows, California towhee, various flycatchers and aerial insectivores such as swallows, and raptors. At night the park will be used by opossum, raccoon, and owls that occur in the vicinity.

Swallows generally nest on wood, concrete and stucco structures. Due to the issue of subsidence, it is not possible to construct this type of structure on the landfill. Currently the landfill does not support nesting habitat for swallows. Conversion of the landfill to a park does not result in any negative impacts to swallow nesting and foraging habitat, and should increase in foraging habitat area and quality.

Trails and Stairs. Many questions and concerns were raised about trails including the number needed, appropriate trail substrate, off-road travel by maintenance personnel and hikers in their absence, and trail "etiquette". The commission also asked if stairs could be added for runners.

Landfill gas and leachate systems maintenance and monitoring are required by State and Federal regulations. Landfill Staff need adequate pathways to service the hundreds of gas wells, leachate wells, condensate sumps, valves and sampling ports. Staff needs to monitor and perform maintenance on these components on a daily basis. Access is especially limited during the wet season where the ground gets muddy and travel is restricted. Leachate well/pump maintenance requires staff to bring tools, pumps, piping and fittings to the actual well location. Staff needs to be able to drive up to these wells in many cases.

There will be 1,850 feet fewer trails in Phase I than in the original Byxbee Park development. As a result of comments from the stakeholders meeting, staff reviewed the draft interim park concepts and eliminated 1,100 feet of trails in Phases IIA and IIB compared to the first draft, and also removed 150 feet of trails on Phase IIC. After the ad hoc committee meeting, an additional 500 feet of trail was removed. Staff has reviewed the options and has included the least intrusive and minimum number of pathways to service the landfill maintenance systems. These systems are monitored using a low impact vehicle. Ranger vehicles are only driven on sanctioned roads, and Open Space staff does not typically need to drive off the roads and trails. Exceptions are when there is a compelling reason to drive off road, such as a fire or medical emergency, or when the work requires being off-road, such as mowing.

The off-road traffic is not expected to impact wildlife as long as trips are kept to a minimum, access routes are reused for the trip in and out, low driving speed are maintained, and care is taken to maintain a safe distance from wildlife occupying the area. These are in keeping with current practices. In addition, renegade trails created by hikers will be scarified to discourage usage and re-seeded with native seed mix to restore habitat. Signage will be added to indicate sensitive habitat areas.

Trails will be graded and maintained so that they provide a smooth walking surface. They will be made with Class II aggregate baserock to be stable and not rocky.

Stairs cannot be added to the site at this time because of issues related to landfill subsidence, maintenance and repair, and liability concerns.

Park Utility Vehicles. Commenters voiced concerns about the use of large off-road equipment and its impacts on habitat.

The City's primary responsibility is to comply with the legally mandated post-closure plan. As a result, there may be times that heavy equipment is required to be used on the closed landfill/Byxbee Park Hills to repair the landfill cover and protect air and water quality. The required post-closure duties include: (1) maintain the structural integrity and effectiveness of all containment structures, and maintain the final cover as necessary to correct the effects of settlement or other adverse factors; (2) continue to operate the leachate collection and removal system as long as leachate is generated and detected; (3) maintain monitoring systems and monitor the ground water, surface water, and the unsaturated zone in accordance with applicable requirements of Article 1, Subchapter 3, Chapter 3, Subdivision 1 (section 20380 et seq.); (4) prevent erosion and related damage of the final cover due to drainage; and, (5) protect and maintain surveyed monuments [installed under section 20950(d)]

Monitoring activities can be completed with a low impact vehicle. The City purchased a lightweight turf vehicle, to minimize impacts on the trails. The utility vehicle (Kubota brand) is used for monitoring and inspections of the landfill's environmental control systems as well as

performing inspections of the landfill as required by Title 27, Section 21090 (C). It is used for maintenance to the extent possible, based on maintenance needs.

Rock Swale. The Parks and Recreation Commission stated that the rock swale was unattractive. Other commenters asked if the size of the swales shown on the plan maps is correct.

The swales are water quality protection features. They are designed to reduce scouring and erosion and to slow storm water flows off of the landfill and into the bay. The design minimizes adverse impacts to water quality, and the rock swales are an important water quality compliance feature. The size of the swales shown on the plan maps was checked and the correct sizes are shown on the updated plans.

Public Art. Commenters expressed a desire for fewer public art features.

No additional public art is proposed as part of the interim concepts.

Signage. The Commission felt that signage restricting access to maintenance pathways may be bypassed and ignored by the public, that signs for sensitive habitat and “trail etiquette” are necessary, and interpretive signs for nature and art are desirable. Some like the signage presented in the Interim Park Concepts, and others did not.

The Architectural Review Board reviewed the plans and gave staff guidance on the Byxbee Park Hills destination sign.

The proposed signs for the Byxbee Park Hills were reviewed by staff in response to comments. Please see the current plan set for proposed signs, which meet the Baylands Design Guidelines.

Graphical Presentation of Plan. A commission member commented that contour lines were incorrect on maps of the Park, and that it was not clear why certain areas are restricted to trail development.

The contour lines provided on the map are correct. The maps have been revised to clarify elevations and slopes, and the plans include a different line type so the contours are easier to read. The trail map was developed by a landscape architect with trail expertise, and with sensitivity to City staff concerns about trail design and maintenance. City Public Works and Open Space staff have collaborated to develop the minimum necessary trail network.

3.3 Existing Park Facilities and Activities

3.3.1 Park Amenities

Trails. The Byxbee Park Hills currently contains trails that connect to other portions of the Baylands Preserve and to Shoreline Park in Mountain View. The trail system is currently limited to the portions of the landfill that are opened as parkland (phases I, IIA and IIB)

Public Art. Public art in the Byxbee Hills Park includes several features installed around 1990. These features include a k-rail chevron, a pole field, and a wind wave structure.

Habitat. The park currently provides ruderal grassland habitat for wildlife, including the burrowing owl. It does not provide habitat for the special-status species that occur in the salt marsh, except possibly where the upland habitat exists immediately adjacent to salt marsh. In those areas it is feasible that salt marsh harvest mouse could travel a short distance into the upland habitat, particularly if there is a high tide and it needs to move out of the pickleweed marsh.

Park Signs. There are two metal signs in the Byxbee Park Hills, including the original aluminum sign in the parking lot, and a general Baylands Nature Preserve sign about rules. Elsewhere in the Baylands Preserve there are wooden signs in the Design Science (Carl Rohr) style.

Furniture. The park currently contains two wooden benches on the top and 15 wooden benches located along the Bayshore Trail on the perimeter of Byxbee Park Hills.

3.3.2 Hours of Operation and Typical Park Use

The hours of operation are 8 a.m. to sunset. Typical park use is passive, including walking/hiking/running, bird/nature watching, mountain biking, and dog-walking. A recent poll of 117 park users found 57 percent of the users were pedestrians, 24 percent were bicyclists, and 19 percent were walking dogs.

3.4 Current Landfill Monitoring and Maintenance

California regulations mandate that the landfill be managed and maintained throughout a minimum 30-year post-closure period based on an approved post-closure maintenance plan. The primary purpose is to protect the integrity of the landfill cover, and monitor and to minimize impacts to air and water quality by managing landfill gas and leachate. The City of Palo Alto Public Works Department is responsible for landfill maintenance and management throughout the 30 year post-closure period. Activities include importing soil and re-grading to correct areas where the surface of the landfill has settled so that water does not pond, seep into the refuse and create leachate, maintenance and repair of gas wells, pipes, and sumps, and leachate wells and pipelines, and monitoring of leachate and gas extraction wells and piezometers. Emergency repairs to these facilities may also be necessary. The laws that govern the landfill operation and maintenance are described in Appendix B.

The landfill gas and leachate collection/monitoring facilities are largely concentrated in the central areas of the landfill, with the perimeters having fewer areas that will require regular access for maintenance. There is an unavoidable need for earth moving equipment, utility vehicles and personnel to be able to access all areas of the landfill and park. Vehicles will remain on maintenance roads as much as possible.

The landfill is comprised of several layers, including the waste layers, a cover layer or “cap” and a vegetation layer. The cap is designed to minimize the release of landfill gas and leachate, and to prevent infiltration of surface water. The landfill has been developed and closed in phases. Phase I, Phase IIA and Phase IIB are capped with a 12-inch thick clay cover. Phase IIC will be capped with a 4-foot deep evapotranspirative (ET) soil cover in 2015.

Landfill leachate is monitored with 17 piezometers placed within the four phases of the landfill. Leachate is pumped from the landfill through a network of 23 existing extraction wells equipped with pneumatic pumps. The leachate is pumped to the City’s sanitary sewer for treatment. A perimeter groundwater monitoring well system is used to monitor the surrounding groundwater in case there is a release of contaminants, from the buried waste. The groundwater monitoring system consists of 13 existing wells and sampling points located around the facility perimeter. A perimeter drainage control system collects surface runoff as part of the landfill drainage and erosion control system. Runoff is collected in v-ditches that discharge to catch basins that discharge to surrounding water bodies. Runoff is also collected on the top deck of the landfill using berms and buried storm water inlets and pipes

Five gas monitoring probes to monitor potential landfill gas migration are spaced at 300 to 500 foot intervals along the property boundary shared with the Palo Alto Regional Water Quality Control Plant (PARWQCP). Several structures on the landfill and several structures at the PARWQCP are monitored for the presence of landfill gas as a safety measure. Gas extraction on the landfill is accomplished through a system of 109 wells distributed throughout the landfill. The gas is pumped to a sewage sludge incinerator or an adjacent flare at PARWQCP via a high-density polyethylene (HDPE) network.

Burrowing animals, including primarily the ground squirrel (*Spermophilus beecheyi*), are managed in landfill areas to insure that their burrowing does not damage the clay or evapotranspirative caps. Damage to the cap can allow surface water infiltration and lead to excessive load on the leachate extraction system; it also can result in the release of landfill gas, compromise both leachate and landfill gas extraction systems by damaging piping, and lead to violation of permit conditions.

Ground squirrels are controlled throughout the landfill with a Pressurized Exhaust Rodent Control (PERC) system. The PERC system consists of a trailer-mounted combustion engine that exhausts to a pressurized tank. A mixture of carbon dioxide and carbon monoxide is delivered from the tank to the ground squirrel burrow, via a hose with a probe that is inserted into the burrow entrance for a minimum of three minutes. Once treated, the entrance to the burrow is sealed. Active burrows are identified for treatment by the presence of entering or exiting squirrels and the presence of fresh mounds of dirt or evidence of new burrow excavation. No treatment is applied where there are signs of burrowing owl occupation, including feathers, pellets or other visual indicators of owl presence.

3.5 Existing Park Operation and Maintenance

This section describes existing park operation and maintenance activities. The proposed new maintenance practices are described in Section 4.3, below.

Byxbee Park Hills is a passive use open space area with walking trails located on closed portions of the landfill. Capped and contoured slopes of the landfill have been covered with a layer of topsoil and hydroseeded with native grasses and forbs. The site is not irrigated, but the Phase I, Phase IIA and Phase IIB portions of the landfill that are open to park use have been

revegetated with a combination of annual grasses and forbs. Phase IIC is in the process of being capped and hydroseeded. In December 2014 approximately 18 acres was hydroseeded. The remaining 33 acres is under construction.

The Palo Alto Community Services Department – Open Space, Parks and Golf Division is responsible for the maintenance of the Byxbee Park Hills facility, apart from the landfill maintenance activities that are implemented by Public Works. The City has assigned these maintenance activities to a contractor. For the purposes of maintenance, the park is divided up into three areas color coded as green, yellow and red (see Figure 4 in Appendix A). Areas color coded in green are maintained each year unless repair to the landfill cap is ongoing. Areas coded in yellow are still being capped. Areas coded in red were maintained beginning in 2014. Maintenance requirements include vegetation management, trail repair, and repair of park amenities. Maintenance activities include mowing, trail grading and filling, revegetation, coyote brush removal, maintenance of signs and benches, and application of herbicide. The current maintenance practices are described below.

Mowing. Currently mowing is conducted in May as a weed maintenance measure and to provide sunlight to native perennials. All hydroseeded areas are mowed to a height of four to six inches, with mowing repeated as necessary to meet these height specifications. Mowing is conducted with a wheeled tractor fitted with a flail or rotary mower. A modified mowing regime to increase the prey base for burrowing owl (and other raptors) is proposed (see Section 4.3, below).

Trail Maintenance. Six to 12-foot wide pedestrian and cycling trails were originally constructed using an oyster shell, and baserock, but these have been replaced with ten to 12-foot paths consisting of Class II aggregate baserock. Current maintenance methods used to maintain unobstructed access along these pathways include spot treating weeds with herbicide. “Renegade paths” created by cyclists and hikers who stray from established routes are rototilled and seeded on an as-needed basis. Seeding occurs in winter months. Trails are repaired by regrading and filling potholes or low spots as needed.

Revegetation. Two general methods of reseeding can occur at the Byxbee Park Hills – mechanical and hydro-seeding. Prior to reseeding the soil will be loosened either by discing, chiseling, or rototilling to a depth of six to eight inches. For mechanical seeding the seed and fertilizer will be broadcasted then harrowed and ring-rolled. For hydroseeding, a balanced fertilizer is first applied to the loosened soil at a rate of 50 pounds per acres, and two inches of compost are tilled into the soil. Next, seed mixture is hydroseeded over the prepared area. The current hydroseed mixture⁴ includes the following species:

- California brome (*Bromus carinatus*)
- Blue wild rye (*Elymus glaucus*)
- Small fescue (*Vulpia microstachys*)
- Native clammy clover (*Trifolium obtusiflorum*)

Coyote Brush Removal. Under current maintenance activities coyote brush is regularly removed from the park to prevent coyote brush roots from penetrating the landfill cap. Coyote brush is removed concurrently with annual mowing.

⁴ Seed mixtures will be selected based on area-specific needs (erosion control, ecotype, etc.). Additional seed mixes could include species approved in the Final Closure and Post-Closure Monitoring Plan (December 2013), or from the list of seeds in the “Proposed Hydroseed Species” list on drawing L-1 – Interim Construction Plan.

Application of Herbicide. Herbicides are not a preferred means of vegetation control, and are used with written permission of the Supervising Ranger and in accordance with state and local regulations. Staff follows the City's Integrated Pest Management (IPM) policies and tries other methods to remove weeds before using herbicides. Herbicides are only applied in designated areas and time frames. As noted above, weeds on trails are spot treated with herbicides. Herbicides may also be used to control noxious and/or highly invasive weeds that form dense stands and reduce wildlife habitat quality if other methods are determined to be ineffective.

4. Proposed Interim Park Concepts

4.1 Park Amenities

Trails. The trails and maintenance paths are proposed to be ten feet wide. The trails will be composed of Class II aggregate base rock. Redundant or unnecessary trails have been removed, and trail alignments have been modified in a few areas to improve the park experience. The existing bayshore trail which connects Byxbee Park Hills to Baylands trails to the north and south will remain in its existing alignment.

The trail system is composed of accessible trails most of which are less than 5 percent grade while the maintenance roads (dual-use trails) can be up to 8 percent grade. Accessible routes include both destination and loop trails that start at the parking lot.

Benches. The park concepts plan provides for up to 15 benches placed to take advantage of surrounding views and provide opportunities to view wildlife, particularly birds (Figures 2, 3, and 4) in addition to benches provided at the vegetative island groupings and the group gathering node (see Figure 2, Sheet L-2, and Figure 3, Sheet L-3.1). The proposed bench design is wooden slats on a curved steel frame, with the option for a dedication plaque. Benches in the vegetative island groupings would consist of a segmental seatwall bench, and seating in the group gathering node will include benches that face outward to take advantage of the views.

Signs. Signs proposed in the interim park concepts include park entry signage (1), park interpretive signs (5), trail marker signs (4), and park regulation signs (4). See Figure 2, Sheet L-3 for sign designs and Figure 2 for conceptual locations. All signs comply with the Palo Alto Baylands Design Guidelines.

The proposed park entry sign is a second tier sign in accordance with the Baylands Design Guidelines and approved by the City's Architectural Review Board.

The park interpretive signs are intended as an educational tool to interpret unique natural, cultural and historic features, as well as management activities for park visitors. These signs are placed at trail nodes and overlooks, and a total of five signs are shown in the concept plan. They are composed of a 42-inch PVC/MDO panel printed with informational graphics surrounded by a two-inch frame on a 16-inch square wood base. They are four feet high.

The five trail markers are placed where users enter the park and at the group node. Each indicates where the user is located on an illustrative map, and shows all of the trails and their distances as well as park amenities. They have the same design as the park interpretive sign.

Up to four park regulation signs are sited in the park, at park entrances and at one vegetative island grouping near the parking lot. These signs indicate important park-specific regulations.

They are two feet wide and four feet tall with 4x4 square redwood top and bottom rails, an R7 aluminum sign panel (18x24 inches), and two 4x4 square redwood posts.

Vegetation. Most of the Byxbee Park Hills will be planted with grassland in order to maintain the integrity of the landfill cover, which could be compromised by deeper rooted plants. Steeper sloped areas will not be mowed as often as the flatter areas on the hilltops, so there will be a variation in vegetation height. In order to provide some visual relief and wildlife habitat, the Byxbee Park Hills Interim Park Concepts plan includes up to eight vegetated islands (Figure 2, and Figure 3, Sheet L-2.1). A limited number of islands will be constructed on a pilot basis before all of the islands are installed. These are areas designed as mounds above the landfill cover, with an HDPE liner underneath to protect the landfill cap. The additional protection allows for planting shrubs and perennials, including sage, manzanita, coyote bush, California lilac, buckwheat, lupine, and native grasses. Please see Figure 2, Sheet L-3 for a list of proposed species. These will be installed on a pilot basis, so that their success and technology can be tested.

Rock-lined Swales; Bridges. The finished landfill slopes include five swales which will be lined with rock by Public Works to prevent erosion of the landfill cover (Figures 2 and 3, Sheet L-1.1). Bridges are necessary in some areas for trails crossing these swales. The bridge design consists of stacked segmental block walls with drainage culverts. The locations and an example picture are shown in Figure 2, sheets L-1 and L-2. There are two existing bridges that will remain, and there is one proposed bridge in the concept plan (see Figure 2, Sheet L-1 and Figure 3, Sheet L-1.1).

4.2 Burrowing Owl Management Plan

Management actions for the burrowing owl take into account both landfill regulatory requirements and the ecological needs of the owl. These actions will only be implemented if the Burrowing Owl Management Plan is approved by the regulatory agencies. Long term maintenance and management of the landfill includes monitoring of and repairs to landfill control systems and the landfill cover. Large-scale repair to areas where landfill subsidence occurs is also anticipated. While the schedule of some of this work can be planned for the non-breeding season for burrowing owls, emergency repairs may also be necessary. Management actions addressed in the Burrowing Owl Management Plan (attached in Appendix C) include ground squirrel control, public use and access, vegetation management, creation and maintenance of artificial burrow sites, feral cat (*Felis silvestris catus*) control, and long-term monitoring. These are summarized in Table 2. The measures that are included in the Burrowing Owl Management Plan will benefit other grassland wildlife species as well, including small mammals, raptors, song birds, reptiles, and invertebrates.

Table 2 Summary of Burrowing Owl Management Activities

Activity	Timing	Condition	Action	Precautions
Install artificial owl burrows	September to February		Area 1: construct 1 nest burrow, 3 satellite burrows according to plans in Barclay 2008. Area 2: construct 2 nest burrows, 3 satellite burrows. Area 3: construct 1 nest burrow, 2 satellite burrows.	Burrow construction is predicated on approval by landfill regulatory agencies, which may impose additional requirements.
Install habitat features such as rock piles and mulch piles	September to February	Install these features where rodents and insects are infrequently observed and/or vegetation has not yet become established.	Create a minimum of 5 rock piles and 20 brush/mulch piles up to a maximum of 50 habitat features for owl prey species throughout both nesting and foraging areas. To make rock piles, stack 15 to 17 6-inch minus-sized rocks, rip rap or similar. Mulch piles will consist of chipped wood, scattered to a depth of approximately 3-4” over a 100 ft ² area. Brush piles Will consist of piles of sticks or twigs, or grasses piled approximately 2 to 3 feet high by about four feet wide. See attached for possible locations and example photos. Maintenance, such as weeding of the habitat features is not required.	Tentative locations may be subject to approval by landfill regulatory agencies.
Install instructional signage	As soon as feasible after approval of the Interim Park Plan.		Along the edge of pathways bordering nesting habitat, install signage stating “Sensitive Wildlife Area. Please Stay Out”. Consider adding signage which says, “Sensitive Wildlife Area. Do not dump or feed cats” and “Please no dog walking in this area. Keep dogs on a leash at all times”.	Keep signage vague to discourage vandalism of burrows or harassment of nesting owls.
Mowing of forage habitat	Twice Yearly - April and May		Mow at the minimum frequency necessary for fire and weed control. The goal is to create foraging habitat with sufficient cover for small rodents and insects. Slopes with a grade steeper than 25% will be mowed at a decreased frequency to help create a mosaic of different vegetation heights throughout the forage habitat. Where weeds form dense, single-species stands in the forage habitat, mowing frequency can be increased. Mowing may also be combined with other methods of weed control in these areas. Where vegetation cover is sparse consider adding mulch or brush piles.	Avoid mowing at dawn or dusk when owls are normally active.

Activity	Timing	Condition	Action	Precautions
Mowing of burrow habitat	Twice Yearly – February and November if owls are present. Feb, May, August and November if owls are not present. Mowing in the vicinity of active burrows may be done under the guidance of a qualified biologist and must follow the guidelines of the CDFW Staff Report (2012).	Mow to keep vegetation at a height of approximately 5 inches or less.	Conduct preconstruction surveys for nesting owls prior to undertaking mowing between February and August. If an active owl nest burrow is found, an avoidance buffer of 250 feet should be established. No mowing should occur inside that buffer. In consultation with a qualified biologist, an impact assessment can be conducted and if appropriate, buffer sizes may be reduced in accordance with the CDFW Staff Report on Burrowing Owl Mitigation (2012). Do not string trim breeding habitat areas. Mow only.	No mowing should occur within 250 feet of any active burrowing owl nest burrow unless a qualified biologist has conducted an impact assessment and established alternative buffer distances in accordance with the guidelines established in the CDFW Staff Report on Burrowing Owl Mitigation (2012)
Artificial burrow maintenance	Annually in early spring. February is suggested.	Debris accumulated at the burrow entrance.	Conduct a survey for overwintering burrowing owls prior to clearing. Do not conduct maintenance on occupied burrows. Clear the PVC tubing that makes up the burrow entrance of any obstructions along its entire length using a plumbing snake such as a General Pipe Cleaners D-25-2 Handy Drain Auger.	Do not conduct maintenance on burrows occupied by burrowing owls.
Feral cat control.	As needed	Cats are observed in the Park.	Live trap and transport to Palo Alto Animal Care and Control.	The non-native red fox (<i>Vulpes vulpes</i>) may also occur at Byxbee Park Hills and is known to prey on ground-nesting birds. Contact United States Department of Agriculture for guidance on fox control should they be observed.
Landfill maintenance activities	As needed	Emergency or routine landfill maintenance is needed.	Conduct a survey for burrowing owls prior to conducting any landfill maintenance activities. Burrowing owls could potentially occupy a variety of natural and man-made features throughout the area, so surveys should be conducted to ensure that maintenance activities do not impact owls. If owls are found to be present within 250 feet of work in the breeding season or within 170 feet of work in the non-breeding season, contact CDFW for guidance.	If owls are detected during the breeding season, a 75-meter (~250 feet) avoidance buffer should be maintained around any occupied burrow until young have fledged. If owls are detected during the non-breeding season a 50-meter (~170 feet) avoidance buffer should be established for the duration of the activity or until owls are no longer present. In the event landfill compliance emergencies require immediate relocation of owls, owls should be passively relocated by a trained biologist in consultation with the California Department of Fish and Wildlife.

Activity	Timing	Condition	Action	Precautions
Vegetation survey for grass height and weed control	Late January, April, July and October.			
Monitoring burrowing owl use	3 times spaced apart during the breeding season (suggest March, June, August); CNDDDB report once per year	Survey each burrow habitat area for signs of owl use at the burrow entrances; document which burrows are in use. Observe burrow and forage areas for owl activity at dawn and at dusk. Report burrow survey results to landfill and park maintenance staff so that avoidance measures can be implemented if necessary. Report sightings to the California Natural Diversity Database annually (https://www.dfg.ca.gov/biogeodata/cnddb/submitti ng_data_to_cnddb.asp). If burrowing owls are not observed, the Supervising Ranger should consider measures to improve habitat conditions such as by altering the mowing regime, changing mowing heights, or increasing the number of prey habitat features (e.g., rock, brush, mulch piles).		
Monitoring burrowing owl habitat quality.	3 times spaced apart during the breeding season (suggest March, June, September)	Maintain overall vegetation cover at approximately 70%, and no less than 50%. No more than 50% of all areas of the park intended to be vegetated either with hydroseed or other planting, should remain bare ground. If 70% vegetative cover is not achieved, staff will review remediation measures to increase the vegetative cover, such as re-seeding with a revised seed mixture.	Survey rock, mulch and brush piles for presence of small mammals and insects. Conduct a visual inspection of the rock piles for small mammals, and/or signs of mammal use such as droppings, flattened grasses. Inspect brush piles by lifting material with a shovel or similar to see if rodents, insects or other prey species move out of the pile when disturbed. Report results to the Supervising Ranger. If prey species are not present, the Supervising Ranger should consider decreasing the mowing frequency, repeating hydroseed application, and/or adding more habitat features such as rock, mulch and brush piles.	If vegetation is too sparse, burrowing owl prey species are unlikely to be present, and burrowing owl habitat would be considered of low quality. If vegetation is too tall in dense stands, burrowing owls will not be able to access the habitat to forage or breed. Dense monotypic stands of invasive weed species should be controlled using methods known to control the particular species. This may include mowing at a particular time of year, hand pulling, applying herbicide, or a combination of methods. Refer to the Maintenance Plan for a more detailed description of weed control techniques.

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4.3 Park Operation and Maintenance Activities and Best Management Practices

The proposed park maintenance activities are described below, and an estimated schedule is presented in Table 3.

Trail Maintenance. Trails will be inspected routinely by Open Space staff for disrepair, and a trail maintenance request will be provided to the Supervising Ranger. Trails will be re-graded, filled and re-compacted during the dry season. This may include grading/filling low spots/eroded areas with trail material and compacting the material to assure water does not pond on the trails, water runoff does not cause erosion, and safety hazards are repaired. Repairs will be completed annually or according to a schedule approved by the Supervising Ranger, and will be done during the dry season.

Vegetation will be removed from the trails on a regular basis either by hand (with tools) or with herbicide as approved by the Supervising Ranger. The schedule will be determined by the Supervising Ranger and may be combined with other vegetation management schedules and contracts, and may be completed by a contractor or by a City employee as deemed appropriate by the Supervising Ranger.

Maintenance of Signs, Benches, Site Furnishings. Signs, benches and other site furnishings will be inspected routinely by Open Space staff for disrepair, and a maintenance request will be provided to the Supervising Ranger. Maintenance may include repair to posts/legs to insure they are plumb and the footing(s) are adequately covered and compacted, removal of graffiti or repair of other vandalism, and repainting or replacement as needed and included in the Parks budget.

Mowing Steep Slopes. Woody plants outside of the vegetation islands that are allowed to grow in areas where they will not compromise the landfill cover will be trimmed by hand as necessary to remove dead material, and will not be mowed. Grassland slopes will be mowed as specified in the Burrowing Owl Management Plan (see below) if necessary. See the weed management program for treatment of invasive/noxious weeds; in some cases heavy infestations require a different method of treatment that does not include mowing.

Mowing Slopes Less Than 25%. These areas are subject to the same treatment specifications as the steep slopes. The slopes are called out because different equipment may be necessary on steep slopes.

Mowing Western Burrowing Owl Breeding and Foraging Habitat. Grasses and weeds will be maintained at a height of less than five inches in the nesting burrow habitat areas to allow an unrestricted view of the surrounding habitat from the burrow. Vegetation that is allowed to grow too tall will discourage owls from colonizing the site and may cause them to abandon a site in which they have overwintered in preference for an area with lower vegetation. A survey for burrowing owls should be conducted in advance of mowing by Open Space staff. Mowing will be conducted in owl breeding areas in February and November if owls are documented to be using the burrows, and in February, May, August, and November if owls are not using the burrows (i.e., avoid mowing when owls are nesting). No mowing should occur within 150 feet of any active nest burrow. Because string trimming is a slower method of weed control, it requires a much more invasive human presence. Mowing will be the principal method of weed management in these areas and string trimmers will not be used when owls are present.

Optimal owl foraging habitat consists of grasslands with a healthy population of small rodents and insects, so mowing of grassland foraging habitat will be conducted yearly in April and May,

and for the remainder of the year it will be done only at a frequency necessary for fire suppression.

Weed Management in the Vegetative Island. Noxious weeds and invasive plant species, as defined by the California Invasive Plant Council or Open Space staff, will be removed from the vegetation islands by hand or with hand tools four times per year, or more frequently if approved by the Supervising Ranger.

The irrigation system to the vegetation islands will be inspected at least monthly for 3 years after installation to insure the plants are established, and then the inspection period can be reduced as determined appropriate by the Supervising Ranger.

Plants that die in the vegetation islands in the first year will be replaced as recommended through adaptive management practices.

Weed Management in the Hydroseed Areas. Noxious weeds and invasive plant species, as defined by the California Invasive Plant Council or Open Space staff, will be hand pulled, mechanically removed or sprayed with herbicide subject to the approval of the Supervising Ranger. Treatment methods for heavy infestations of noxious weeds and invasive plant species shall be informed by "Weed Control in Natural Areas in the Western United States" published by the University of California Weed Research and Information Center. Weed management will occur four times per year, or more frequently if approved by the Supervising Ranger.

Maintenance of Landscape Art Features. Open Space staff will report any art features maintenance needs to the Community Services Manager responsible for public art.

Maintenance of Swales/Drainage Systems. Rock-lined swales, culverts and other drainage systems will be cleaned of debris and muck once per year, or as determined necessary by the Supervising Ranger. Hand methods are recommended to maintain the integrity of the drainage systems. Erosion damage will be repaired once per year, or as determined necessary by the Supervising Ranger. This work may be done by a contractor or Open Space staff.

General Maintenance Notes. Perform a quarterly check of all areas of the landfill to ensure no sinking or low spots. Re-grade, fill and compact areas where necessary to prevent water accumulation or further ground disturbance. Areas of the final landfill cover that are not successfully vegetated after hydroseeding will be re-seeded to provide erosion control, as determined by Public Works.

Feral cat feeding stations that are found within the park will be removed and whenever they are observed in the park, feral cats will be live trapped and transported to Palo Alto Animal Services.

Table 3. Estimated Maintenance Schedule	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
TRAIL MAINTENANCE					X	X	X	X	X			
MOW OWL NESTING BURROW HABITAT–Owls Absent		X			X			X			X	
MOW OWL NESTING BURROW HABITAT–Owls Present		X									X	
MOW HYDROSEEDDED AREAS		X			X			X			X	
NOXIOUS/INVASIVE WEED MANAGEMENT		X			X			X			X	
BENCHES/SITE FURNISHINGS*				X								
RE-SEED (WEATHER DEPENDENT)										X	X	
IRRIGATION MAINTENANCE			X	X	X	X	X	X	X	X	X	
SWALES/DRAINAGE STRUCTURES*				X								
LANDSCAPE ART FEATURES INSPECTION*			X									

*Annually, timing to be determined by the Supervising Ranger; a suggested month is shown in the table.

4.4 Interim Park Plan Evaluation Schedule and Future Planning

Open Space staff will establish permanent photo-monitoring locations once the park has been developed, and will take photos at these specific locations in at least two seasons during the year. The reason is to document the progression of vegetation growth that benefits park users and wildlife. The photo-monitoring stations need to include burrowing owl burrow habitat, forage habitat in the rest of Byxbee Park Hills, habitat islands, and a landscape overview. The results will be reviewed annually by the Supervising Ranger and if changes are necessary to the maintenance and operation activities to improve vegetation results, the Supervising Ranger will provide recommendations to the head of the Open Space Division and to the Public Works landfill department.

In addition to the photo-monitoring, Open Space staff will keep a log of the monitoring activities conducted under the Burrowing Owl Management Plan, if implementation of the plan is approved by the regulatory agencies.

5.0 Compliance with Baylands Master Plan Goals

Master Plan Goals:

The overall goal of the master plan was to convert the landfill into a rolling pastoral park that would be an environmental asset and a continuation of open space.

In addition, the master plan established the following goals:

- Preserve and expand marshes
- Protect wildlife and restore upland diversity of plants and animals
- Control access to environmentally sensitive areas
- Expand pedestrian and bicycle activities
- Reduce vehicle traffic in the Baylands
- Restrict storage and parking of vehicles
- Prevent additional urban intrusion
- Ensure the landfill area becomes a continuation of natural green space
- Integrate art with the park landscape
- Eliminate telephone and electric wires and poles

Additional goals include the following:

- Create habitat for burrowing owl populations to attempt to bring back historic burrowing owl populations
- Control and remove invasive weeds
- Create a hill and valley effect in the park
- Provide panoramic views of the marsh
- Create an area within the Baylands that provides passive recreational opportunities that are compatible with the goal of conserving and protecting the natural environment

The Byxbee Park Hills Interim Concepts Plan addresses the Baylands Master Plan goals in the following ways:

- The park design is pastoral
- The park offers numerous biking and pedestrian trails that provide access to the entire park and numerous viewing opportunities.
- The trail system in the park provides pathways to keep pedestrians and bicyclists from entering environmentally sensitive areas. The interim plan also incorporates trail marker and park regulations signs to keep pedestrians and bicyclists on the trails and out of environmentally sensitive areas.
- No motorized vehicles except authorized vehicles (i.e., those used by Open Space and/or Public Works staff or their contractors in the course of their duties, or emergency vehicles such as police, fire, medical).
- The park is designed so that it incorporates upland open space and passive recreational activities.
- The park provides panoramic views of the marsh.
- The park provides three locations to create burrowing owl habitat.
- The park design incorporates planting of native grassland and shrub vegetation
- Invasive species and weed management is incorporated into the maintenance plan for the park

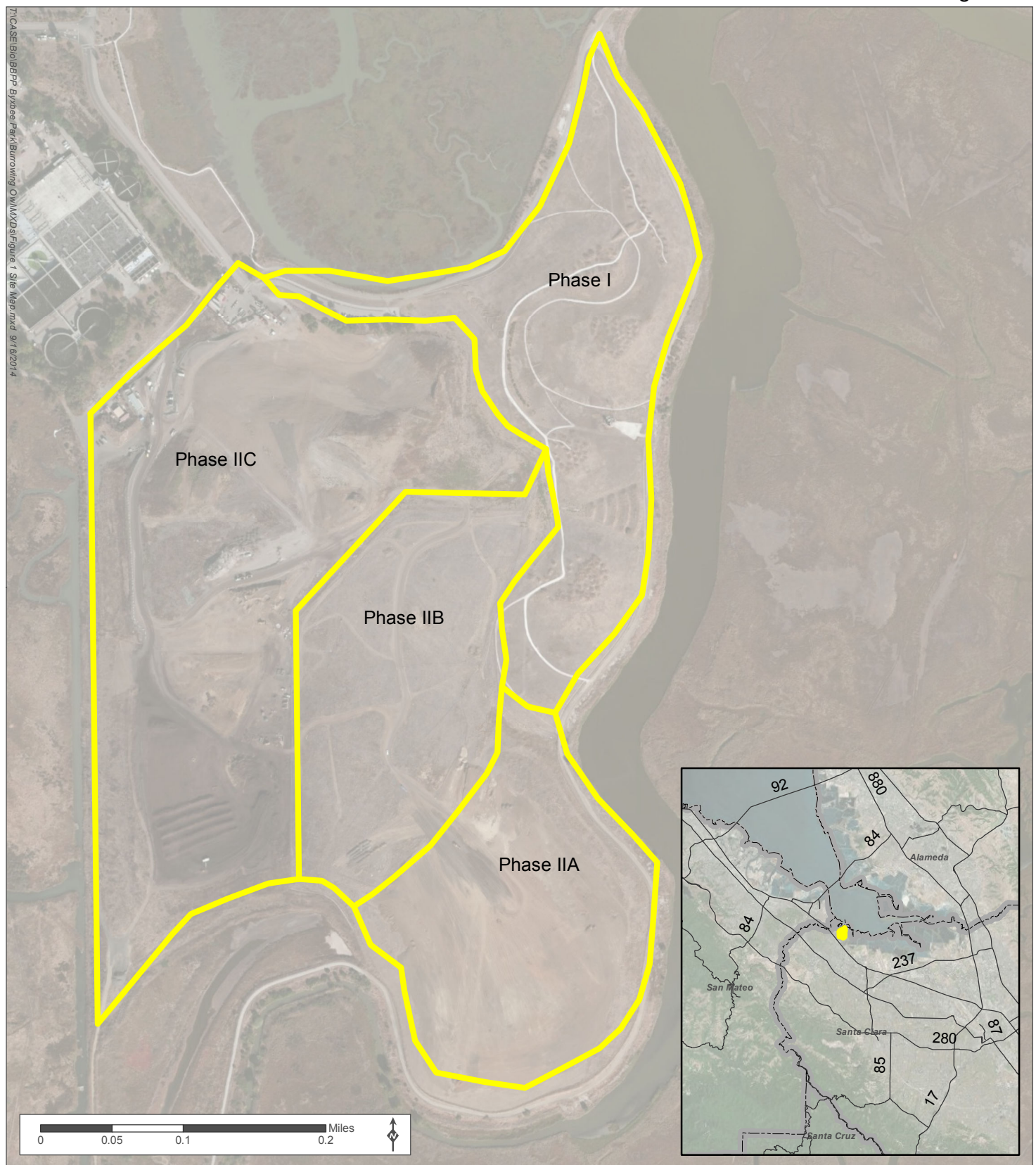
Appendix A: Figures

Figure 1. Project Location

Figure 2. Byxbee Park Hills Conceptual Landscape Plan Site Amenities and Layout (3 Sheets)

Figure 3. Byxbee Park Hills Conceptual Plan Construction Documents (6 sheets)

Figure 4. Byxbee Park Hills Maintenance Areas



Byxbee Park Hills Limits and Closure Phases

Figure 1 Regional and Site Vicinity

Byxbee Park Hills



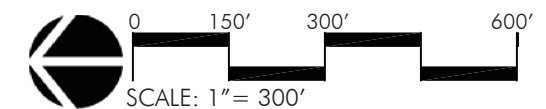
KEYNOTE LEGEND

- ACCESSIBLE TRAIL
- MAINTENANCE PATH
- EXISTING BAYSHORE TRAIL
- ① GROUP GATHERING NODE

- ② PROPOSED BRIDGE
- ③ BENCH(ES) LOCATION
- ④ PROPOSED VEGETATIVE ISLAND(S)
- ⑤ POSSIBLE FUTURE VEGETATIVE ISLANDS (PENDING PILOT EVALUATION)

- ⑥ POTENTIAL BURROWING OWL HABITAT LOCATION
- ⑦ ROCK-LINED DRAINAGE SWALES
- ⑧ MEASURE E AREA (+/- 10 ACRES)
- ⑨ EXISTING BRIDGE TO REMAIN

A SIGN TYPE, REFER TO SHEET L-3 FOR ADDITIONAL INFORMATION



CITY OF
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BYXBEE PARK HILLS INTERIM PARK CONCEPTS PALO ALTO, CALIFORNIA

CONCEPTUAL LANDSCAPE PLAN SITE AMENITIES AND SIGNAGE LAYOUT

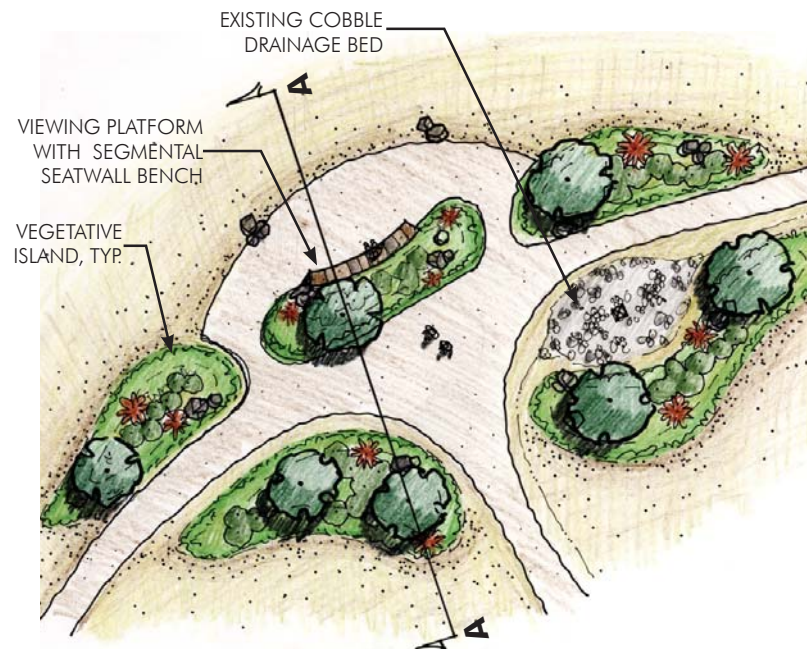


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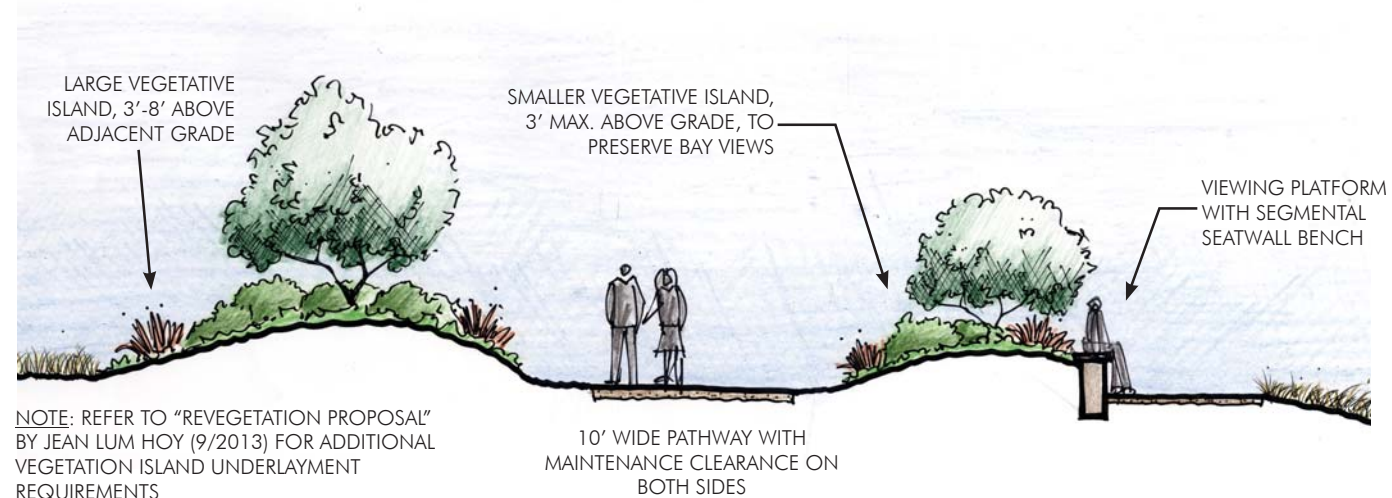


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ASSOCIATES**
LANDSCAPE ARCHITECTURE
+ PLANNING

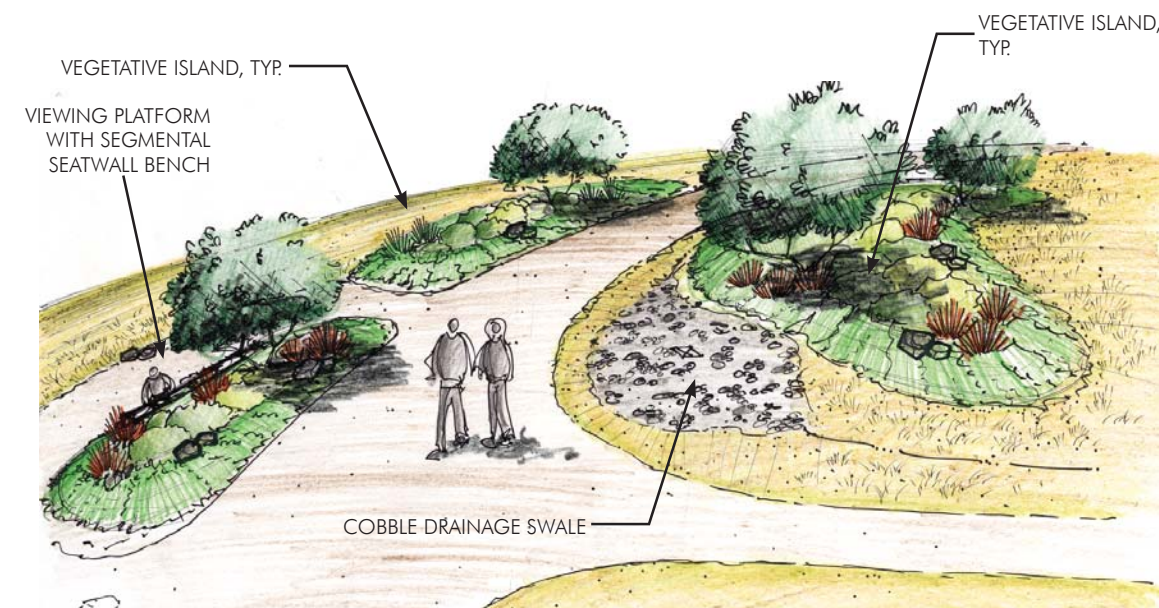
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FEBRUARY 18, 2015



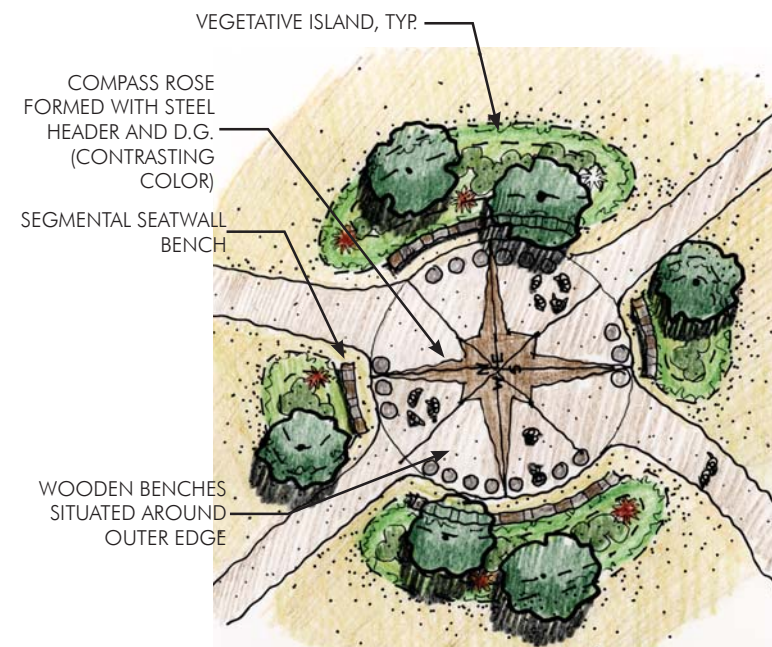
PLAN 'A': VEGETATIVE ISLAND GROUPING WITH VIEWING AREA



SECTION 'A': THROUGH VEGETATIVE ISLAND GROUPING AND VIEWING PLATFORM



PERSPECTIVE 'A': VEGETATIVE ISLAND GROUPING



PLAN 'B': GROUP GATHERING NODE



PROPOSED BENCH
WOODEN SLATS ON CURVED STEEL FRAME,
WITH OPTIONAL DEDICATION PLAQUE



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ALTO**

BYXBEE PARK HILLS INTERIM PARK CONCEPTS
PALO ALTO, CALIFORNIA

CONCEPTUAL LANDSCAPE PLAN
VIGNETTE SKETCHES AND PHOTOS OF AMENITIES



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SCIENCES

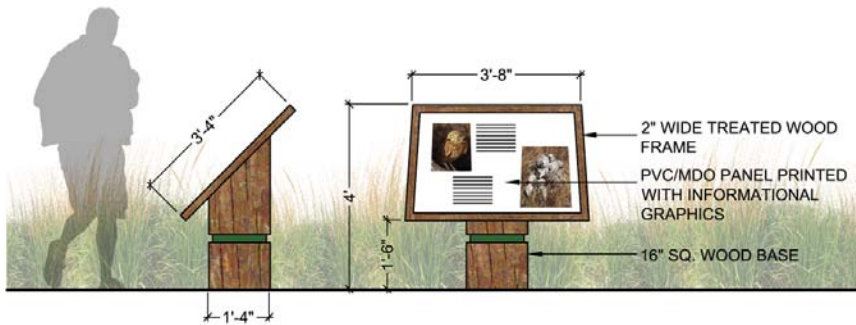


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+ PLANNING

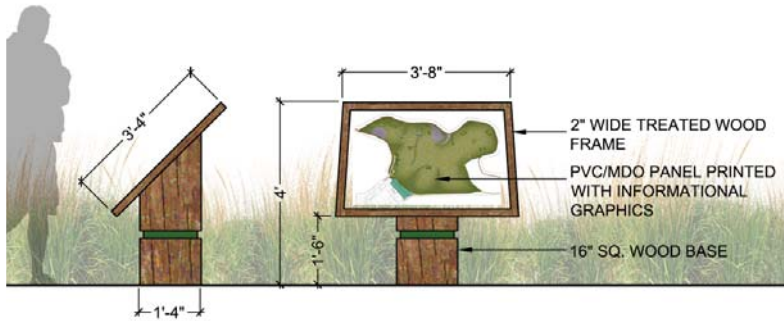
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FEBRUARY 18, 2015



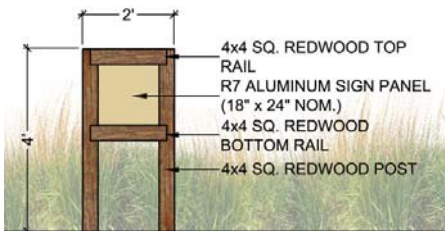
A PARK ENTRY SIGNAGE



B PARK INTERPRETIVE SIGNAGE
TO BE USED AS AN EDUCATIONAL TOOL TO INTERPRET UNIQUE NATURAL, CULTURAL, HISTORIC FEATURES, AND MANAGEMENT ACTIVITIES FOR PARK VISITORS.



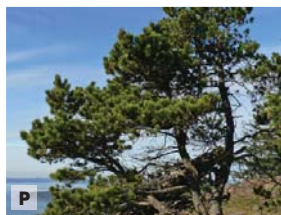
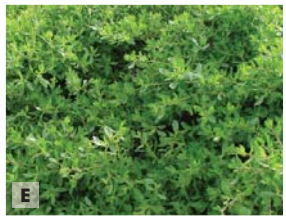
C TRAIL MARKER SIGN
INDICATES WHERE USER IS LOCATED AT ON AN ILLUSTRATIVE SITE MAP. SHOWS ALL TRAILS AND THEIR DISTANCES, AND SITE AMENITIES.



D PARK REGULATION SIGN
INDICATES IMPORTANT PARK-SPECIFIC REGULATIONS.

VEGETATIVE ISLANDS PLANT LIST

SPECIES	COMMON NAME
A <i>Artemisia californica</i>	California Sagebrush
B <i>Arctostaphylos 'Pacific Mist'</i>	Pacific Mist Manzanita
C <i>Arctostaphylos 'Pumila'</i>	Dune Manzanita
D <i>Atriplex lentiformis brewerii</i>	Coastal Quailbush
E <i>Baccharis pilul. 'Pigeon Point'</i>	Coyote Bush
F <i>Ceanothus maritimus</i>	Bluff Lilac
G <i>Ceanothus thrysiflorus</i>	Blue Blossom Lilac
H <i>Eriogonum fasciculatum</i>	California Buckwheat
I <i>Eriogonum nudum</i>	Naked Buckwheat
J <i>Eriophyllum staechadifolium</i>	Yellow Yarrow
K <i>Limonium perezii</i>	Sea Lavender
L <i>Leymus cond. 'Canyon Prince'</i>	Canyon Prince Wild Rye
M <i>Lupinus chamaissonis</i>	Coastal Silver Lupine
N <i>Mimulus aurantiacus</i>	Sticky Monkey Flower
O <i>Muhlenbergia rigens</i>	Deer Grass
P <i>Pinus contorta v. contorta</i>	Shore Pine
Q <i>Salvia mellifera</i>	Black Sage



CITY OF
**PALO
ALTO**

BYXBEE PARK HILLS INTERIM PARK CONCEPTS
PALO ALTO, CALIFORNIA

CONCEPTUAL LANDSCAPE PLAN
PARK SIGNAGE DETAILS AND PROPOSED VEGETATION ISLAND PLANT MATERIAL



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SCIENCES



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LANDSCAPE ARCHITECTURE
PLANNING

L-3

FEBRUARY 18, 2015



3427 MIGUELITO COURT
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Project:

INTERIM PARK CONCEPTS

BYXBEE PARK HILLS
PALO ALTO, CA

Client:

CITY OF
PALO ALTO

PALO ALTO, CA

Sheet Contents:

INTERIM
CONSTRUCTION PLAN

Date:

10/31/14

Revised:

No.	DATE	DESCRIPTION
1	12/15/14	CITY REVIEW
2	1/09/15	MAINTENANCE NOTES
3	2/02/15	CITY REVIEW

Job No.:

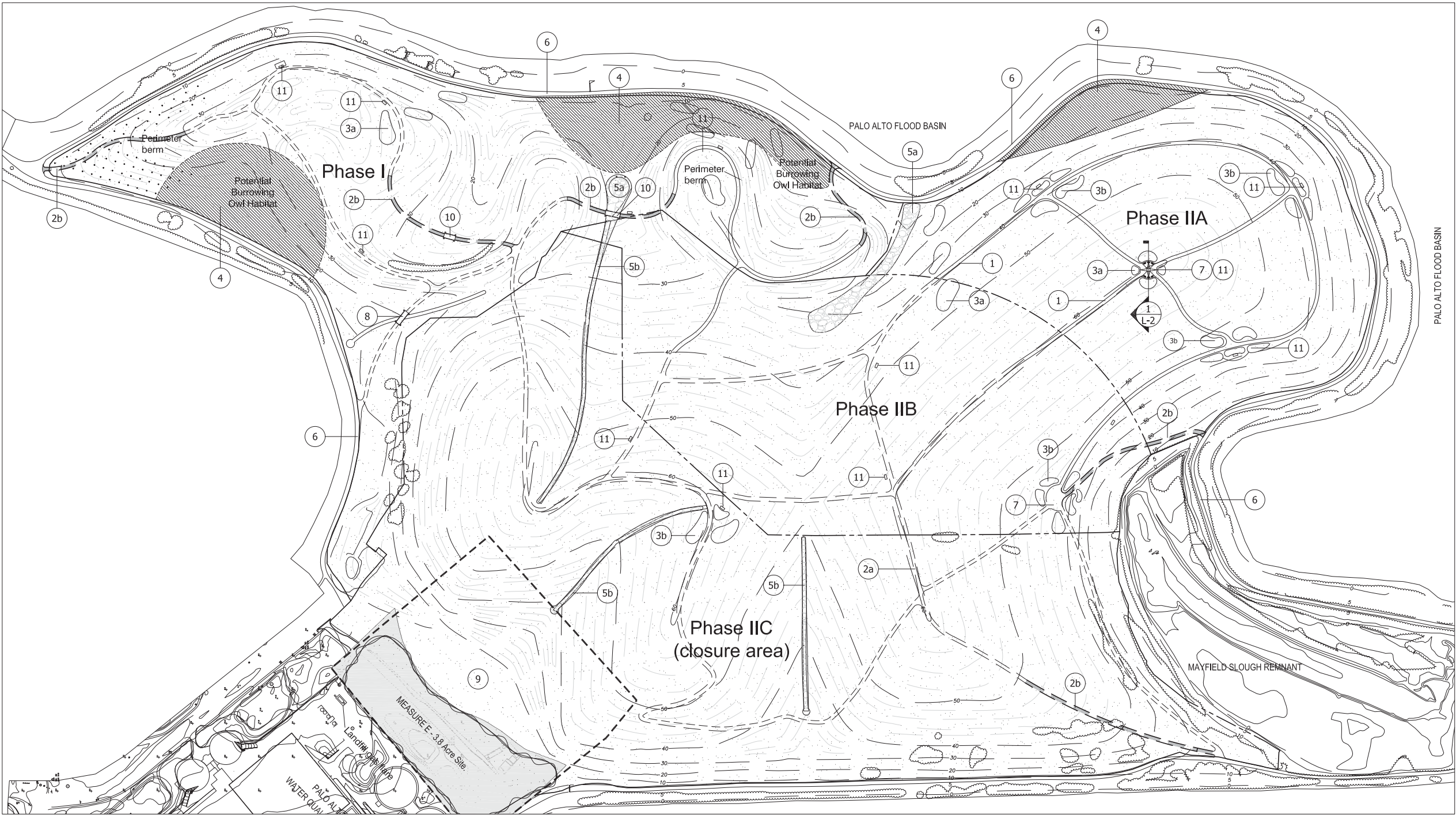
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Sheet:

L-1.1

No.

of



KEY NOTES

1. EXISTING TRAIL SYSTEM TO REMAIN. PROTECT IN PLACE.

2. PROPOSED 10-FOOT WIDE TRAIL SYSTEM:
a. ACCESSIBLE (5% SLOPE MAXIMUM).
b. MAINTENANCE PATH.

3. VEGETATIVE ISLANDS/BERMS: a. PROPOSED. REFER TO DETAIL 1, SHEET L-2.1.
b. FUTURE. NUMBER, TYPES AND LOCATIONS OF VEGETATIVE ISLANDS/BERMS MAY BE EXPANDED BASED ON THE SUCCESS OF THE INITIAL CONCEPTUAL TEST PLOTS. CONCEPTUAL TEST PLOTS TO BE SIZED NO GREATER THAN 8'H. X 90'W. X 60'D. FUTURE INSTALLATION OF VEGETATIVE ISLANDS/BERMS MAY INCREASE AND VARY IN SIZE AND SHAPE.

4. PROPOSED BURROWING OWL HABITAT. REFER TO BURROWING OWL MANAGEMENT PLAN BY TRA ENVIRONMENTAL (OCTOBER 2014).

5. a. EXISTING COBBLE DRAINAGE SWALE. b. PROPOSED COBBLE DRAINAGE SWALE (BY OWNER).

6. EXISTING BAYSHORE TRAIL.

7. GROUP GATHERING NODE.

8. PROPOSED TRAIL BRIDGE. STACKED SEGMENTAL BLOCK WALLS WITH DRAINAGE CULVERTS AND ROCK RIP RAP. BY OWNER.

9. MEASURE 'E' AREA (10 ACRES +/-).

10. EXISTING BRIDGE TO REMAIN. PROTECT IN PLACE.

11. PROPOSED BENCH LOCATION. BENCHES SHALL BE PILOT ROCK #WRB-SWRB-C BLACK (B)-6CO34 OR OWNER APPROVED EQUAL. REFER TO DETAIL 2, SHEET L-2.1.

HYDROSEED MIX (ALL AREAS)

THE PROPOSED HYDROSEED MIXTURE SHALL CONSIST OF THE FOLLOWING SEEDS:

- *Elymus glaucus* BLUE WILDRYE
- *Bromus carinatus* CALIFORNIA BROME
- *Vulpia microstachys* SMALL FESCUE
- *Trifolium obtusiflorum* NATIVE CLAMMY CLOVER
- *Eschscholzia californica* CALIFORNIA POPPY
- *Stipa pulchra* PURPLE NEEDLEGRASS
- *Lupinus nanus* SKY LUPINE

REFER TO SPECIFICATION SECTION 02930 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

GENERAL NOTES

A. REFER TO SHEET L-2.2 FOR MAINTENANCE NOTES.

B. REFER TO SHEET L-3.1 FOR PROPOSED PLANTING AND IRRIGATION.

C. REFER TO SHEETS L-4.1 & 4.2 FOR PLANTING AND IRRIGATION DETAILS.

LEGEND

- EXISTING TRAIL
- PROPOSED ACCESSIBLE TRAIL
- MAINTENANCE PATH
- HYDROSEEDING



SCALE: 1" = 120'-0"

0' 120' 240' 360'



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Project:

INTERIM PARK CONCEPTS

BYXBEE PARK HILLS
PALO ALTO, CA

Client:

CITY OF
PALO ALTO

PALO ALTO, CA

Sheet Contents:

INTERIM
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No.	DATE	DESCRIPTION
1	12/15/14	CITY REVIEW
2	1/09/15	MAINTENANCE NOTES
3	2/02/15	CITY REVIEW

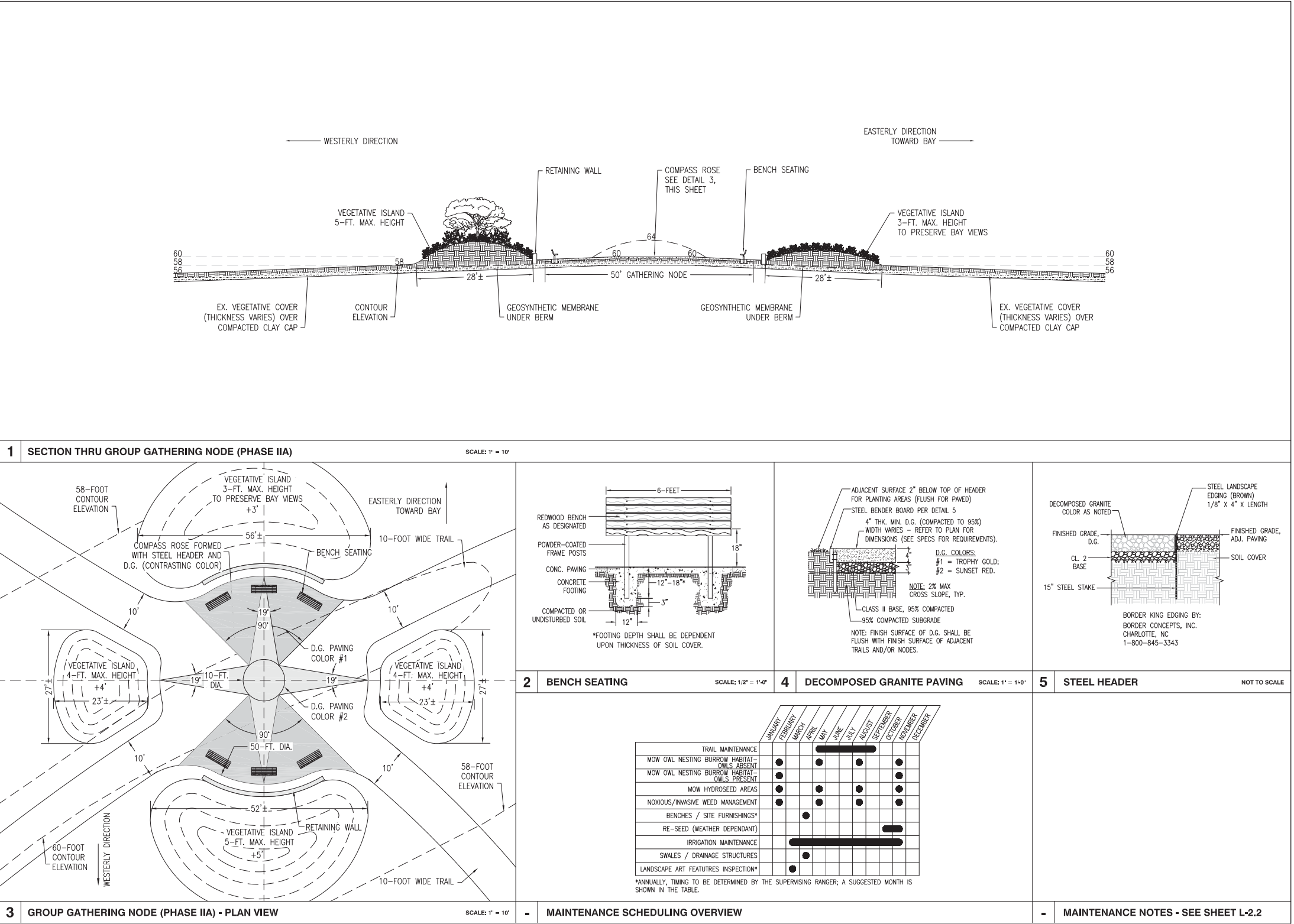
Job No.:

08-0148

Sheet:

L-2.1

No. of



MAINTENANCE NOTES

TRAIL MAINTENANCE. TRAILS WILL BE INSPECTED ROUTINELY BY OPEN SPACE STAFF FOR DISREPAIR, AND A TRAIL MAINTENANCE REQUEST WILL BE PROVIDED TO THE SUPERVISING RANGER. TRAILS WILL BE RE-GRADED, FILLED AND RE-COMPACTED DURING THE DRY SEASON. THIS MAY INCLUDE GRADING/FILLING LOW SPOTS/ERODED AREAS WITH TRAIL MATERIAL AND COMPACTING THE MATERIAL TO ASSURE WATER DOES NOT POND ON THE TRAILS. WATER RUNOFF DOES NOT CAUSE EROSION, AND SAFETY HAZARDS ARE REPAIRED. REPAIRS WILL BE COMPLETED ANNUALLY OR ACCORDING TO A SCHEDULE APPROVED BY THE SUPERVISING RANGER, AND WILL BE DONE DURING THE DRY SEASON. VEGETATION WILL BE REMOVED FROM THE TRAILS ON A REGULAR BASIS EITHER BY HAND (WITH TOOLS) OR WITH HERBICIDE AS APPROVED BY THE SUPERVISING RANGER. THE SCHEDULE WILL BE DETERMINED BY THE SUPERVISING RANGER AND MAY BE COMBINED WITH OTHER VEGETATION MANAGEMENT SCHEDULES AND CONTRACTS, AND MAY BE COMPLETED BY A CONTRACTOR OR BY A CITY EMPLOYEE AS DEEMED APPROPRIATE BY THE SUPERVISING RANGER.

MAINTENANCE OF SIGNS, BENCHES, SITE FURNISHINGS. SIGNS, BENCHES AND OTHER SITE FURNISHINGS WILL BE INSPECTED ROUTINELY BY OPEN SPACE STAFF FOR DISREPAIR, AND A MAINTENANCE REQUEST WILL BE PROVIDED TO THE SUPERVISING RANGER. MAINTENANCE MAY INCLUDE REPAIR TO POSTS/LEGS TO INSURE THEY ARE PLUMB AND THE FOOTING(S) ARE ADEQUATELY COVERED AND COMPACTED, REMOVAL OF GRAFFITI OR REPAIR OF OTHER VANDALISM, AND REPAINTING OR REPLACEMENT AS NEEDED AND INCLUDED IN THE PARKS BUDGET.

MOWING STEEP SLOPES. WOODY PLANTS OUTSIDE OF THE VEGETATION ISLANDS THAT ARE ALLOWED TO GROW IN AREAS WHERE THEY WILL NOT COMPROMISE THE LANDFILL COVER WILL BE TRIMMED BY HAND AS NECESSARY TO REMOVE DEAD MATERIAL, AND WILL NOT BE MOWED. GRASSLAND SLOPES WILL BE MOWED AS SPECIFIED IN THE BURROWING OWL MANAGEMENT PLAN (SEE BELOW) IF NECESSARY. SEE THE WEED MANAGEMENT PROGRAM FOR TREATMENT OF INVASIVE/NOXIOUS WEEDS; IN SOME CASES HEAVY INFESTATIONS REQUIRE A DIFFERENT METHOD OF TREATMENT THAT DOES NOT INCLUDE MOWING.

MOWING SLOPES LESS THAN 25%. THESE AREAS ARE SUBJECT TO THE SAME TREATMENT SPECIFICATIONS AS THE STEEP SLOPES. THE SLOPES ARE CALLED OUT BECAUSE DIFFERENT EQUIPMENT MAY BE NECESSARY ON STEEP SLOPES.

MOWING WESTERN BURROWING OWL BREEDING AND FORAGING HABITAT. GRASSES AND WEEDS WILL BE MAINTAINED AT A HEIGHT OF LESS THAN FIVE INCHES IN THE NESTING BURROW HABITAT AREAS TO ALLOW AN UNRESTRICTED VIEW OF THE SURROUNDING HABITAT FROM THE BURROW. VEGETATION THAT IS ALLOWED TO GROW TOO TALL WILL DISCOURAGE OWLS FROM COLONIZING THE SITE AND MAY CAUSE THEM TO ABANDON A SITE IN WHICH THEY HAVE OVERWINTERED IN PREFERENCE FOR AN AREA WITH LOWER VEGETATION. A SURVEY FOR BURROWING OWLS SHOULD BE CONDUCTED IN ADVANCE OF MOWING BY OPEN SPACE STAFF. MOWING WILL BE CONDUCTED IN OWL BREEDING AREAS IN FEBRUARY AND NOVEMBER IF OWLS ARE DOCUMENTED TO BE USING THE BURROWS, AND IN FEBRUARY, MAY, AUGUST, AND NOVEMBER IF OWLS ARE NOT USING THE BURROWS (I.E., AVOID MOWING WHEN OWLS ARE NESTING). NO MOWING SHOULD OCCUR WITHIN 150 FEET OF ANY ACTIVE NEST BURROW. BECAUSE STRING TRIMMING IS A SLOWER METHOD OF WEED CONTROL, IT REQUIRES A MUCH MORE INVASIVE HUMAN PRESENCE. MOWING WILL BE THE PRINCIPAL METHOD OF WEED MANAGEMENT IN THESE AREAS AND STRING TRIMMERS WILL NOT BE USED WHEN OWLS ARE PRESENT. OPTIMAL OWL FORAGING HABITAT CONSISTS OF GRASSLANDS WITH A HEALTHY POPULATION OF SMALL RODENTS AND INSECTS, SO MOWING OF GRASSLAND FORAGING HABITAT WILL BE CONDUCTED YEARLY IN APRIL AND MAY, AND FOR THE REMAINDER OF THE YEAR IT WILL BE DONE ONLY AT A FREQUENCY NECESSARY FOR FIRE SUPPRESSION.

WEED MANAGEMENT IN THE VEGETATIVE ISLAND. NOXIOUS WEEDS AND INVASIVE PLANT SPECIES, AS DEFINED BY THE CALIFORNIA INVASIVE PLANT COUNCIL OR OPEN SPACE STAFF, WILL BE REMOVED FROM THE VEGETATION ISLANDS BY HAND OR WITH HAND TOOLS FOUR TIMES PER YEAR, OR MORE FREQUENTLY IF APPROVED BY THE SUPERVISING RANGER. THE IRRIGATION SYSTEM TO THE VEGETATION ISLANDS WILL BE INSPECTED AT LEAST MONTHLY FOR 3 YEARS AFTER INSTALLATION TO INSURE THE PLANTS ARE ESTABLISHED, AND THEN THE INSPECTION PERIOD CAN BE REDUCED AS DETERMINED APPROPRIATE BY THE SUPERVISING RANGER. PLANTS THAT DIE IN THE VEGETATION ISLANDS IN THE FIRST YEAR WILL BE REPLACED AS RECOMMENDED THROUGH ADAPTIVE MANAGEMENT PRACTICES.

WEED MANAGEMENT IN THE HYDROSEED AREAS. NOXIOUS WEEDS AND INVASIVE PLANT SPECIES, AS DEFINED BY THE CALIFORNIA INVASIVE PLANT COUNCIL OR OPEN SPACE STAFF, WILL BE HAND PULLED, MECHANICALLY REMOVED OR SPRAYED WITH HERBICIDE SUBJECT TO THE APPROVAL OF THE SUPERVISING RANGER. TREATMENT METHODS FOR HEAVY INFESTATIONS OF NOXIOUS WEEDS AND INVASIVE PLANT SPECIES SHALL BE INFORMED BY "WEED CONTROL IN NATURAL AREAS IN THE WESTERN UNITED STATES" PUBLISHED BY THE UNIVERSITY OF CALIFORNIA WEED RESEARCH AND INFORMATION CENTER. WEED MANAGEMENT WILL OCCUR FOUR TIMES PER YEAR, OR MORE FREQUENTLY IF APPROVED BY THE SUPERVISING RANGER.

MAINTENANCE OF LANDSCAPE ART FEATURES. OPEN SPACE STAFF WILL REPORT ANY ART FEATURES MAINTENANCE NEEDS TO THE COMMUNITY SERVICES MANAGER RESPONSIBLE FOR PUBLIC ART.

MAINTENANCE OF SWALES/DRAINAGE SYSTEMS. ROCK-LINED SWALES, CULVERTS AND OTHER DRAINAGE SYSTEMS WILL BE CLEANED OF DEBRIS AND MUCK ONCE PER YEAR, OR AS DETERMINED NECESSARY BY THE SUPERVISING RANGER. HAND METHODS ARE RECOMMENDED TO MAINTAIN THE INTEGRITY OF THE DRAINAGE SYSTEMS. EROSION DAMAGE WILL BE REPAIRED ONCE PER YEAR, OR AS DETERMINED NECESSARY BY THE SUPERVISING RANGER. THIS WORK MAY BE DONE BY A CONTRACTOR OR OPEN SPACE STAFF.

GENERAL MAINTENANCE NOTES. PERFORM A QUARTERLY CHECK OF ALL AREAS OF THE LANDFILL TO ENSURE NO SINKING OR LOW SPOTS. RE-GRADE, FILL AND COMPACT AREAS WHERE NECESSARY TO PREVENT WATER ACCUMULATION OR FURTHER GROUND DISTURBANCE. AREAS OF THE FINAL LANDFILL COVER THAT ARE NOT SUCCESSFULLY VEGETATED AFTER HYDROSEEDING WILL BE RE-SEEDED TO PROVIDE EROSION CONTROL, AS DETERMINED BY PUBLIC WORKS.

FERAL CAT FEEDING STATIONS THAT ARE FOUND WITHIN THE PARK WILL BE REMOVED AND WHENEVER THEY ARE OBSERVED IN THE PARK, FERAL CATS WILL BE LIVE TRAPPED AND TRANSPORTED TO PALO ALTO ANIMAL SERVICES.



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LANDSCAPE ARCHITECT'S SEAL

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Job No.:

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Sheet:

L-2.2

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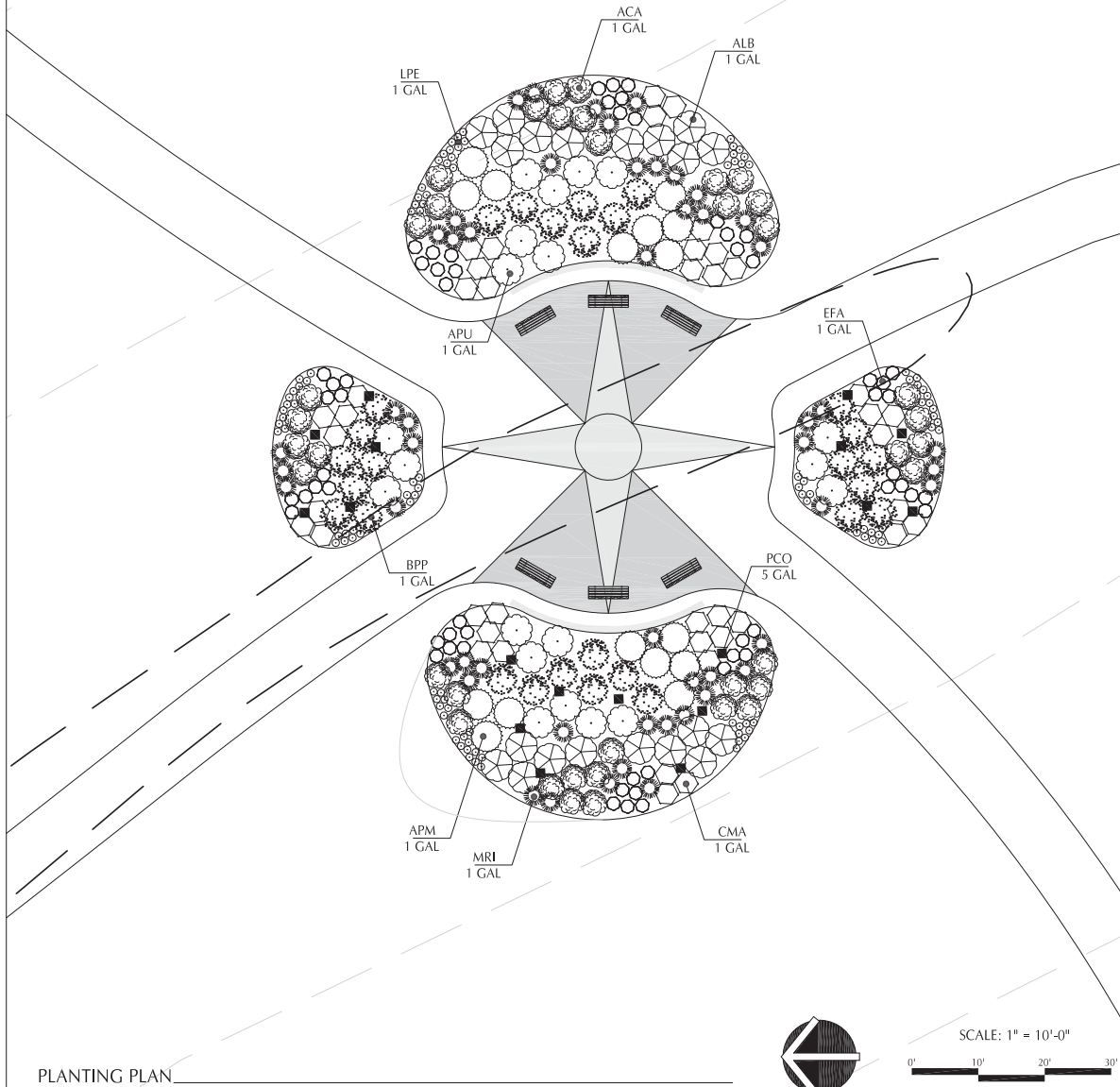
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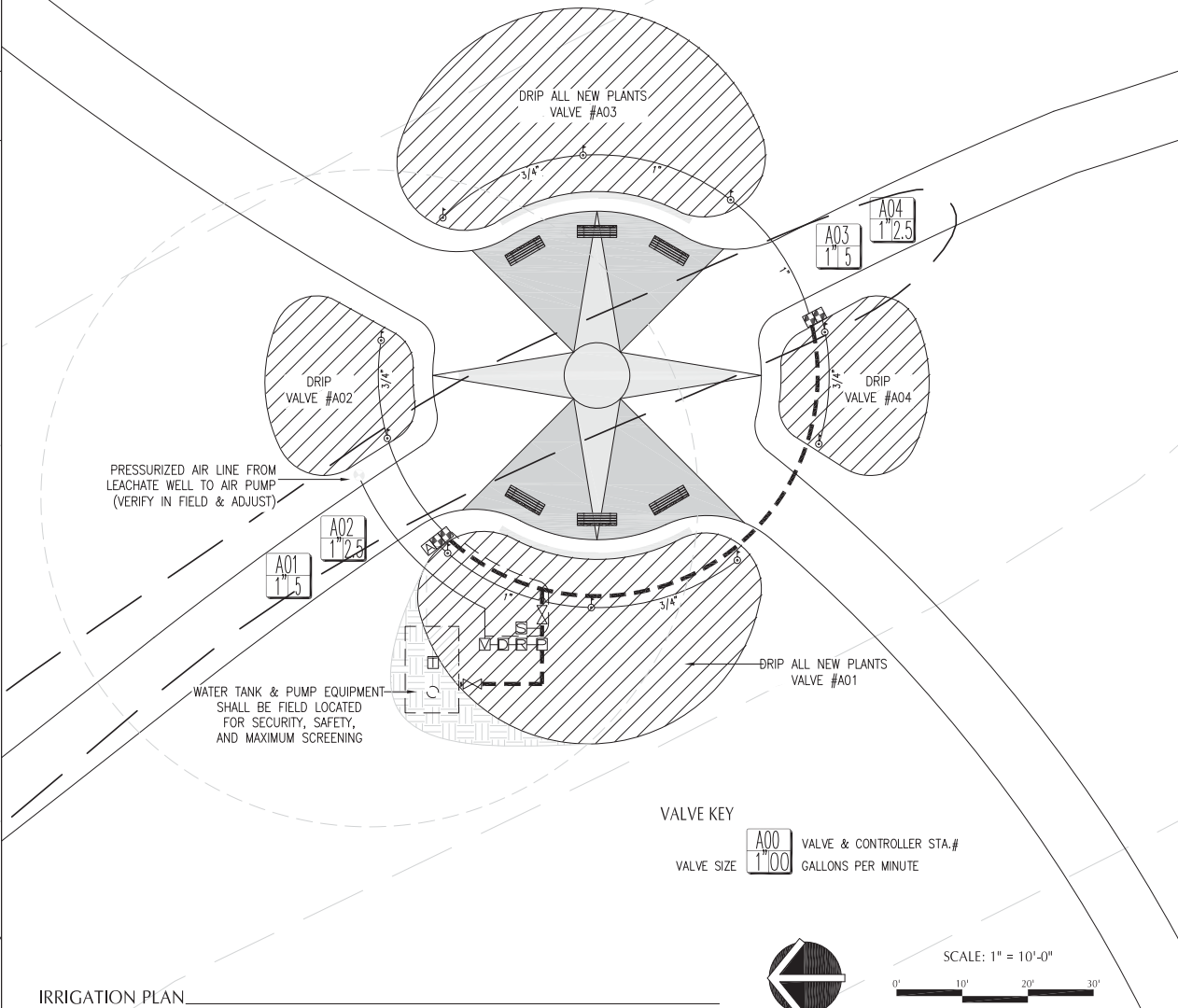
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No.

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PLANTING PLAN



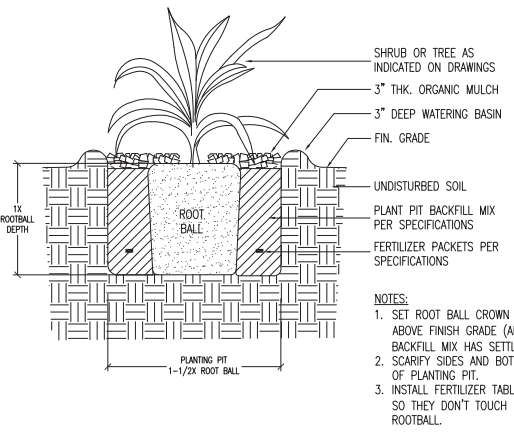
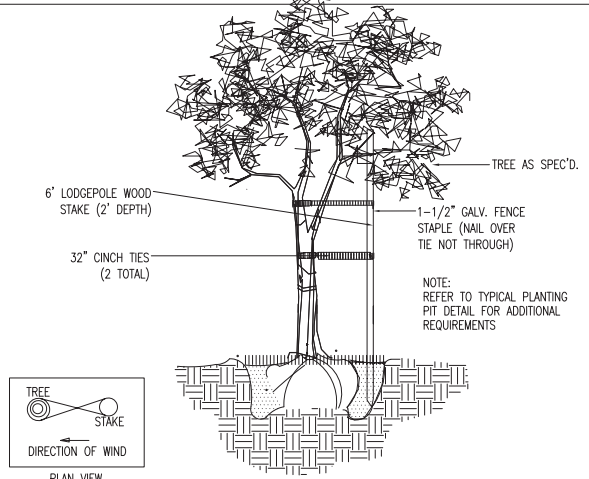
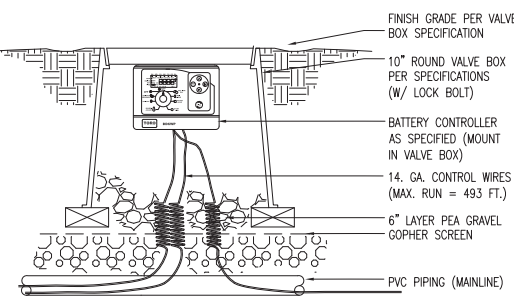
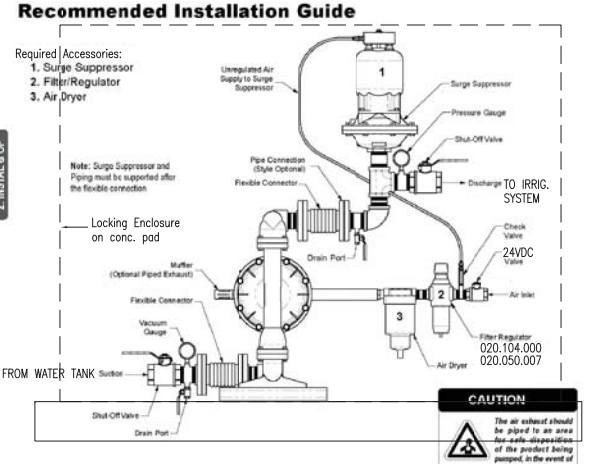
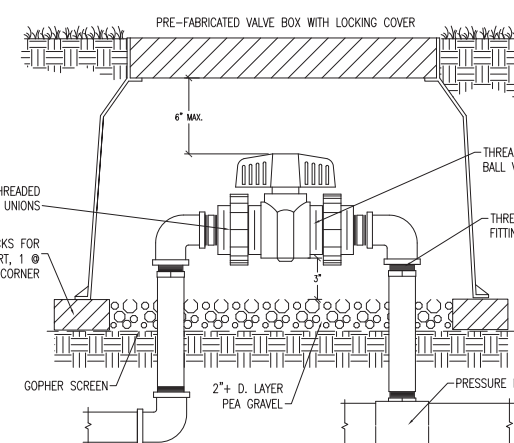
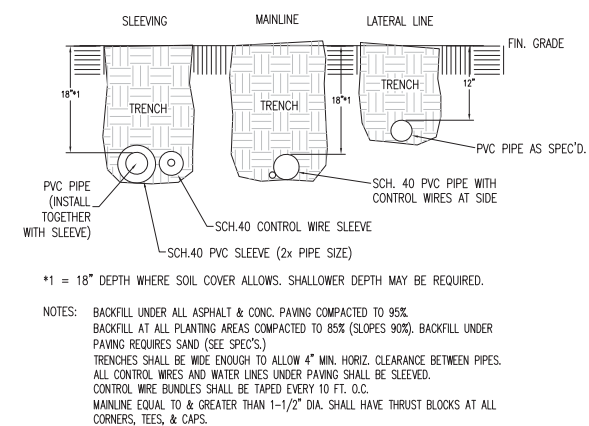
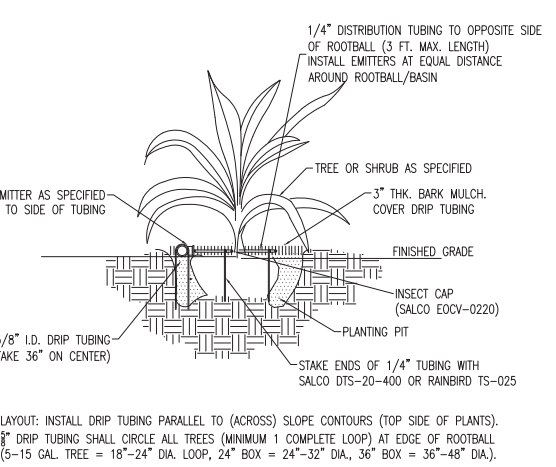
IRRIGATION PLAN

PLANT LEGEND

BOTANICAL / COMMON NAME	QNTY.-SIZE	NOTES	BOTANICAL / COMMON NAME	QNTY.-SIZE	NOTES
ACA Artemisia californica California Sagebrush	38 - 1 GAL	DETAIL 1, SHT. L-4.1	LPE Limonium perezii Sea Lavender	108 - 1 GAL	DETAIL 1, SHT. L-4.1
ALB Atriplex lentiformis brewerii Coastal Quailbush	20 - 1 GAL	DETAIL 1, SHT. L-4.1	MRI Muhlenbergia rigens Deer Grass	52 - 1 GAL	DETAIL 1, SHT. L-4.1
APM Arctostaphylos 'Pacific Mist' Pacific Mist Manzanita	16 - 1 GAL	DETAIL 1, SHT. L-4.1	PCO Pinus contorta v. contorta SHORE PINE	18 - 5 GAL	DETAILS 1 & 2, SHT. L-4.1
APU Arctostaphylos 'Pumila' Dune Manzanita	20 - 1 GAL	DETAIL 1, SHT. L-4.1	PLANTING NOTES REFER TO SHEET L-4.1		
BPP Baccharis pilul. 'Pigeon Point' Coyote Bush	28 - 1 GAL	DETAIL 1, SHT. L-4.1			
CMA Ceanothus maritimus Bluff Lilac	42 - 1 GAL	DETAIL 1, SHT. L-4.1			
EFA Eriogonum fasciculatum California Buckwheat	60 - 1 GAL	DETAIL 1, SHT. L-4.1			

IRRIGATION LEGEND

SYMBOL	DESCRIPTION	NOTE	SYMBOL	DESCRIPTION	NOTE
	TORO DDCWP-4-9V BATTERY CONTROLLER (REQUIRES THE USE OF DC-LATCHING VALVE SOLENOIDS)	INSTALL IN VALVE BOX PER MANUFACTURER'S INSTRUCTIONS. REFER TO DETAIL 4, SHEET L-4.1		NORWESCO #N-42119 2500 GAL. BELOW GROUND WATER HOLDING TANK (98" x 158" x 51")	BURY TO UP TO HATCH DEPTH (REMAINDER BELOW GROUND)
	KBI BTU-TE BALL VALVE (1")	INSTALL PER DETAIL 8, SHEET L-4.1		WARREN RUPP SANDPIPER #S05B1AEWANS000 AIR OPERATED BOOSTER PUMP	INSTALL IN LOCKING ENCLOSURE. V.I.T. #PE-40AL OR APPROVED EQUAL. REFER TO DETAIL 5, SHEET L-4.1
	MAINLINE SCH. 40 PVC PIPE (PURPLE, NON-POTABLE)	1" UNLESS NOTED OTHERWISE. REFER TO DETAIL 9, SHEET L-4.1		SANDPIPER #020.104.000 AIR FILTER/REGULATOR (1/2" PORT, SET OUTPUT TO 60 PSI)	INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
	SCH. 40 PVC PIPE & WIRE SLEEVE	SEE IRRIGATION NOTE #7, SHEET L-4.1		24V. DC SOLENOID AIR VALVE	REFER TO DETAIL 5, SHEET L-4.1
	LATERAL LINE SCH. 40 PVC PIPE (PURPLE, NON-POTABLE) SEE NOTE # 9.	MINIMUM PIPE SIZE = 3/4". REFER TO DETAIL 9, SHEET L-4.1		WARREN RUPP AIR DRYER (1/2" PORT)	REFER TO DETAIL 5, SHEET L-4.1
	TORO DZK-700-1-MF DRIP CONTROL ZONE WITH DC-LATCHING SOLENOID	REFER TO DETAIL 10, SHT. L-4.1		SANDPIPER #TA1 SURGE SUPPRESSOR	REFER TO DETAIL 5, SHEET L-4.1
	DRILINE 5/8" I.D. POLYETHYLENE PIPE (PURPLE STRIPE) WITH RAINBIRD XB-PC EMITTERS	REFER TO DETAIL 11, SHEET L-4.1 SEE IRRIGATION NOTE NO.1 SHEET L-4.1	IRRIGATION NOTES REFER TO SHEET L-4.1		
	PVC TO POLY DRILINE ADAPTER	INSTALL PER DETAIL 12, SHT. L-4.2			

 SHRUB OR TREE AS INDICATED ON DRAWINGS 3" THK. ORGANIC MULCH 3" DEEP WATERING BASIN FIN. GRADE UNDISTURBED SOIL PLANT PIT BACKFILL MIX PER SPECIFICATIONS FERTILIZER PACKETS PER SPECIFICATIONS 1" ROOTBALL DEPTH ROOT BALL 1-1/2X ROOT BALL PLANTING PIT NOTES: 1. SET ROOT BALL CROWN 1" ABOVE FINISH GRADE (AFTER BACKFILL MIX HAS SETTLED). 2. SCARIFY SIDES AND BOTTOM OF PLANTING PIT. 3. INSTALL FERTILIZER TABLETS SO THEY DON'T TOUCH ROOTBALL.		 6" LODGEPOLE WOOD STAKE (2' DEPTH) 32" CINCH TIES (2 TOTAL) 1-1/2" GALV. FENCE STAPLE (NAIL OVER TIE NOT THROUGH) TREE AS SPEC'D. NOTE: REFER TO TYPICAL PLANTING PIT DETAIL FOR ADDITIONAL REQUIREMENTS 2. INSTALL OR PLAN VIEW		PLANTING NOTES 1. INSTALL BARK MULCH IN ALL PLANTING AREAS. MULCH SHALL BE A MINIMUM 2" THICK IN SHRUB AREAS. 2. QUANTITIES/SIZES SHOWN IN THE PLANT LEGEND ARE FOR REFERENCE ONLY. IN THE EVENT OF DISCREPANCIES, THE ACTUAL PLAN COUNT/SIZE SHALL PREVAIL. 3. REVIEW THE PLANTING AND IRRIGATION SPECIFICATIONS PRIOR TO BIDDING. IF NOT PROVIDED, CONTACT THE LANDSCAPE ARCHITECT. 4. TREES AND SHRUBS SHALL NOT BE PLANTED WITHIN 25-FT. OF LANDFILL MAINTENANCE SYSTEMS. 5. MINIMUM SOIL DEPTH 5' UNDER TREES AND 3' UNDER SHRUBS. SEE SECTION THROUGH VEGETATIVE ISLAND/BERM; DETAIL 1, SHEET L-4.		IRRIGATION NOTES 1. 2- 1 GPH EMITTERS/1 GAL., 3- 1 GPH/5 GAL., 2- 2 GPH/15 GAL., 3- 2 GPH/24" BOX. REFER TO DETAILS 11 & 12. INSTALL EMITTERS AT EQUAL DISTANCE AROUND ROOTBALL. 2. IRRIGATION PLANS ARE DIAGRAMMATIC! ACTUAL LINE AND EQUIPMENT PLACEMENT SHALL BE DETERMINED ON SITE DURING CONSTRUCTION. 3. 1" POINT OF CONNECTION (P.O.C.) DOWNSTREAM OF AIR PUMP SHALL BE PROVIDED BY GEN. CONTRACTOR. 4. SYSTEM DESIGN BASED ON 80 P.S.I. STATIC AIR PRESSURE. MINIMUM OPERATING PRESSURE SHALL BE 30 P.S.I. (WATER PRESSURE) FOR DRIP IRRIGATION. 5. LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR 100% COVERAGE AT NO ADDITIONAL COST TO OWNER. SITE DIMENSIONS SHOULD BE THOROUGHLY CHECKED BY CONTRACTOR PRIOR TO BIDDING AND CONSTRUCTION. DISCREPANCIES SHOULD BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT. 6. REFER TO THE SPECIFICATIONS PRIOR TO BIDDING AND CONSTRUCTION (IF SPEC'S. ARE NOT PROVIDED, CONTACT THE LANDSCAPE ARCHITECT FOR A COPY). 7. ALL LINES UNDER PAVING SHALL BE SLEEVED. CONTRACTOR SHALL INSTALL SLEEVES IN STRAIGHT LINES FROM PLANTER TO PLANTER. PLACE DESIGNATED LINE INSIDE SLEEVE PRIOR TO INSTALLATION. SLEEVES SHALL BE 2x LINE SIZE. 8. PIPE SIZES SHOWN ON THE PLAN CONTINUE DOWNSTREAM, TO THE NEXT SIZE LABEL, TYPICAL. 9. INSTALL ALL VALVE BOXES WITHIN 12" OF WALKWAY. NO EXCEPTIONS. 10. IRRIGATION EQUIPMENT MAY BE SHOWN OUTSIDE OF PLANTERS FOR CLARITY. INSTALL ALL EQUIPMENT IN PLANTERS UNLESS NOTED OTHERWISE. 11. ALL COMPONENTS UTILIZED FOR IRRIGATION SYSTEM SHALL BE INSTALLED WITH PURPLE RECYCLED WATER MARKINGS (MAINLINE, LATERALS, DRIPLINE, VALVES & BOXES). 12. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLATION OF ALL WATER TANK AND AIR PUMP COMPONENTS.	
1	TYPICAL SHRUB-TREE PLANTING	NOT TO SCALE	2	TYPICAL TREE STAKING	NOT TO SCALE	3	PLANTING NOTES
 FINISH GRADE PER VALVE BOX SPECIFICATION 10" ROUND VALVE BOX PER SPECIFICATIONS (W/ LOCK BOLT) BATTERY CONTROLLER AS SPECIFIED (MOUNT IN VALVE BOX) 14. GA. CONTROL WIRES (MAX. RUN = 493 FT.) 6" LAYER PEA GRAVEL GOPHER SCREEN PVC PIPING (MAINLINE) NOTES: LANDSCAPE CONTRACTOR TO PROVIDE / INSTALL WITH TWO HIGH-QUALITY ALKALINE BATTERIES. MAINTENANCE CONTRACTOR SHALL REPLACE BATTERIES ANNUALLY / OR MORE FREQUENTLY AS REQUIRED.		4 AUTOMATIC CONTROLLER NOT TO SCALE		 Recommended Installation Guide Required Accessories: 1. Surge Suppressor 2. Filter/Regulator 3. Air Dryer Notes: Surge Suppressor and Piping must be supported after the flexible connection. Locking Enclosure on conc. pod FROM WATER TANK CAUTION The air exhaust should be piped to an area that will not be occupied by the product being pumped, in the event of a discharge failure.			
 PRE-FABRICATED VALVE BOX WITH LOCKING COVER 6" MAX. THREADED BALL VALVE THREADED FITTINGS THREADED SCH.80 UNIONS (4) BRICKS FOR SUPPORT, 1 @ EACH CORNER GOPHER SCREEN 2" + D. LAYER PEA GRAVEL PRESSURE MAIN NOTES: BACKFILL UNDER ALL ASPHALT & CONC. PAVING COMPACTED TO 95%. BACKFILL AT ALL PLANTING AREAS COMPACTED TO 85% (SLOPES 90%). BACKFILL UNDER PAVING REQUIRES SAND (SEE SPEC'S). TRENCHES SHALL BE WIDE ENOUGH TO ALLOW 4" MIN. HORIZ. CLEARANCE BETWEEN PIPES. ALL CONTROL WIRES AND WATER LINES UNDER PAVING SHALL BE SLEEVED. CONTROL WIRE BUNDLES SHALL BE TAPED EVERY 10 FT. O.C. MAINLINE EQUAL TO & GREATER THAN 1-1/2" DIA. SHALL HAVE THRUST BLOCKS AT ALL CORNERS, TEES, & CAPS.		5 AIR PUMP SYSTEM NOT TO SCALE		6 AIR PUMP SYSTEM NOTES		7 IRRIGATION NOTES	
 SLEEVING MAINLINE LATERAL LINE FIN. GRADE 18"x1" TRENCH PVC PIPE (INSTALL TOGETHER WITH SLEEVE) SCH.40 PVC SLEEVE (2x PIPE SIZE) SCH. 40 PVC PIPE WITH CONTROL WIRES AT SIDE *1 = 18" DEPTH WHERE SOIL COVER ALLOWS. SHALLOWER DEPTH MAY BE REQUIRED. NOTES: BACKFILL UNDER ALL ASPHALT & CONC. PAVING COMPACTED TO 95%. BACKFILL AT ALL PLANTING AREAS COMPACTED TO 85% (SLOPES 90%). BACKFILL UNDER PAVING REQUIRES SAND (SEE SPEC'S). TRENCHES SHALL BE WIDE ENOUGH TO ALLOW 4" MIN. HORIZ. CLEARANCE BETWEEN PIPES. ALL CONTROL WIRES AND WATER LINES UNDER PAVING SHALL BE SLEEVED. CONTROL WIRE BUNDLES SHALL BE TAPED EVERY 10 FT. O.C. MAINLINE EQUAL TO & GREATER THAN 1-1/2" DIA. SHALL HAVE THRUST BLOCKS AT ALL CORNERS, TEES, & CAPS.		8 PVC BALL VALVE NOT TO SCALE		9 TYPICAL PIPE TRENCHING NOT TO SCALE		10 DRIP CONTROL ASSEMBLY NOT TO SCALE	
 1/4" DISTRIBUTION TUBING TO OPPOSITE SIDE OF ROOTBALL (3 FT. MAX. LENGTH) INSTALL EMITTERS AT EQUAL DISTANCE AROUND ROOTBALL/BASIN TREE OR SHRUB AS SPECIFIED 3" THK. BARK MULCH COVER DRIP TUBING FINISHED GRADE INSECT CAP (SALCO EDCV-0220) PLANTING PIT STAKE ENDS OF 1/4" TUBING WITH SALCO DTS-20-400 OR RAINBIRD TS-025 5/8" I.D. DRIP TUBING (STAKE 36" ON CENTER) LAYOUT: INSTALL DRIP TUBING PARALLEL TO (ACROSS) SLOPE CONTOURS (TOP SIDE OF PLANTS). 8" DRIP TUBING SHALL CIRCLE ALL TREES (MINIMUM 1 COMPLETE LOOP) AT EDGE OF ROOTBALL (5-15 GAL. TREE = 18"-24" DIA. LOOP, 24" BOX = 24"-32" DIA., 36" BOX = 36"-48" DIA.).		11 DRIP LINE & EMITTERS NOT TO SCALE					



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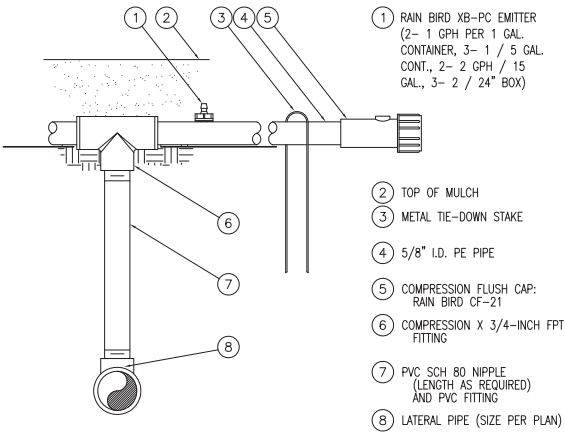
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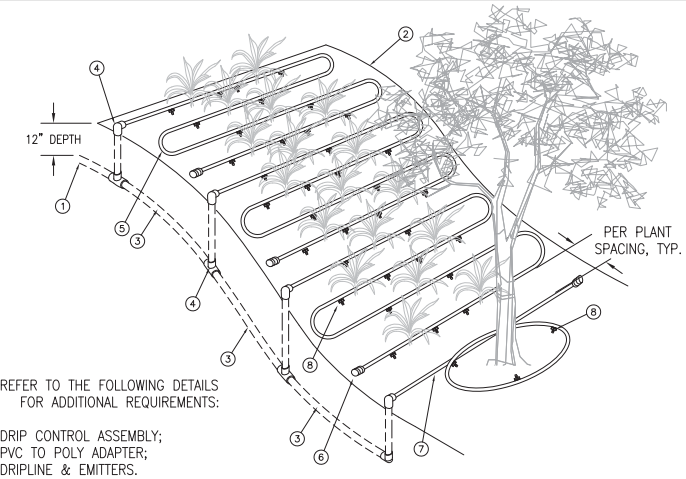
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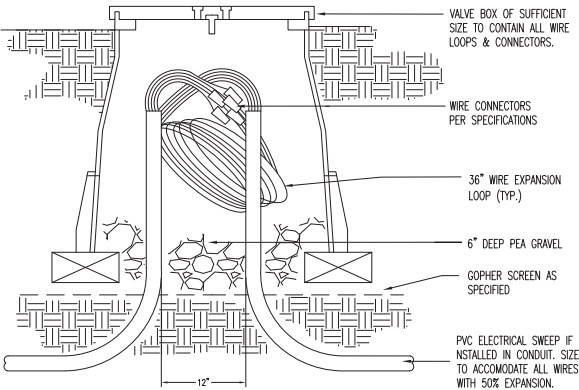


12 PVC TO POLY ADAPTER NOT TO SCALE

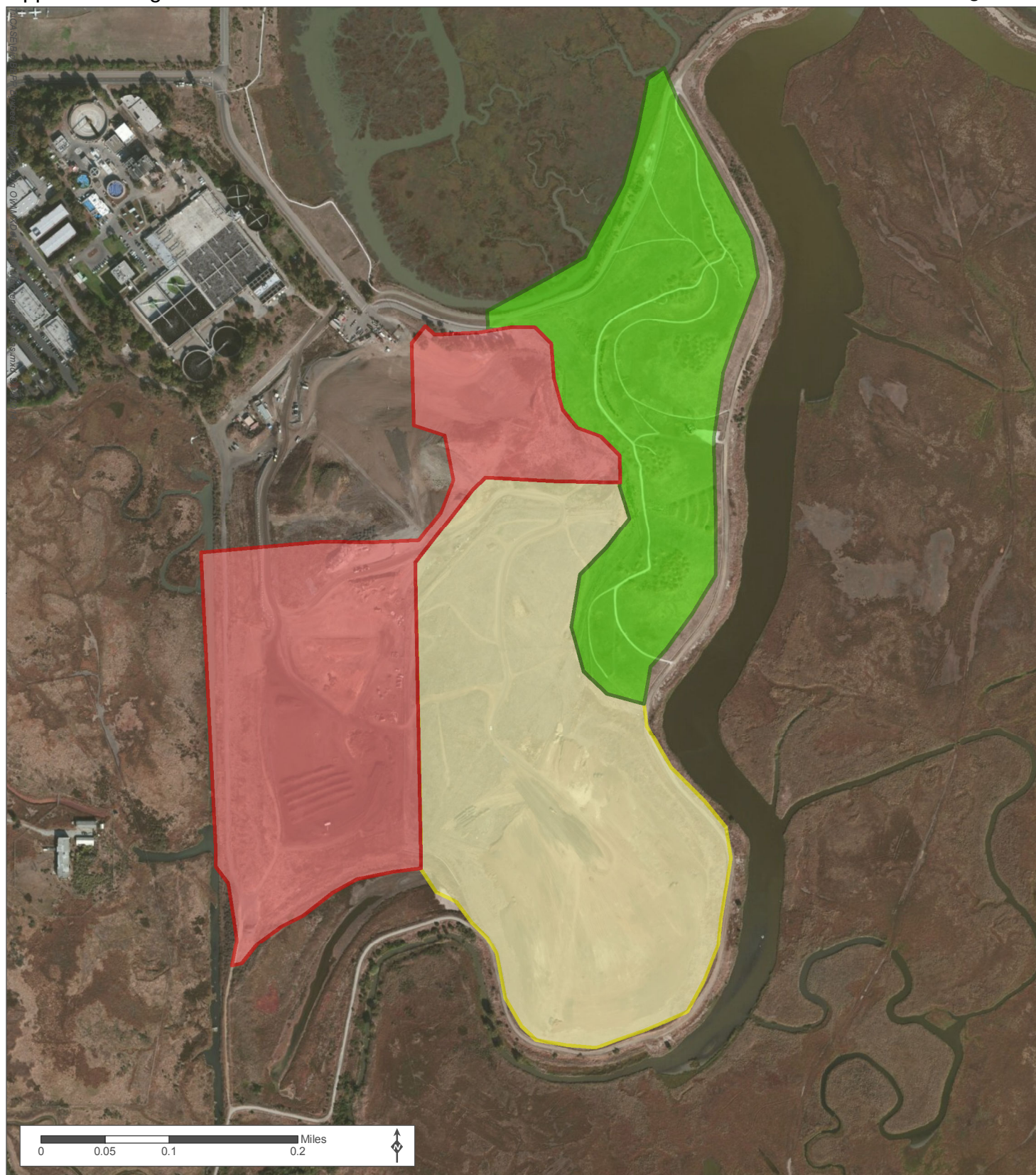


13 DRIP LINE & EMITTER LAYOUT NOT TO SCALE

- 1 PVC LATERAL LINE FROM CONTROL ZONE VALVE KIT (SIZED TO MEET GPM FLOW DEMAND)
- 2 LINE OF SLOPE WHERE APPLICABLE.
- 3 PVC SUPPLY HEADER (SIZE PER PLAN)
- 4 PVC TO POLY ADAPTER (TYPICAL). LOCATION PER PLAN
- 5 ON-SURFACE DRIPLINE: MAXIMUM LENGTH DETERMINED BY FLOW (4 GPM) & DISTANCE (200').
- 6 DRIPLINE END CAP, TYPICAL
- 7 LAYOUT 5/8" DRIPLINE PARALLEL TO SLOPE CONTOURS, TYPICAL WHERE OCCURS
- 8 DRIP EMITTER AS DESIGNATED (QUANTITY/LOCATION/NOTES)
- 9 WHEN USING 5/8" INSERT FITTINGS WITH DESIGN PRESSURE OVER 50 PSI, IT IS REQUIRED THAT STAINLESS STEEL CLAMPS BE INSTALLED ON EACH FITTING.



14 CONTROL WIRE J-BOX NOT TO SCALE

**Mowing**

- Mowed Yearly Beginning 2015
- Mowed Yearly
- Side Slopes Mowed Less Frequently

Figure 6 Mowing and Maintenance Areas*Byxbee Park Hills*

Appendix B: Regulatory Information

Laws Related to Landfill Monitoring and Maintenance

Federal Clean Air Act

The Palo Alto Landfill is located within the San Francisco Bay Area Air Basin (SFBAAB), an area of non-attainment for national and state ozone, state particulate matter (PM10), and national and state fine particulate matter (PM2.5) air quality standards. The Bay Area Air Quality Management District (BAAQMD) is responsible for maintaining air quality and regulating emissions of criteria and toxic air pollutants within the SFBAAB. The City of Palo Alto operates the Palo Alto Landfill in accordance with the requirements and conditions set forth in its Permit to Operate issued to the City by the BAAQMD in June 2012. The Palo Alto Landfill has a landfill gas recovery system that consists of pipelines, condensate sumps and landfill gas extraction wells. This system must be maintained and kept operational in order for the City to remain in compliance with the Permit to Operate issued by the BAAQMD. In addition to the gas recovery system the City is required to maintain and monitor the integrity of the landfill cover to minimize uncontrolled releases of landfill gas. Burrowing animals are controlled in areas where the landfill cover can be compromised by burrows which can potentially facilitate the process of gas migration out of the landfill.

Federal Clean Water Act and State Porter-Cologne Water Quality Act

Under the Clean Water Act, the Environmental Protection Agency (EPA) set effluent limitations and guidelines for landfill operations including landfill leachate and gas collection condensate. The EPA regulates the discharge of dredged or fill material into waters of the U.S, and the California State Water Resources Control Board enforces section 401. The State Water Resources Control Board sets statewide policy related to water quality, coordinates and supports regional water quality control boards, and reviews petitions that contest regional board actions. The RWQCB sets water quality standards, waste discharge requirements for its region, determines compliance with those standards, and takes enforcement action. Leachate is “liquid that has passed through or emerged from solid waste and contains soluble, suspended, or miscible materials removed from such waste”. Condensate is liquid which has condensed in a gas collection system during the extraction of gas from the landfill and typically consists of methane and carbon dioxide, the by-products of microbial breakdown of landfill waste. These are volatile gasses that need to be removed to control hazardous conditions.

At PALF, the landfill leachate is monitored via piezometers and pumped from the landfill through extraction wells to the City’s sanitary sewer for treatment. Leachate movement through the bottom of the landfill or out of landfill waste is monitored via sampling points located around the facility perimeter. As part of the landfill drainage and erosion control system, runoff is collected in v-ditches that discharge to catch basins that in turn, discharge to surrounding water bodies. All of these systems must be maintained to comply with Waste Discharge Requirements issued by the RWQCB. The integrity of the landfill cover is also required to be maintained to minimize the infiltration of storm water into the waste. This includes re-grading areas that have subsided and where water can pond, fixing erosion, cracks or other openings in the landfill cover, and discouraging burrowing animals where burrows can potentially facilitate the process of infiltration of surface water.

California Title 14 and CalRecycle

The California Department of Resources Recycling and Recovery (CalRecycle) oversees the state’s recycling and waste management programs that are implemented according to Title 28

of the California Code of Regulations. It relies on a Local Enforcement Agency (LEA) to monitor landfill activities. Santa Clara County is the LEA for the PALF.

The Engineering Support Branch of CalRecycle reviews and approves solid waste facility closure/post-closure maintenance plans to identify how state standards will be met, then the LEA inspects each site on a regular basis to insure that the standards are met. The state standards concern the integrity of the landfill, so that the landfill does not attract unwanted vectors (rats, flies), does not release landfill gases (methane), and does not impact ground or surface water as a result of storm or irrigation water percolating through the refuse (leachate).

Burrowing animals are generally controlled at landfills in order to avoid non-compliance with state standards. As a result, the burrowing owl management plan needs to incorporate burrow designs that do not threaten the integrity of the landfill cover, and that are approved by CalRecycle and monitored by the LEA.

Laws Related to Biological Resources

Federal

Endangered Species Act

A 1998 amendment to the Fish and Wildlife Conservation Act mandated that the USFWS identify a list of nongame birds that, without additional conservation actions are likely to become candidates for listing under the Endangered Species Act (ESA) of 1973. The goal of this list, *Birds of Conservation Concern 2008* (USFWS 2008), was to identify birds not yet listed under the ESA but that represented the highest conservation priorities, and to promote study and conservation of habitats and ecosystems important to these species. The burrowing owl is not listed under the ESA, but is included on the Shortgrass Prairie list of Birds of Conservation Concern.

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State

California Endangered Species Act

The California Endangered Species Act (CESA; Fish and Game Code 2050 et seq.) establishes the policy of the State to conserve, protect, restore, and enhance threatened or endangered species and their habitats. CESA mandates that State agencies shall not approve projects that would jeopardize the continued existence of threatened or endangered species if reasonable and prudent alternatives are available that would avoid jeopardy. The burrowing owl is not currently listed as a species protected by CESA.

California Fish and Game Code

Burrowing owls are protected by California Fish and Game Code section 3503, which reads, “It is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto.” In addition, under Fish and Game Code section 3503.5, “it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto”. Disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered “taking” by the California Department of Fish and Wildlife (CDFW). The burrowing owl is in the order Strigiformes and is protected under both sections of Fish and Game Code.

Local

Santa Clara Valley Habitat Conservation Plan

The Santa Clara Valley Habitat Conservation Plan and Natural Communities Conservation Plan (Plan) was adopted by the County of Santa Clara Valley, the Santa Clara Valley Water District, the Santa Clara Valley Transportation Authority, and the cities of Gilroy, Morgan Hill and San Jose to streamline the permitting process for development, infrastructure and maintenance activities. The Plan, which was approved in January 2013, is intended as a comprehensive approach to evaluate impacts to natural resources and mitigation requirements instead of separately permitting and mitigating projects on an individual basis. It includes a fee-based conservation strategy to compensate for impacts to covered species and their habitats in a specified Plan Area (Figure 4). Jurisdictions, projects and activities outside of the Plan Area are not covered by the Plan. Because Palo Alto and the PALF are not within the Plan Area, activities at the PALF are not governed by the Plan. However, because most of the south bay burrowing owl habitat is not within the Plan Area, the Plan has a provision for mitigating future impacts to owls by creating habitat reserves in a designated region outside of the Valley Plan Area. The PALF is located in that designated region. If a developer wished to mitigate for burrowing owl impacts caused by a project in the Plan Area by funding a reserve at the PALF this would need to be coordinated with the City of Palo Alto and involve the Plan Implementing Entity.

Appendix C: Burrowing Owl Management Plan

Management Plan for the Western Burrowing Owl Byxbee Park Hills



Prepared for:
City of Palo Alto
Public Works Department
Community Services Department
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February 2015

Management Plan for the Western Burrowing Owl Byxbee Park Hills

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February 2015

Table of Contents

1.0	INTRODUCTION AND PURPOSE	1
2.0	WESTERN BURROWING OWL DESCRIPTION AND ECOLOGY.....	2
2.1	DESCRIPTION	2
2.2	LIFE CYCLE	2
2.3	HABITAT.....	2
2.4	HOME RANGE.....	2
3.0	LOCAL DISTRIBUTION OF WESTERN BURROWING OWL.....	3
4.0	REGULATORY FRAMEWORK.....	5
4.1	MIGRATORY BIRD TREATY ACT	5
4.2	ENDANGERED SPECIES ACT.....	5
4.3	CLEAN AIR ACT	5
4.5	CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)	7
4.6	CALIFORNIA ENDANGERED SPECIES ACT	7
4.7	CALIFORNIA FISH AND GAME CODE	7
4.8	SANTA CLARA VALLEY HABITAT CONSERVATION PLAN.....	7
5.0	MANAGEMENT GUIDELINES.....	8
5.1	CDFW CONSERVATION GOALS FOR THE BURROWING OWL IN CALIFORNIA.....	8
5.2	CALIFORNIA BURROWING OWL CONSORTIUM GUIDELINES.....	8
5.3	CDFW STAFF REPORT ON BURROWING OWL MITIGATION	8
6.0	LANDFILL MAINTENANCE AND MANAGEMENT.....	9
7.0	CURRENT BYXBEE PARK HILLS MAINTENANCE REQUIREMENTS ACTIVITIES.....	10
7.1	MOWING	11
7.2	TRAIL MAINTENANCE	11
7.3	REVEGETATION	11
7.4	COYOTE BRUSH REMOVAL	11
7.5	MAINTENANCE OF MOUNDS AND OTHER ARTISTIC FEATURES.....	11
7.6	APPLICATION OF HERBICIDE	11
8.0	PROPOSED BURROWING OWL MANAGEMENT MEASURES.....	12
8.1	SET ASIDE BURROW HABITAT AREAS AND MANAGE REMAINING AREAS FOR FORAGE	1
8.2	GROUND SQUIRREL MANAGEMENT	1
8.3	INSTALLATION AND MAINTENANCE OF ARTIFICIAL BURROWS, MOUNDS, PERCHES AND OTHER HABITAT FEATURES.....	1
8.4	PUBLIC ACCESS FOR HIKING AND DOG WALKING AND INSTRUCTIONAL SIGNAGE.....	2
8.5	HYDROSEEDING, MOWING AND WEED MANAGEMENT	3
8.6	FERAL CAT CONTROL	3
8.7	MONITORING, REPORTING AND ADAPTIVE MANAGEMENT	4
9.0	CONCLUSION	5
10.0	LITERATURE CITED.....	6

List of Figures

Figure 1 Regional and Site Vicinity Location	A-1
Figure 2 CNDDDB Occurrences of Burrowing Owls	A-2
Figure 3 Byxbee Park Hills Overwintering Owl Locations	A-3
Figure 4 Santa Clara Valley Habitat Plan Expanded Study and Permit Area	A-4
Figure 5 PALF Existing Environmental Control Systems	A-5
Figure 6 Byxbee Park Hills Maintenance Areas	A-6
Figure 7 Artificial Burrow Design	A-7
Figure 8 Nesting and Foraging Habitat with Artificial Nest and Sattelite Burrow Locations	A-8
Figure 9 Tentative Habitat Feature Locations.....	A-9

List of Appendices

Appendix A Figures.....	A-1
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List of Acronyms

CDFW – California Department of Fish and Wildlife
CEQA – California Environmental Quality Act
CESA – California Endangered Species Act
CNDDDB – California Natural Diversity Database
ESA – Endangered Species Act
ET – Evapotranspirative
HDPE – High density polyethylene
MBTA – Migratory Bird Treaty Act
PALF – City of Palo Alto Landfill
PARWQCP – Palo Alto Regional Water Quality Control Plant
PERC – Pressurized Exhaust Rodent Control system
USFWS – United States Fish and Wildlife Service

SUMMARY

This plan describes ways to manage the local burrowing owl population at the Palo Alto landfill as the landfill is closed and converted to an open space park known as Byxbee Park Hills. The implementation of this plan is contingent upon approval from the landfill regulatory agencies, including the Local Enforcement Agency, the Regional Water Quality Control Board, and the Bay Area Air Quality Management District. The plan describes the landfill regulations that require compliance with current air and water quality standards, and park maintenance and use requirements, as well as management recommendations for the owl, such as predator and vegetation control, guidelines for human use of and access to proposed park facilities, control of ground squirrels, and opportunities for enhancement of the site for burrowing owls.

1.0 Introduction and Purpose

The Palo Alto Landfill (PALF) is owned and operated by the City of Palo Alto, and is located in the Palo Alto Baylands (Figure 1). The landfill is part of the Byxbee Park Master Plan, and portions of it have been closed and developed for park use. The entire landfill will eventually be converted to park use, and an interim park plan will be implemented before a final park plan is proposed. The interim plan offers an opportunity to test park design, vegetation, and management methods. Ongoing maintenance of the closed landfill and the park will be necessary after the site is converted to park use. Landfill maintenance is required by law and is paramount to public safety, thus landfill maintenance has priority over other activities at the site. All of these issues affect the western burrowing owl (*Athene cunicularia hypugaea*), a California Species of Special Concern which occurs in the area and has overwintered in burrows on the site.

This Management Plan for the Western Burrowing Owl provides guidelines for the management of burrowing owls and their habitat on the landfill and park lands in a manner that is consistent with landfill regulations and the on-going need for maintenance of the closed landfill, as well as park maintenance and public access and use. Federal, state and local wildlife regulations, and the recommendations and guidelines of state agencies and local burrowing owl working groups are also considered. The plan recommends development of overwintering, foraging and breeding habitat for burrowing owls wherever possible, in consideration of other management, maintenance and monitoring requirements. This plan will be used to inform the overall maintenance plans for the landfill and park. This management plan has the following organization:

- Description and Ecology – This section describes the owl, its habitat requirements, and range.
- Local Distribution – Current population status and trends of the burrowing owl in the Santa Clara Valley and in the area surrounding the Byxbee Park Hills.
- Regulatory Framework – Federal, state and local regulations pertaining to the burrowing owl and to the landfill that were the framework of the plan.
- Burrowing Owl Management Guidelines – Existing goals and conservations guidelines for burrowing owls.
- Landfill Maintenance and Management – PALF management and maintenance activities mandated during the 30 year post-closure period.
- Management Measures – Management and maintenance activities that will be undertaken to optimize breeding and foraging habitat for owls, and to encourage colonization of the site by owls, and to stabilize and increase the local population

2.0 Western Burrowing Owl Description and Ecology

2.1 Description

The western burrowing owl is a mottled brownish and sand colored, dove-sized raptor, with large yellow eyes, a rounded head lacking ear tufts, white eyebrows, and long legs compared to other owl species. It spends a great deal of time standing on dirt mounds at the entrance to a burrow, or perched on a fence post or other low perch from which it hunts for prey. It frequently hunts by hovering in place above the ground and dropping on prey from above. Burrowing owls feed primarily on insects such as grasshoppers, June beetles, and moths, but will also eat small rodents, birds, and reptiles. This owl species is active during the day and night, primarily active in the early morning and early evening hours.

2.2 Life Cycle

The breeding season for the burrowing owl is February 1 through August 31. Up to eleven, but typically seven to nine, eggs are laid in a burrow, abandoned pipe, or other subterranean hollow where incubation is completed by the female in 28-30 days and the young hatch. Young burrowing owls emerge from their burrow to await delivery of food by the parents at approximately 2 weeks of age (Johnsgard 1988). Parents feed the young until they fledge at about 44 days of age (Landry 1979). Young remain in the vicinity of the natal burrow, using satellite burrows for refuge for about two months after hatching. Young reach sexual maturity at one year of age, but some females may not breed their first year (Lutz and Plumpton 1999).

2.3 Habitat

The western burrowing owl is a ground dwelling owl, typically found nesting in arid prairies, fields, and open areas where vegetation is sparse and low to the ground. It is heavily dependent upon the presence of mammal burrows (commonly ground squirrel and American badger) in its habitat to provide shelter from predators or inclement weather, and to provide a nesting place. Foraging habitat tends to be made up of grassland areas with a slightly taller average vegetation height than nesting habitat, so the presence of a mosaic of short and medium height vegetation is important to the survival of this species (Clayton and Schmutz 1999). Space between burrows occupied by burrowing owls is dependent on the species of animal that excavated the burrow and the local density of burrowing owls. Where burrows were clustered closely, such as in prairie dog colonies, occupied owl burrows were clustered more closely (Johnson, et al. 2010).

2.4 Home Range

The burrowing owl is a migratory species in portions of its range, which includes western North America from Canada to Mexico, and east to Texas and Louisiana. Burrowing owl populations in California are more often sedentary or locally migratory. In the Santa Clara Valley, paired owls remain sedentary year round unless some external factors such as loss of foraging habitat or disturbance of their breeding habitat forces them to relocate. Unmated owls, which are often owls dispersing from their natal burrow, range more widely in search of a mate. Harman and Barclay (2007) reported the longest recorded movement of a banded burrowing owl in the south Bay Area to be 7.5 miles (12 km) from the San José International Airport to Moffett Federal Airfield.

The western burrowing owl has disappeared from a significant portion of its range in the last 15 years. Nearly 60% of the breeding groups of owls known to have existed in California during the 1980s had disappeared by the early 1990s (Burrowing Owl Consortium, 1993). The conversion of grassland habitat has been a significant factor in the reduction of the local population. Because burrowing owls depend on other animals to dig their burrows, eradication of ground squirrels has also contributed to their decreased numbers (Haug et al. 1993).

3.0 Local Distribution of Western Burrowing Owl

Between 1988 and 2002, 66% of sites occupied by the burrowing owl in the Santa Clara Valley were lost to development. At present, approximately 50 pairs of owls remain in the entire county (Trulio 2014). For owls to remain in Santa Clara, open grassland habitats of sufficient size and with a healthy population of ground squirrels must remain available. On lands that owls do not occupy, but where they are present nearby, owls can potentially become reestablished. Trulio (2004) observed that sites that have the greatest potential to attract burrowing owls have the following characteristics:

- Are within 300 meters of occupied habitat
- Were recently occupied by nesting owls
- Are relatively large (in excess of 30 acres)
- Are un-fragmented by roads, paths or other habitat features
- Are relatively flat and of low elevation
- Possess optimal habitat characteristics (grasses of suitable height, ground squirrel population)

Byxbee Park Hills is located within a region of the south bay known to support burrowing owl. Owls have been recorded north, northeast, south and southeast of the landfill, and the landfill may be part of a corridor of open space that allows movement between breeding populations. A search of the California Natural Diversity Database (CNDDB 2014) that includes all burrowing owls recorded within five miles of Byxbee Park Hills provided the following information, which is also shown by occurrence number and year on Figure 2.

- Occurrence 21 – A colony located at Byxbee Park Hills, “just east of the city dump and west of Mayfield Slough” was monitored sporadically between 1911 and 2008. The most recent report of owls at this location was in January 2008, when one wintering adult was observed at a burrow.
- Occurrence 27 – In 1983, one individual owl was observed at a burrow entrance at the Palo Alto Municipal Airport on a levee parallel to and northeast of the runway opposite the control tower.
- Occurrence 25 – This colony was monitored between 1998 and 2005. The most recent observation was in May 2008, when one adult pair and one juvenile were observed. The colony is located on the Shoreline Golf Links, west of Mountain View Slough.
- Occurrence 215 – In 1983 four pairs and an unknown number of juveniles were recorded at Long Point, just north of Shoreline Park and northwest of Moffett Federal Airfield.
- Occurrence 1031 – This site was monitored between 1998 and 2003. The most recent occurrence is in 2003 when two burrows were observed. The burrows are located at Shoreline Golf Links east of Mountain View Slough.

- Occurrence 1235 – A single active nest burrow was observed in 2004 between the salt pond levee and the northeast golf course at Shoreline Park.
- Occurrence 1032 – This colony was monitored sporadically between 1998 and 2004. The most recent occurrence is from 2004 when four nests were reported. The colony is located at Shoreline at Mountain View Park, in the field northeast of the Amphitheater.
- Occurrence 1033 – This burrow was monitored between 1999 and 2004, and was last documented as occupied in 2004. It is located east of Stevens Creek, 0.42 miles northwest of the intersection of Parsons and Arnold Avenues at Moffett Federal Airfield.
- Occurrence 1035 – A single occupied burrow was documented at Moffett Federal Airfield in the field northwest of the tower in 1998.
- Occurrence 22 – An “active colony” was reported in 1983, 0.75 miles west near the intersection of Fair Oaks Avenue and Highway 237.
- Occurrence 23 – Nine burrow sites were observed between 1999 and 2004, approximately 1.5 miles north of the intersection of U.S. 101 and Matilda Avenue.
- Occurrence 26 – This colony was monitored between 1998 and 2009. The most recent observation was made in July 2009, when “43 owls were trapped at 14 nests”. This colony is located at the north end and east side of the flight line at Moffett Federal Airfield and includes the golf course at Moffett Federal Airfield.
- Occurrence 24 – This colony is considered inactive or extirpated, and the date of owls last being observed is unknown. The colony was situated southeast of the confluence of Coyote Creek and Alviso Slough.
- Occurrence 784 – This colony was monitored between 1998 and 2009. The most recent observation was in 2009, when four adults and one juvenile were trapped at two nests. This colony is located at the southwest end of Moffett Federal Airfield.
- Occurrence 51 – This colony is considered extirpated. It was situated southeast of the confluence of Coyote Creek and Alviso Slough, north of Sunnyvale and has no record date.
- Occurrence 18 – This colony is considered possibly extirpated. It was situated northwest of the intersection of Jarvis Road and Thornton Avenue at the east end of the Dumbarton Bridge. The last observation of burrowing owls at this location was 1979.

The CNDDDB does not include the most current information on the population of western burrowing owl at Shoreline Park, which consists of two breeding pairs of owls as of June 2014. In 2014, one pair produced four chicks and the second pair produced two chicks. Shoreline Park averages approximately six breeding pairs of owls during the breeding season, with the population increasing temporarily during the non-breeding season as un-banded overwintering owls occupy the site (Phillip Higgins City of Mountain View Wildlife Preservation Biologist, personal communication). Shoreline Park is situated within 2 miles of Byxbee Park Hills, so dispersing offspring of this population of owls provide one of the best opportunities for recruitment of foraging and overwintering owls for Byxbee Park Hills. Owls may also disperse from Moffett Federal Airfield, situated approximately 2.5 to 3 miles from Byxbee Park Hills. At present (July 2014) Moffett Federal Airfield has 11 active nest burrows with four breeding pairs of owls (Christopher Alderete, personal communication).

The City of Palo Alto has monitored known occupied burrows at the Palo Alto Baylands, including Byxbee Park Hills, but does not have a formal burrowing owl monitoring or management program. Overwintering owls have been observed in the PALF Phase I closure (Figure 1) area just west of Mayfield Slough as recently as March 3rd 2014, but breeding activity

has not been observed at that location. Two active burrow locations occupied by a single owl were observed in a topsoil stockpile between PALF Phase IIB and Phase IIC closure areas (Figure 1) in January 2014, and eight additional burrows, occupied by two owls, were observed in Phase I between November 2013 and March 2014 (Figure 3). No owls are known to currently occupy Byxbee Park Hills or the landfill as of the publication of this plan.

In an area where very few opportunities exist to increase burrowing owl habitat, the PALF and park present a unique opportunity to establish and enhance up to 130 acres of open space for burrowing owls. At present, Byxbee Park Hills has limited breeding and foraging habitat for burrowing owls. The PALF Phase I closure area contains approximately 8 acres of breeding and foraging habitat (Figure 1). This area contains ground squirrel burrows that are potential nesting habitat and mowed annual grasses that could be used for foraging. Ground squirrel and other burrowing mammal populations have been managed throughout the park wherever there is a concern for the landfill cap being compromised, which currently limits the amount of natural burrow nesting and refuge habitat. Vegetative cover is also sparse. Two artificial nest burrows were created in the Phase IIB closure area of the landfill, but the surrounding area on the landfill does not currently have enough vegetative cover to support prey species for burrowing owl forage. To date, burrowing owls have not been observed at either artificial nest burrow, so the burrows will either be relocated or abandoned in place.

4.0 Regulatory Framework

4.1 Migratory Bird Treaty Act

The burrowing owl is protected under the federal Migratory Bird Treaty Act (16 USC, Sections 703 to 711). The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Unless permitted by regulations, the MBTA provides that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. Under the MBTA it is illegal to remove vegetation containing nests that are in active use, since this could result in killing a bird or destroying an egg. This would also be a violation of the California Fish and Game Code (see section 1.5.7, below).

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4.4 California Title 14 and CalRecycle

The California Department of Resources Recycling and Recovery (CalRecycle) oversees the state’s recycling and waste management programs that are implemented according to Title 14 of the California Code of Regulations. It relies on a Local Enforcement Agency (LEA) to monitor landfill activities. Santa Clara County is the LEA for the PALF.

The Engineering Support Branch of CalRecycle reviews and approves solid waste facility closure/post-closure maintenance plans to identify how state standards will be met, then the LEA inspects each site on a regular basis to insure that the standards are met. The state standards concern the integrity of the landfill, so that the landfill does not attract unwanted vectors (rats, flies), does not release landfill gases (methane), and does not impact ground or surface water as a result of storm or irrigation water percolating through the refuse (leachate).

Burrowing animals are generally controlled at landfills in order to avoid non-compliance with state standards. As a result, the burrowing owl management plan needs to incorporate burrow designs that do not threaten the integrity of the landfill cover, and that are approved by CalRecycle and monitored by the LEA.

4.5 California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA) Guidelines Section 15380 defines endangered, threatened, and rare species for purposes of CEQA and clarifies that CEQA review extends to other species that are not formally listed under the state or federal endangered species acts but that meet specified criteria. Under CEQA, a mandatory finding of significance is required if impacts to threatened or endangered species are likely to occur. Also, under CEQA Guidelines Section 15065 a mandatory finding of significance is required if a project has the potential to substantially degrade or reduce the habitat of or restrict the range of an endangered species. The California Department of Fish and Wildlife has listed the burrowing owl as a Species of Special Concern. Impacts to burrowing owl need to be considered under CEQA, but there is not a mandatory finding of significance because the burrowing owl is not listed as threatened or endangered.

4.6 California Endangered Species Act

The California Endangered Species Act (CESA; Fish and Game Code 2050 et seq.) establishes the policy of the State to conserve, protect, restore, and enhance threatened or endangered species and their habitats. CESA mandates that State agencies shall not approve projects that would jeopardize the continued existence of threatened or endangered species if reasonable and prudent alternatives are available that would avoid jeopardy. The burrowing owl is not currently listed as a species protected by CESA.

4.7 California Fish and Game Code

Burrowing owls are protected by California Fish and Game Code section 3503, which reads, “It is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto.” In addition, under Fish and Game Code section 3503.5, “it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto”. Disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered “taking” by the California Department of Fish and Wildlife (CDFW). The burrowing owl is in the order Strigiformes and is protected under both sections of Fish and Game Code.

4.8 Santa Clara Valley Habitat Conservation Plan

The Santa Clara Valley Habitat Conservation Plan and Natural Communities Conservation Plan (Plan) was adopted by the County of Santa Clara Valley, the Santa Clara Valley Water District, the Santa Clara Valley Transportation Authority, and the cities of Gilroy, Morgan Hill and San Jose to streamline the permitting process for development, infrastructure and maintenance activities. The Plan, which was approved in January 2013, is intended as a comprehensive

approach to evaluate impacts to natural resources and mitigation requirements instead of separately permitting and mitigating projects on an individual basis. It includes a fee-based conservation strategy to compensate for impacts to covered species and their habitats in a specified Plan Area (Figure 4). Jurisdictions, projects and activities outside of the Plan Area are not covered by the Plan. Because Palo Alto and the PALF are not within the Plan Area, activities at the PALF are not governed by the Plan. However, because most of the south bay burrowing owl habitat is not within the Plan Area, the Plan has a provision for mitigating future impacts to owls by creating habitat reserves in a designated region outside of the Valley Plan Area. The PALF is located in that designated region. If a developer wished to mitigate for burrowing owl impacts caused by a project in the Plan Area by funding a reserve at the PALF this would need to be coordinated with the City of Palo Alto and involve the Plan Implementing Entity.

5.0 Management Guidelines

5.1 CDFW Conservation Goals for the Burrowing Owl in California

In 2008 CDFW developed a set of conservation goals for burrowing owls in California (CDFW 2008). Those goals include the following:

- Maintain the size and distribution of extant burrowing owl populations.
- Where possible, increase geographic distribution of burrowing owls into formerly occupied historic range where suitable habitat still exists or can be created or enhanced.
- Increase the size of existing burrowing owl populations where possible and appropriate.
- Protect and restore self-sustaining ecosystems or natural communities which do or could potentially support burrowing owls at a landscape scale, and which will require minimal long-term management by humans.
- Remove or ameliorate unnatural causes of burrowing owl population declines, including control of rodent hosts and prey.
- Recover populations of burrowing owls and their natural dynamics including movement and genetic exchange among populations.
- Engage stakeholders in burrowing owl protection and habitat management.

5.2 California Burrowing Owl Consortium Guidelines

The California Burrowing Owl Consortium is a group of wildlife professionals, agencies and advocates whose mission is to enhance the conservation of burrowing owls by providing a forum for the exchange of information about research, status, and policy and by developing management guidelines. In 1993 the Consortium developed the Burrowing Owl Survey Protocol and Mitigation Guidelines which provide a decision making process to be implemented whenever a project may impact burrowing owls or their habitat.

5.3 CDFW Staff Report on Burrowing Owl Mitigation

In 1995 the California Department of Fish and Wildlife developed a comprehensive conservation and mitigation strategy for burrowing owls, which was updated in 2012 to reflect the continued decline of this species (CDFW 2012). The report provides rigorous methods for burrowing owl surveys, impacts assessments, avoidance and minimization measures, and mitigation measures. The staff report defines activities with the potential to take or impact burrowing owls,

including burrow blockage, crushing burrow tunnels, and mowing among others. It defines the required qualifications for biologists who may conduct burrowing owl habitat assessments, surveys, and impact assessments, including:

1. Familiarity with the species and its local ecology;
2. Experience conducting habitat assessments and non-breeding and breeding season surveys, or experience with these surveys conducted under the direction of an experienced surveyor;
3. Familiarity with the appropriate state and federal statutes related to burrowing owls, scientific research, and conservation;
4. Experience with analyzing impact of development on burrowing owls and their habitat.”

Also included are recommended setback buffers which are based on the level of disturbance as identified in the impact assessment. Buffers are as small as 50 meters for low-level disturbances in the non-breeding season, to as large as 500 meters for high-level disturbances in the vicinity of active nest burrows during the breeding season.

6.0 Landfill Maintenance and Management

California regulations mandate that the landfill be managed and maintained throughout a 30 year post-closure period in accordance with an approved post-closure maintenance plan. The primary purpose is to protect the integrity of the landfill cover, and monitor and manage landfill gas and leachate to minimize impacts to air and water quality. The City of Palo Alto Public Works Department is responsible for landfill maintenance and management throughout the 30 year post-closure period. Activities include grading to correct areas where the contours of the landfill have settled so that water does not pond, seep into the refuse and create leachate, maintenance and repair of gas pipes and mains, sumps, and leachate lines, and occasional monitoring of leachate and gas extraction wells and piezometers. Emergency repairs to these facilities may also be necessary. The laws that govern the landfill operation and maintenance are described in section 4.0, above.

The landfill gas and leachate collection/monitoring facilities are largely concentrated in the central areas of the landfill, with the perimeters having fewer areas that will require regular access for maintenance (Figure 5). The need for earth moving equipment, utility vehicles and personnel to be working within the maintenance and emergency repair areas is anticipated and unavoidable. Access to areas that require maintenance will be via existing and proposed new roads.

The PALF is a Class III disposal site comprised of several layers, including the waste layers, a cover layer or “cap” and a vegetation layer. The cap is designed to minimize the release of landfill gas and leachate, and to prevent infiltration of surface water. The landfill has been developed and closed in phases. Phase I, Phase IIA and Phase IIB are capped with a clay cover. Phase IIC will be capped with an evapotranspirative (ET) cover.

Landfill leachate is monitored with 17 existing piezometers within the four phases of the landfill. Leachate is pumped from the landfill through a network of 23 existing extraction wells equipped with a pneumatic pump. The leachate is pumped to the City’s sanitary sewer for treatment. A groundwater monitoring program is used to monitor leachate movement through the bottom of the landfill or out of landfill waste. The groundwater monitoring system consists of 13 existing wells and sampling points located around the facility perimeter. A perimeter drainage control system collects surface runoff as part of the landfill drainage and erosion control system. Runoff is collected in v-ditches that discharge to catch basins that discharge to surrounding water bodies.

Five gas monitoring probes to monitor landfill gas are spaced at 300 to 500 foot intervals along the property boundary shared with the Palo Alto Regional Water Quality Control Plant (PARWQCP). Landfill gas monitoring is currently conducted via seven structures, but during the post closure phase will be monitored from four locations, one in Byxbee Park Hills, and three adjacent to PARWQCP. Gas extraction is accomplished through a system of 109 wells distributed throughout the landfill. The gas is pumped to a sewage sludge incinerator or an adjacent flare at PARWQCP via a high-density polyethylene (HDPE) network.

Burrowing animals, including primarily the ground squirrel (*Spermophilus beecheyi*), are controlled in landfill areas to insure that their burrowing does not damage the clay or evapotranspirative caps. Damage to the cap can allow surface water infiltration and lead to excessive load on the leachate extraction system, it can also result in the release of landfill gas, can compromise both leachate and landfill gas extraction systems by damaging piping, and it can lead to violation of permit conditions.

Ground squirrels are controlled throughout the landfill with a Pressurized Exhaust Rodent Control (PERC) system. This practice was recently suspended pending further study and discussion. The PERC system consists of a trailer-mounted combustion engine that exhausts to a pressurized tank. A mixture of carbon dioxide and carbon monoxide is delivered from the tank to the ground squirrel burrow, via a hose with a probe that is inserted into the burrow entrance for a minimum of three minutes. Once treated, the entrance to the burrow is sealed. Active burrows are identified for treatment by the presence of entering or exiting squirrels and the presence of fresh mounds of dirt or evidence of new burrow excavation. No treatment is applied where there are signs of burrowing owl occupation, including feathers, pellets or other visual indicators of owl presence.

7.0 Current Byxbee Park Hills Maintenance Requirements Activities

Byxbee Park Hills is a passive use open space area with walking trails located on closed portions of the PALF. Capped and contoured slopes of the landfill have been covered with a layer of topsoil and hydroseeded with native grasses and forbs. The site is not irrigated, but the Phase I, Phase II and Phase IIA portions of the landfill that are open to park use have been revegetated with a combination of annual grasses and forbs that support a colony of ground squirrels. Phase IIC is in the process of being capped, covered with topsoil and hydroseeded. In April 2014, vegetation was not yet well established throughout much of the Phase IIC area, with many areas of bare ground or where weedy species such as cheeseweed (*Malva parviflora*), Italian thistle (*Carduus pycnocephalus*), and mustard (*Brassica* sp.) had become established. Ground squirrels and other fossorial mammals are controlled throughout Phase IIC, so they are largely absent.

The Palo Alto Community Services Department – Open Space, Parks and Golf Division is responsible for the maintenance of the Byxbee Park Hills facility, apart from the landfill maintenance activities that are implemented by Public Works. The City has assigned these maintenance activities to a contractor. For the purposes of maintenance, the park is divided up into three areas color coded as green, yellow and red (Figure 6). Areas color coded in green are maintained each year unless repair to the landfill cap is ongoing. Areas coded in yellow are still being capped. Areas coded in red were maintained beginning in 2014. Maintenance requirements include vegetation management, trail repair, and repair of park appurtenances. Maintenance activities include mowing, trail grading and filling, revegetation, coyote brush removal, maintenance of signs and benches, and application of herbicide. The current maintenance practices are described below. This plan recommends that some of the current maintenance practices be modified to benefit burrowing owl, and that some activities be added. The modifications and additions are described in section 8.0 of this report.

7.1 Mowing

Currently mowing is conducted in May as a weed maintenance measure and to provide sunlight to native perennials. All hydroseeded areas are mowed to a height of four to six inches, with mowing repeated as necessary to meet these height specifications. Mowing is conducted with a wheeled tractor fitted with a flail or rotary mower. A modified mowing regime to increase the prey base for burrowing owl (and other raptors) is recommended in section 8.5.

7.2 Trail Maintenance

Six to 12-foot wide pedestrian and cycling trails were constructed using an oyster shell, base rock and decomposed granite bed. Current maintenance methods used to maintain unobstructed access along these pathways include spot treating weeds with herbicide. . “Renegade paths” created by cyclists and hikers who stray from established routes are rototilled and seeded on an as-needed basis. Seeding occurs in winter months. Trails are repaired by regrading and filling potholes or low spots as needed.

7.3 Revegetation

Areas of the park slated for revegetation are prepared in advance for seeding by chiseling and rototilling to a depth of six to eight inches, then harrowing and ring-rolling to create an even bed. A balanced fertilizer is then applied at a rate of 50 pounds per acre and two inches of compost are tilled into the soil. Next, a hydroseed mix is applied. The current hydroseed mix includes the following species:

- California brome (*Bromus carinatus*)
- Blue wild rye (*Elymus glaucus*)
- California oatgrass (*Danthonia californica*)
- Purple needlegrass (*Nasella pulchra*)
- Three weeks fescue (*Festuca microstachys*)
- California melic (*Melica californica*)
- Idaho fescue (*Festuca idahoensis*)
- Tufted hair grass (*Deschamsia cespitosa*)
- Creeping rye (*Leymus triticoides*)

7.4 Coyote Brush Removal

Under current maintenance activities coyote brush is regularly removed from the park to prevent coyote brush roots from penetrating the landfill cap. Coyote brush is removed concurrently with annual mowing.

7.5 Maintenance of Mounds and Other Artistic Features

Under current maintenance activities string trimming is used around mounds, berms and other artistic features to remove weeds and other tall vegetation and to maintain an artistic appearance.

7.6 Application of Herbicide

Herbicides are not a preferred means of vegetation control, and are used with written permission of the Supervising Ranger. Herbicides are only applied in designated areas and time frames. As noted above weeds on trails are spot treated with herbicides. Herbicides may also

be used to control noxious and/or highly invasive weeds that form dense stands and reduce wildlife habitat quality.

8.0 *Proposed Burrowing Owl Management Measures*

Management actions for the burrowing owl take into account both landfill regulatory requirements and the ecological needs of the owl. Long term maintenance and management of the landfill includes monitoring of and repairs to landfill control systems and the landfill cover. Large-scale repair to areas where landfill subsidence occurs is also anticipated. While the schedule of some of this work can be planned for the non-breeding season for burrowing owls, emergency repairs may also be necessary. Burrowing owl management actions include ground squirrel control, public use and access, vegetation management, creation and maintenance of artificial burrow sites, feral cat (*Felis silvestris catus*) control, and long-term monitoring. These are summarized in Table 1 and described in more detail in the subsequent sections.

Table 1 Summary of Burrowing Owl Management Activities

Activity	Timing	Condition	Action	Precautions
Install artificial owl burrows	September to February		Area 1: construct 1 nest burrow, 3 satellite burrows according to plans in Barclay 2008. Area 2: construct 2 nest burrows, 3 satellite burrows. Area 3: construct 1 nest burrow, 2 satellite burrows. See Figures 7 and 8.	Burrow construction is predicated on approval by landfill regulatory agencies, which may impose additional requirements.
Install habitat features such as rock piles and mulch piles (Figure 9).	September to February	Install these features where rodents and insects are infrequently observed and/or vegetation has not yet become established.	Create a minimum of 5 rock piles and 20 brush/mulch piles up to a maximum of 50 habitat features for owl prey species throughout both nesting and foraging areas. To make rock piles, stack 15 to 17 6-inch minus-sized rocks, rip rap or similar. Mulch piles will consist of chipped wood, scattered to a depth of approximately 3-4” over a 100 ft ² area. Brush piles Will consist of piles of sticks or twigs, or grasses piled approximately 2 to 3 feet high by about four feet wide. See attached Figure 9 for possible locations and example photos. Maintenance, such as weeding of the habitat features is not required.	Tentative locations show in Figure 9 may be subject to approval by landfill regulatory agencies.
Install instructional signage	As soon as feasible after approval of the Interim Park Plan.		Along the edge of pathways bordering nesting habitat, install signage stating “Sensitive Wildlife Area. Please Stay Out”. Consider adding signage which says, “Sensitive Wildlife Area. Do not dump or feed cats” and “Please no dog walking in this area. Keep dogs on a leash at all times”.	Keep signage vague to discourage vandalism of burrows or harassment of nesting owls.
Mowing of forage habitat (Figure 8)	Yearly - April and May		Mow at the minimum frequency necessary for fire and weed control. The goal is to create foraging habitat with sufficient cover for small rodents and insects. Slopes with a grade steeper than 25% will be mowed at a decreased frequency to help create a mosaic of different vegetation heights throughout the forage habitat. Where weeds form dense, single-species stands in the forage habitat, mowing frequency can be increased. Mowing may also be combined with other methods of weed control in these areas. Where vegetation cover is sparse consider adding mulch or brush piles.	Avoid mowing at dawn or dusk when owls are normally active.
Mowing of burrow habitat (Figure 9)	Yearly – February and November if owls are present. Feb, May, August and November if owls are not present. Mowing in the vicinity of active burrows may be done under the guidance of a qualified biologist and must follow the guidelines of the CDFW Staff Report (2012).	Mow to keep vegetation at a height of approximately 5 inches or less.	Conduct preconstruction surveys for nesting owls prior to undertaking mowing between February and August. If an active owl nest burrow is found, an avoidance buffer of 250 feet should be established. No mowing should occur inside that buffer. In consultation with a qualified biologist, an impact assessment can be conducted and if appropriate, buffer sizes may be reduced in accordance with the CDFW Staff Report on Burrowing Owl Mitigation (2012). Do not string trim breeding habitat areas. Mow only.	No mowing should occur within 250 feet of any active burrowing owl nest burrow unless a qualified biologist has conducted an impact assessment and established alternative buffer distances in accordance with the guidelines established in the CDFW Staff Report on Burrowing Owl Mitigation (2012)

Activity	Timing	Condition	Action	Precautions
Artificial burrow maintenance	Annually in early spring. February is suggested.	Debris accumulated at the burrow entrance.	Conduct a survey for overwintering burrowing owls prior to clearing. Do not conduct maintenance on occupied burrows. Clear the PVC tubing that makes up the burrow entrance of any obstructions along its entire length using a plumbing snake such as a General Pipe Cleaners D-25-2 Handy Drain Auger.	Do not conduct maintenance on burrows occupied by burrowing owls.
Feral cat control.	As needed	Cats are observed in the Park.	Live trap and transport to Palo Alto Animal Care and Control.	The non-native red fox (<i>Vulpes vulpes</i>) may also occur at Byxbee Park Hills and is known to prey on ground-nesting birds. Contact United States Department of Agriculture for guidance on fox control should they be observed.
Landfill maintenance activities	As needed	Emergency or routine landfill maintenance is needed.	Conduct a survey for burrowing owls prior to conducting any landfill maintenance activities. Burrowing owls could potentially occupy a variety of natural and man-made features throughout the area, so surveys should be conducted to ensure that maintenance activities do not impact owls. If owls are found to be present within 250 feet of work in the breeding season or within 170 feet of work in the non-breeding season, contact CDFW for guidance.	If owls are detected during the breeding season, a 75-meter (~250 feet) avoidance buffer should be maintained around any occupied burrow until young have fledged. If owls are detected during the non-breeding season a 50-meter (~170 feet) avoidance buffer should be established for the duration of the activity or until owls are no longer present.
Vegetation survey for grass height and weed control	Late January, April, July and October.			
Monitoring burrowing owl use	3 times spaced apart during the breeding season (suggest March, June, August); CNDDDB report once per year	Survey each burrow habitat area for signs of owl use at the burrow entrances; document which burrows are in use. Observe burrow and forage areas for owl activity at dawn and at dusk. Report burrow survey results to landfill and park maintenance staff so that avoidance measures can be implemented if necessary. Report sightings to the California Natural Diversity Database annually (https://www.dfg.ca.gov/biogeodata/cnddb/submitti ng_data_to_cnddb.asp). If burrowing owls are not observed, the Supervising Ranger should consider measures to improve habitat conditions such as by altering the mowing regime, changing mowing heights, or increasing the number of prey habitat features (e.g., rock, brush, mulch piles).		
Monitoring burrowing owl habitat quality.	3 times spaced apart during the breeding season (suggest March, June, September)	Maintain overall vegetation cover at approximately 70%, and no less than 50%. No more than 50% of all areas of the park intended to be vegetated either with hydroseed or other planting, should remain bare ground. If 70% vegetative cover is not achieved, staff will review remediation measures to increase the vegetative cover, such as re-seeding with a revised seed mixture.	Survey rock, mulch and brush piles for presence of small mammals and insects. Conduct a visual inspection of the rock piles for small mammals, and/or signs of mammal use such as droppings, flattened grasses. Inspect brush piles by lifting material with a shovel or similar to see if rodents, insects or other prey species move out of the pile when disturbed. Report results to the Supervising Ranger. If prey species are not present, the Supervising Ranger should consider decreasing the mowing frequency, repeating hydroseed application, and/or adding more habitat features such as rock, mulch and brush piles.	If vegetation is too sparse, burrowing owl prey species are unlikely to be present, and burrowing owl habitat would be considered of low quality. If vegetation is too tall in dense stands, burrowing owls will not be able to access the habitat to forage or breed. Dense monotypic stands of invasive weed species should be controlled using methods known to control the particular species. This may include mowing at a particular time of year, hand pulling, applying herbicide, or a combination of methods. Refer to the Maintenance Plan for a more detailed description of weed control techniques.

8.1 Set Aside Burrow Habitat Areas and Manage Remaining Areas for Forage

The City of Palo Alto has designated three areas on the landfill/park totaling 6.6 acres that will be designed, protected, and maintained as burrowing owl nesting burrow habitat (Figure 8; please also see Figure 2 of the Byxbee Park Hills Interim Park Concepts Plan Narrative for the February 2015 proposed layout of the trail system) if approved by landfill regulatory agencies. These areas are located a sufficient distance from control systems (e.g., condensate traps and piezometers), maintenance roads, and from the new ET cover in Phase IIC to allow maintenance activities to occur without disturbing owls or owl burrow habitat. These areas are also located with public use and proximity to forage habitat in mind. Artificial burrows will be installed in these areas (see section 8.3, below). Perimeter berms will be built around these burrow areas so that they are clearly delineated for staff and the public. It is recommended that signs be installed to restrict access to these areas. Maintenance activities, including both park and landfill maintenance, are not excluded from these areas. In order to prevent ponding of surface water, the landfill cover in these areas will be contoured to match existing landfill slopes. Nesting habitat will be managed for owls, and will not include features that may be in other areas of the park such as benches for seating or areas where people are encouraged to congregate.

The remaining 120 acres of the capped and closed landfill will be revegetated with annual grassland species, and can be managed in a way that enhances burrowing owl forage habitat. Management measures include mowing, installing habitat features to support prey species the owls eat, and monitoring. The specific management measures are described in Sections 8.2 through 8.7.

8.2 Ground squirrel management

While burrowing owls are known to occur in situations where ground squirrels are absent, they are most likely to persist and thrive in an area with an active ground squirrel population. The owls use the burrows for cover and also find insects there for food; the owls do not eat the ground squirrels. The squirrels maintain the burrows and their food stores and excrement attract the insects and small mammals that the owls can eat. At Shoreline Park, Phil Higgins found that the most commonly consumed prey item of burrowing owls was earwigs (*Forficula* sp.). This could be because of the burrow microclimate (Phil Higgins, personal communication) and the vegetative material and excrement that attract earwigs (University of Lethbridge 2014).

The University of California Ground Squirrel Best Management Practices (University of California 2014) states that “the average squirrel burrow is usually less than three feet deep”. Two feet of cover is applied to the entire landfill cap in advance of hydroseeding. Five feet of additional cover will be added to the three areas set aside for burrowing owl nest burrow habitat to provide a total of seven feet of burrowing substrate. Ground squirrels will not be managed in these three areas, and are expected to colonize and establish burrows which will provide natural nesting habitat for burrowing owls as well as habitat for insects that provide food for the owls.

8.3 Installation and Maintenance of Artificial Burrows, Mounds, Perches and Other Habitat Features

Artificial nest burrows have proven to be an effective alternative to natural ground squirrel burrows, but they are most successful where a population of ground squirrels is present (Phil Higgins, personal communication). The entrances to the artificial owl burrows installed at nearby Shoreline Park in Mountain View accumulate dirt and debris except where ground squirrels are present (Phil Higgins, personal communication). The ground squirrels apparently remove dirt

and debris from the entrances, and probably from the tunnels as well, as part of their normal activities. Apparently the owls do not maintain the burrows. If necessary, artificial burrows can be kept clear by maintenance personnel. Maintenance involves clearing out debris such as dead and live vegetation, trash, and/or dirt that has accumulated at and is blocking the PVC tubing that makes up the entrance to the burrow. Maintenance should be completed once in early spring, in advance of burrowing owl nesting season and should be done with the use of a plumbing snake such as a General Pipe Cleaners D-25-2 Handy Drain Auger, so that the entire alignment of the burrow entrance can be cleared.

The burrow design proposed for use in Byxbee Park Hills will be based on the design in “A Simple Artificial Burrow Design for Burrowing Owls” (Barclay 2008) (Figure 7). This design uses unperforated plastic drain line as “burrows” leading to plastic irrigation valve boxes for nesting. The four-inch plastic tubing in Barclay’s design will be substituted with a six-inch tube, with a slot cut along its length that allows owls to walk along the natural substrate instead of on the plastic tubing. The concrete block (labeled D in Figure 7) can also be eliminated from the burrow design as burrowing predators have not been known to be a local problem (Phil Higgins personal communication). This design has been used successfully at nearby Shoreline Park in Mountain View. Artificial burrows created at grade rather than on a mound are easier to mow, but do not provide the elevated perch that a typical natural squirrel mound does..

Each nesting burrow area can contain one primary burrows (with at least two entrances). Satellite burrows have just one entrance. The exact spacing will be determined in the field at the time of installation, however, artificial burrows should be spaced no closer than 110 meters (approximately 360 feet) (Green and Anthony 1997). Nest and satellite burrows both use the design shown in Figure 7, but nest burrows differ in the number of entrances. The areas set aside for burrow nesting habitat and foraging habitat within Byxbee Park Hills and the approximate number and locations of artificial nest burrows and satellite burrows are shown on Figure 9.

Rock and brush piles placed throughout the nesting and foraging habitat will provide cover for insect and small rodent prey species, and can serve as perches for burrowing owls. Piles of mulch are also recommended because they provide habitat for both rodents and insects (Trulio and Higgins 2012b) particularly in the interim period before vegetation cover becomes established at the park. It is recommended that a minimum of five rock piles and 20 brush/mulch piles be installed, and that a maximum of 50 habitat features for owl prey species be created throughout the park, including both nesting and foraging areas. These features are described as follows, and possible locations are shown in Figure 10.

- Rock piles are small. Stack 15 to 17 6-inch-minus rocks, rip rap or similar into a pile.
- Mulch piles consist of chipped wood, scattered to a depth of approximately 3-4” over a 100 ft² area.
- Brush piles will consist of piles of sticks or twigs, or grasses piled approximately 2 to 3 feet high by about four feet wide.

Maintenance of the rock and brush piles is not anticipated to be necessary. These features are intended only as habitat features for burrowing owl prey species, and will continue to function effectively if weed species become established.

8.4 Public Access for Hiking and Dog Walking and Instructional Signage

Public access to Byxbee Park Hills is available, but limited to hiking trails. Hikers and dog walkers are allowed on all trails, but dogs must be kept on leash at all times. Dogs will be excluded from the 6.6 acres set aside as nesting burrow habitat as well as from perimeter

berms that delineate these areas, but will be allowed on the adjacent trails. Signage will be placed at regular intervals along the trails mandating that all activities, including hiking, dog walking and bicycling be restricted to established trails.

8.5 Hydroseeding, Mowing and Weed Management

The finished landfill will be hydroseeded with grassland species. Purple needlegrass (*Stipa pulchra*) and small fescue (*Festuca microstachys*) are included in the hydroseed mix throughout the park. These native California species were present in the burrowing owl's natural habitat prior to the introduction of invasive non-native grass species and have the advantage of being adapted to California's naturally occurring periods of drought. Because of their naturally low-growing morphology, they require less mowing to maintain optimal nesting habitat conditions for burrowing owls. These two grass species should be preferentially applied on and within 50 feet of the nest mounds. California sagebrush (*Artemisia californica*) and sticky monkey flower (*Mimulus aurantiacus*), beach evening primrose (*Camissoniopsis cheiranthifolia*), and American dunegrass (*Leymus mollis mollis*) should be eliminated from the hydroseed mix for burrowing owl nesting burrow areas.

Grasses and weeds must be managed for fire control and habitat quality. It is recommended that the grassland vegetation in the nesting burrow habitat areas be maintained at a height of less than five inches to allow an unrestricted view of the surrounding habitat from the burrow. Vegetation that is allowed to grow too tall will discourage owls from colonizing the site and may cause them to abandon a site in which they have overwintered in preference for an area with lower vegetation. Mowing in owl nesting burrow habitat should be completed in February and November if owls are present, and in February, May, August and November if owls are not present. If it is necessary to mow when owls are present, a qualified biologist needs to evaluate the impacts in accordance with the CDFW Staff Report on Burrowing Owl Mitigation (2012, or as updated by CDFW). No mowing should occur within 250 feet of any active nest burrow. Because string trimming is a slower method of weed control, it requires a much more invasive human presence, so string trimming should not be done in the nesting burrow habitat areas if burrowing owls have been documented to occupy these areas.

Optimal owl foraging habitat consists of grasslands with a healthy population of small rodents and insects, so it is recommended that the forage habitat only be mowed as necessary for fire suppression, which will depend on rainfall.

Noxious and invasive weed species (as defined by the California Invasive Plant Council or the Supervising Ranger) can establish dense patches that will not provide habitat for burrowing owls. The treatment methods for these weeds are species-specific and may or may not include mowing. Weed management should follow the guidelines of the Landscape Plan, and may also consider professional guidance such as provided in "Weed Control in Natural Areas in the Western United States" by the University of California Weed Research and Information Center. The University of California Integrated Pest Management website should also be consulted for specific weed management guidelines (http://www.ipm.ucdavis.edu/PMG/weeds_all.html). No weed management will occur within 250 feet of burrows occupied by burrowing owl. String trimming will be avoided and only used where mowing is not possible.

8.6 Feral Cat Control

In April 2014 the Palo Alto City Council approved an ordinance that prohibits feeding wildlife and feral animals in Palo Alto parks and other open-space areas. City staff has observed that feeding stations for feral cats lure in other pests and predatory species including rats, skunks,

raccoons, opossum and nuisance birds such as gulls and crows. Feral cats that are fed continue to hunt wildlife and are a particular threat to ground-nesting birds (City of Palo Alto 2013). Cats will also reduce the native rodent population as noted in a study at the East Bay Regional Park District by the American Bird Conservancy (Winter and Wallace 2004), further degrading the site suitability for burrowing owls.

While feral cats are limited in number at Byxbee Park Hills, the following measures are recommended to minimize impacts on the burrowing owl. Any feeding stations that are found within the park will be removed and whenever they are observed in the park, feral cats will be live trapped and transport to Palo Alto Animal Services. The City of Palo Alto also has an agreement with the United States Department of Agriculture (USDA) to capture predators of the Federally Endangered Ridgeway rail (*Rallus obsoletus*) formerly known as the California Clapper Rail. Predators of the rail include feral cat and non-native red fox (*Vulpes vulpes*), two species which may also prey on burrowing owl. This agreement with the USDA benefits the local burrowing owl population by expending the area in which their predators are controlled.

8.7 Monitoring, Reporting and Adaptive Management

An ongoing program that includes monitoring of the burrowing owl habitat, prey base, artificial nest burrows, and nest success, is necessary to ensure the effectiveness of this program. It is recommended that a qualified biologist familiar with the foraging and breeding habits of burrowing owls train park personnel on how best to undertake a monitoring effort that answers the following questions:

- Are invasive weeds being managed effectively?
- Is vegetation height within artificial nest burrow sites and foraging habitat maintained at a height optimal for nesting and foraging success? For example, vegetation within 100 feet of the burrows, and ideally throughout the burrow habitat should be mowed to a height of five inches or less (Trulio and Higgins 2012b), but taller vegetation is desirable in forage areas to support sufficient cover for rodents. Is there a mosaic of vegetation heights and prey species habitat?
- How much vegetation cover is there throughout the park? No more than 30% of all areas of the park intended to be vegetated either with hydroseed or other planting should remain bare ground in order to optimize habitat for burrowing owl prey species.
- Are ground squirrels present in the park? Are there natural ground squirrel burrows present or evidence that squirrels are occupying artificial burrows?
- Are conditions on the site favorable to support burrowing owl prey species, or if not, are they improving? To improve conditions for owl prey species, should the mowing regime be changed, or should vegetation cover, rock, brush and mulch piles be increased?
- Is there evidence of cat feeding stations, are cats present in the park?
- Are owls present at Byxbee Park Hills? Are they foraging or breeding?

The following surveys are recommended:

- A vegetation survey once in March and again in late June, with a final survey in early August when annual grasses and forbs tend to go into a state of dormancy.
- A survey every three months to assess burrowing owl prey species, ground squirrel, feral cat, and burrowing owl populations.
- A survey of artificial and natural burrows will be undertaken on a monthly basis during the breeding season for burrowing owls, to determine if burrows are occupied by single or mated burrowing owls. Note the presence and number of any burrowing owl chicks.
- Any active owl burrows in Byxbee Park should be protected from impacts from landfill maintenance projects to the greatest feasible extent, based on landfill post-closure regulations. The California Burrowing Owl Consortium guidelines (1993) recommend

that an activity-specific plan to protect burrowing owls should be developed for each project that occurs within 50 meters (170 feet) of an occupied burrow during the non-breeding season (September 1 through January 31), and within 75 meters (250 feet) during the breeding season (February 1-August 31). If owls are detected during the breeding season, a 75-meter avoidance buffer should be maintained around any occupied burrow until young have fledged. If owls are detected during the non-breeding season a 50-meter avoidance buffer should be established for the duration of the activity or until owls are no longer present. Report burrow survey results to landfill and park maintenance staff so that avoidance measures can be implemented if necessary. Report sightings to the California Natural Diversity Database annually (https://www.dfg.ca.gov/biogeodata/cnddb/submitting_data_to_cnddb.asp).

The results of these surveys should be used to evaluate the effectiveness of the plan and determine if changes are needed to adapt the plan to changing needs of the burrowing owl population or other species of concern.

9.0 CONCLUSION

This burrowing owl management plan uses a combination of ground squirrel and vegetation management techniques to encourage owls that currently inhabit nearby areas (Shoreline Park, Moffett Federal Airfield) to venture into Byxbee Park Hills to forage and perhaps breed. Artificial nest burrows established in areas of the park protected from public use will provide refuge for foraging owls and possibly nesting habitat so that the burrowing owl population in the south bay could increase. While one of the goals of this plan is to establish Byxbee Park Hills as a breeding area for burrowing owls, it is recognized that areas where ground squirrel populations can remain and burrowing owls can nest undisturbed are restricted by the need for ongoing maintenance of the landfill. Expanding foraging habitat for owls has a high chance of success and will benefit a broad range of species. Creating and managing grasslands in Byxbee Park Hills will improve the habitat for small mammals and birds, which will provide a food source for large mammals and birds of prey that forage in the same habitat.

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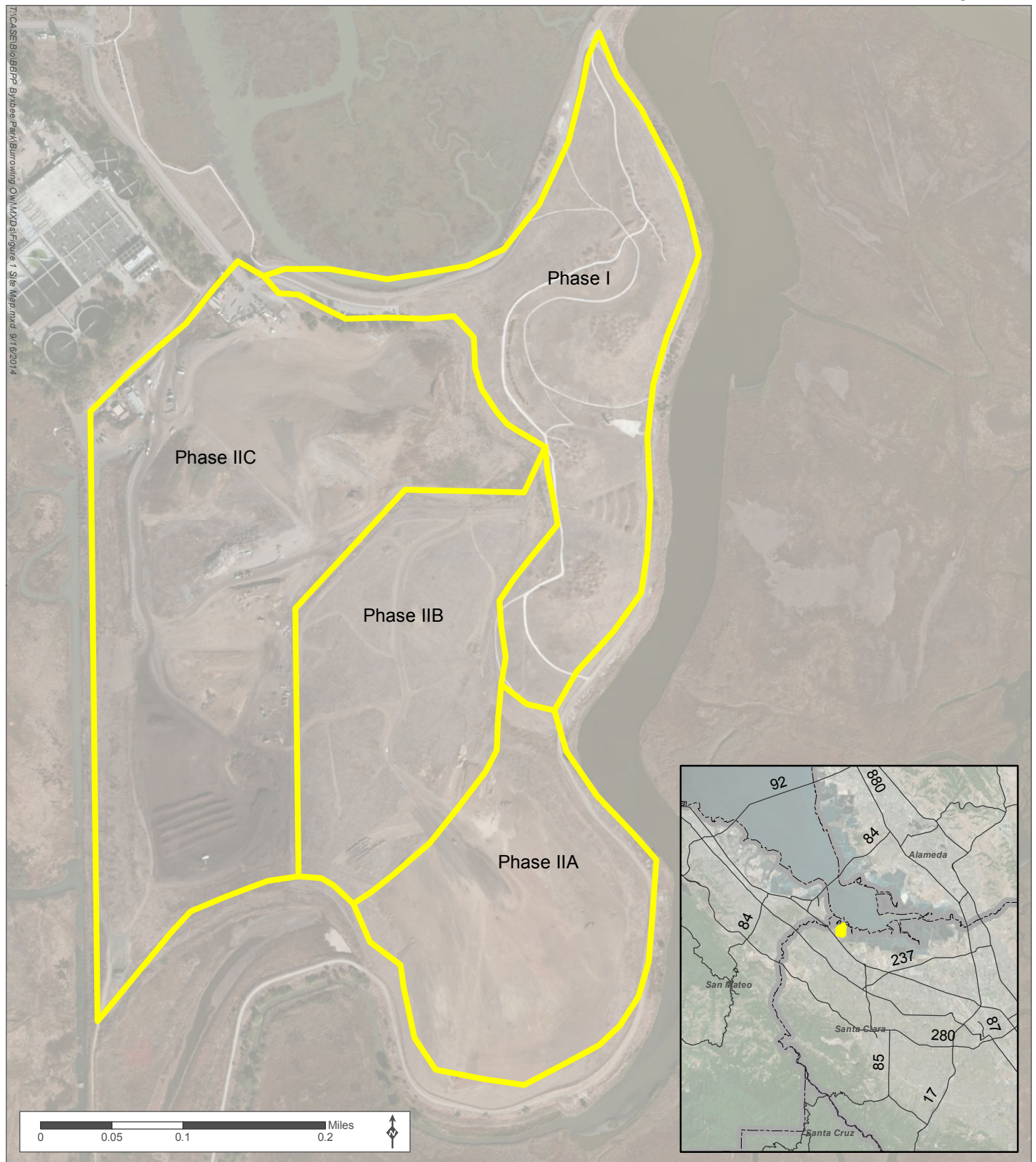
BURROWING OWL MANAGEMENT PLAN FOR THE BYXEBEE PARK FINAL INTERIM PARK PLAN

APPENDIX A

FIGURES

MIG|TRA Environmental Sciences

OASIS Associates

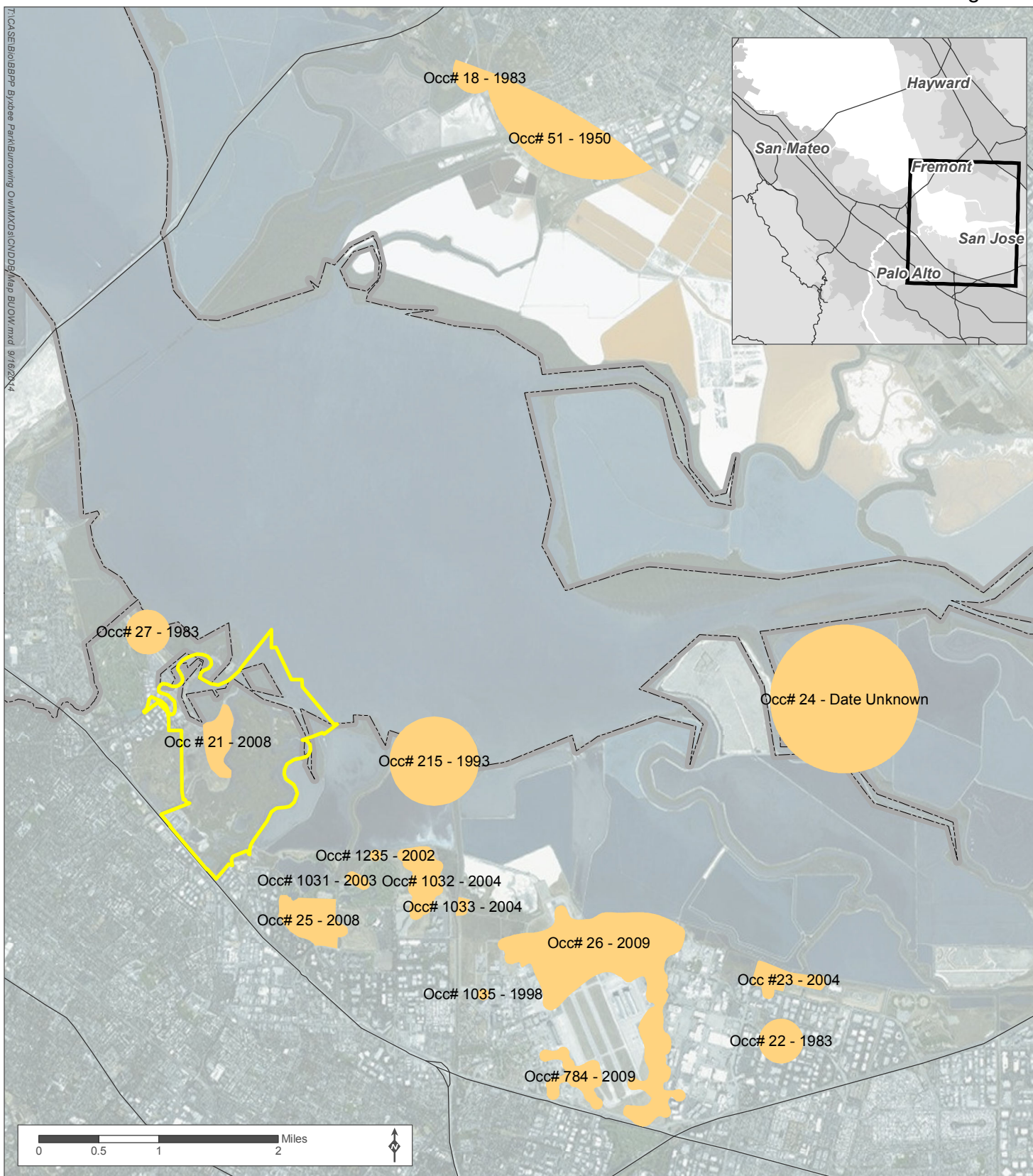


Source: TRA Environmental Sciences, Inc., Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Byxbee Park Hills Limits and Closure Phases

Figure 1 Regional and Site Vicinity

Byxbee Park Hills

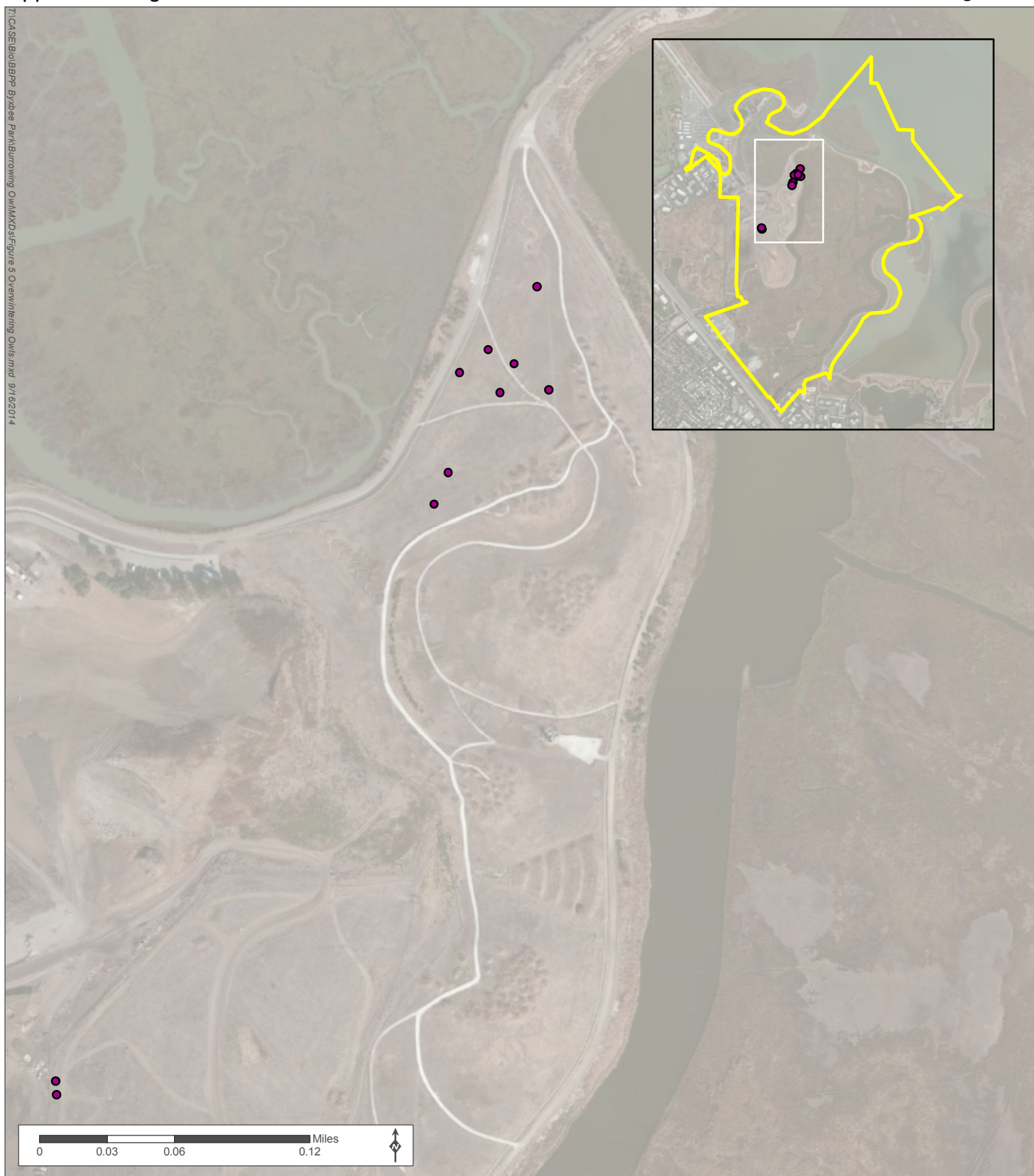


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- Burrowing Owl CNDDDB Occurrence # and Date (see text for descriptions)
- Palo Alto Baylands Which Includes Byxbee Park Hills
- Major Road
- County Boundary

Figure 2 Burrowing Owl Locations within 5 Miles

Byxbee Park Hills

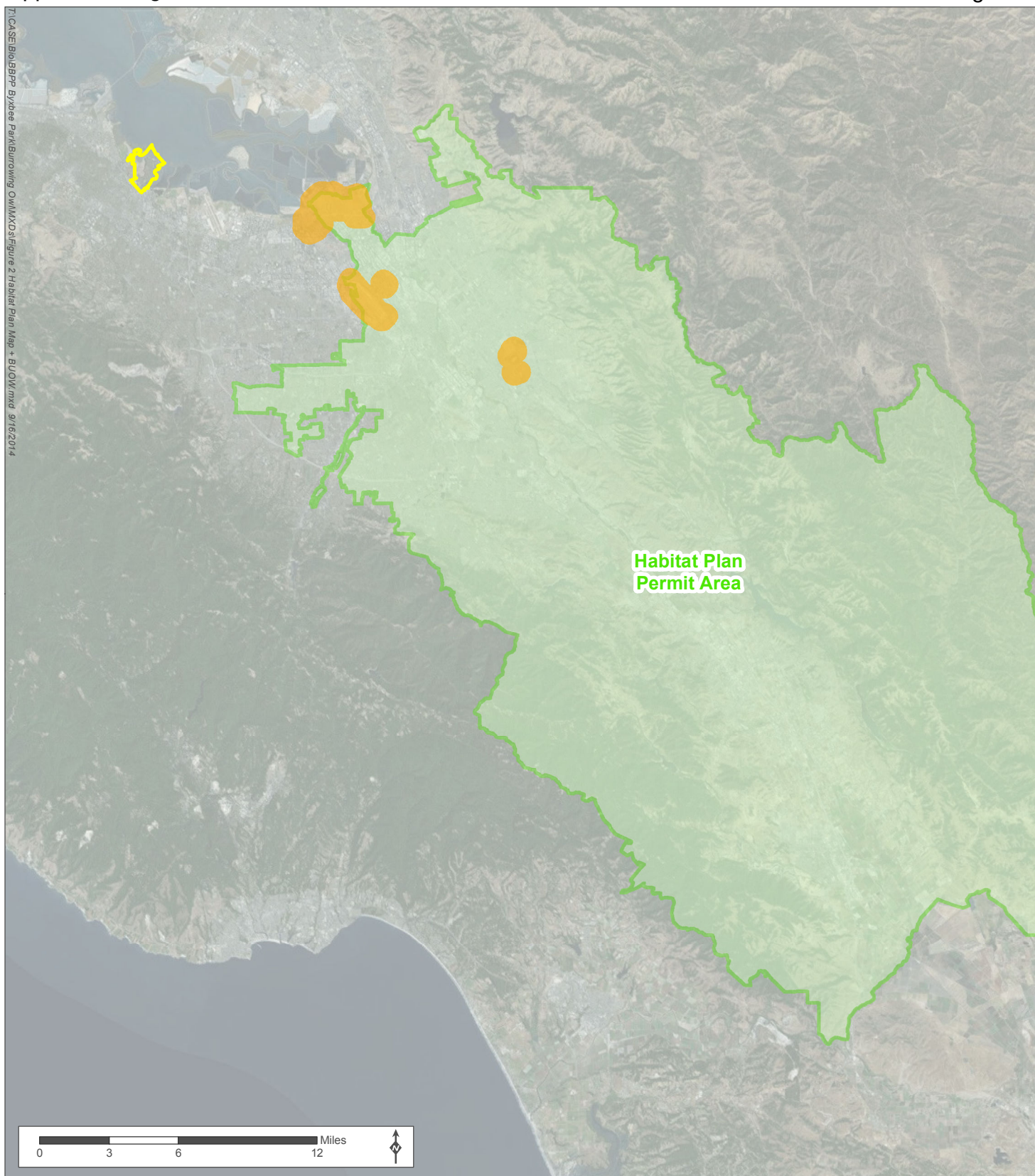


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- Burrow
- Palo Alto Baylands Which Includes Byxbee Park Hills

Figure 3 Past Locations of Overwintering Owls

Byxbee Park Hills

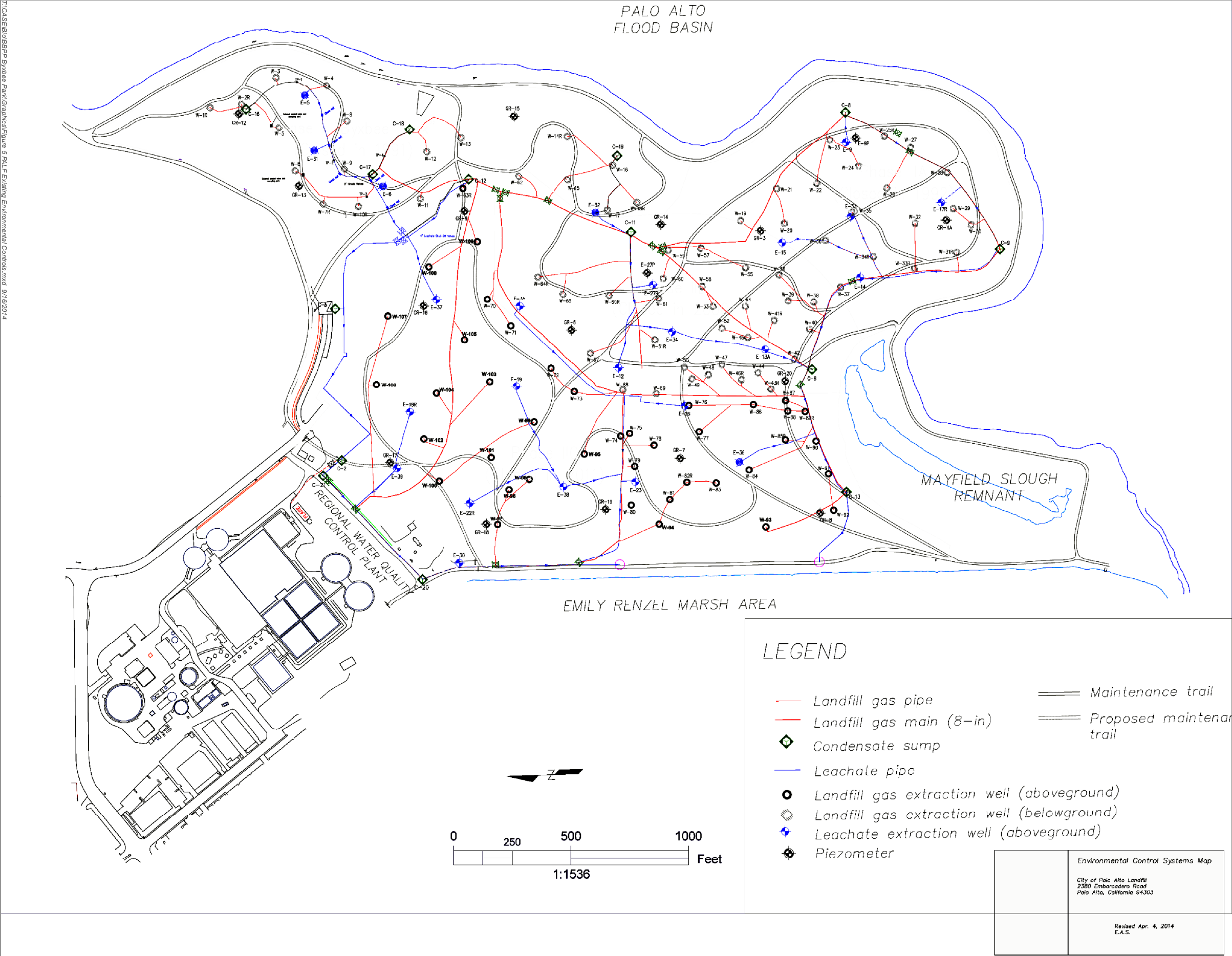


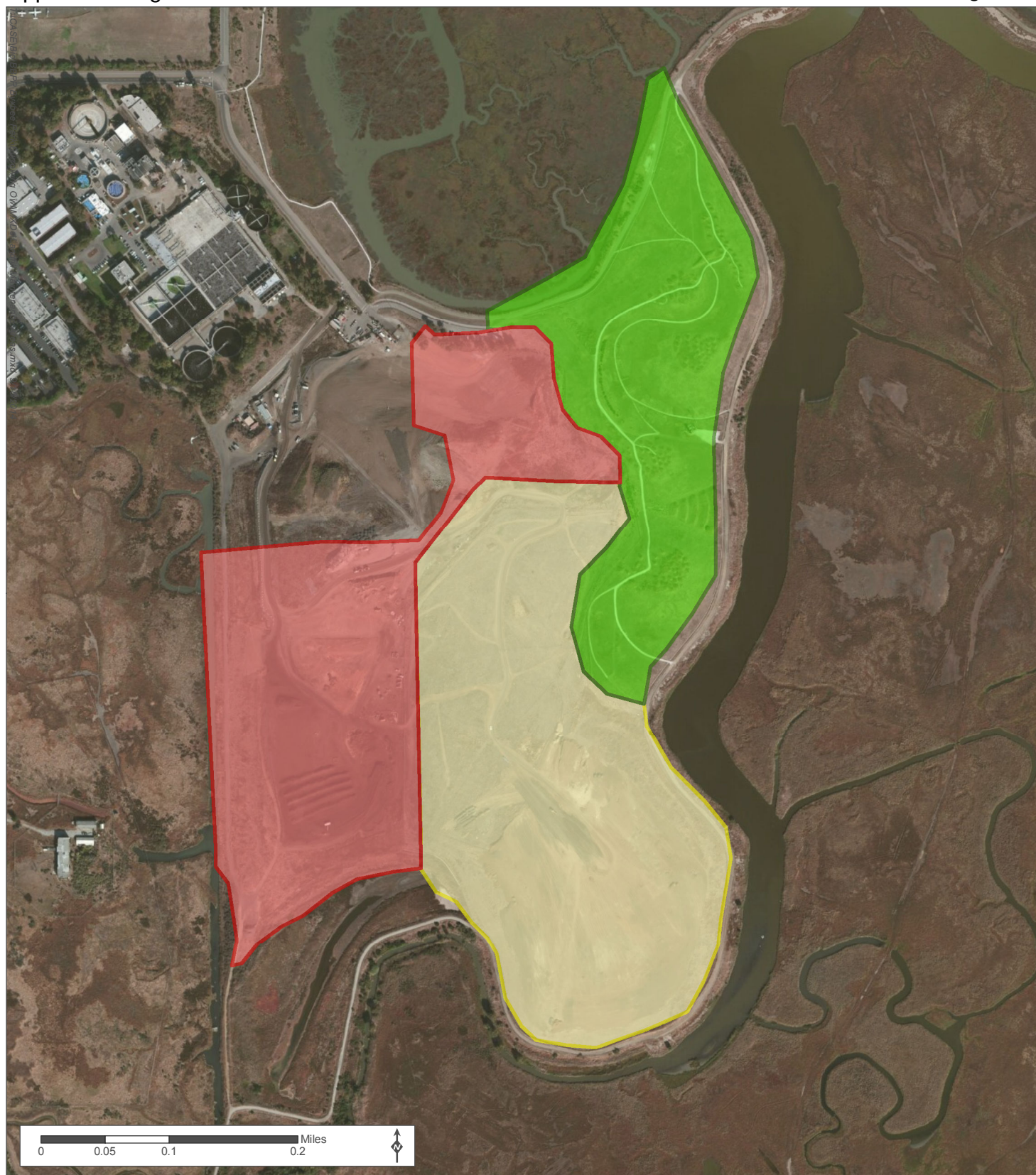
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- Palo Alto Baylands Which Includes Byxbee Park Hills
- Burrowing Owl Fee Zones
- Habitat Plan Permit Area

Figure 4 Santa Clara Valley Habitat Plan Area Map
with Expanded Burrowing Owl Study Area

Figure 5
PALF Existing
Environmental Control
Systems
Byxbee Park Hills





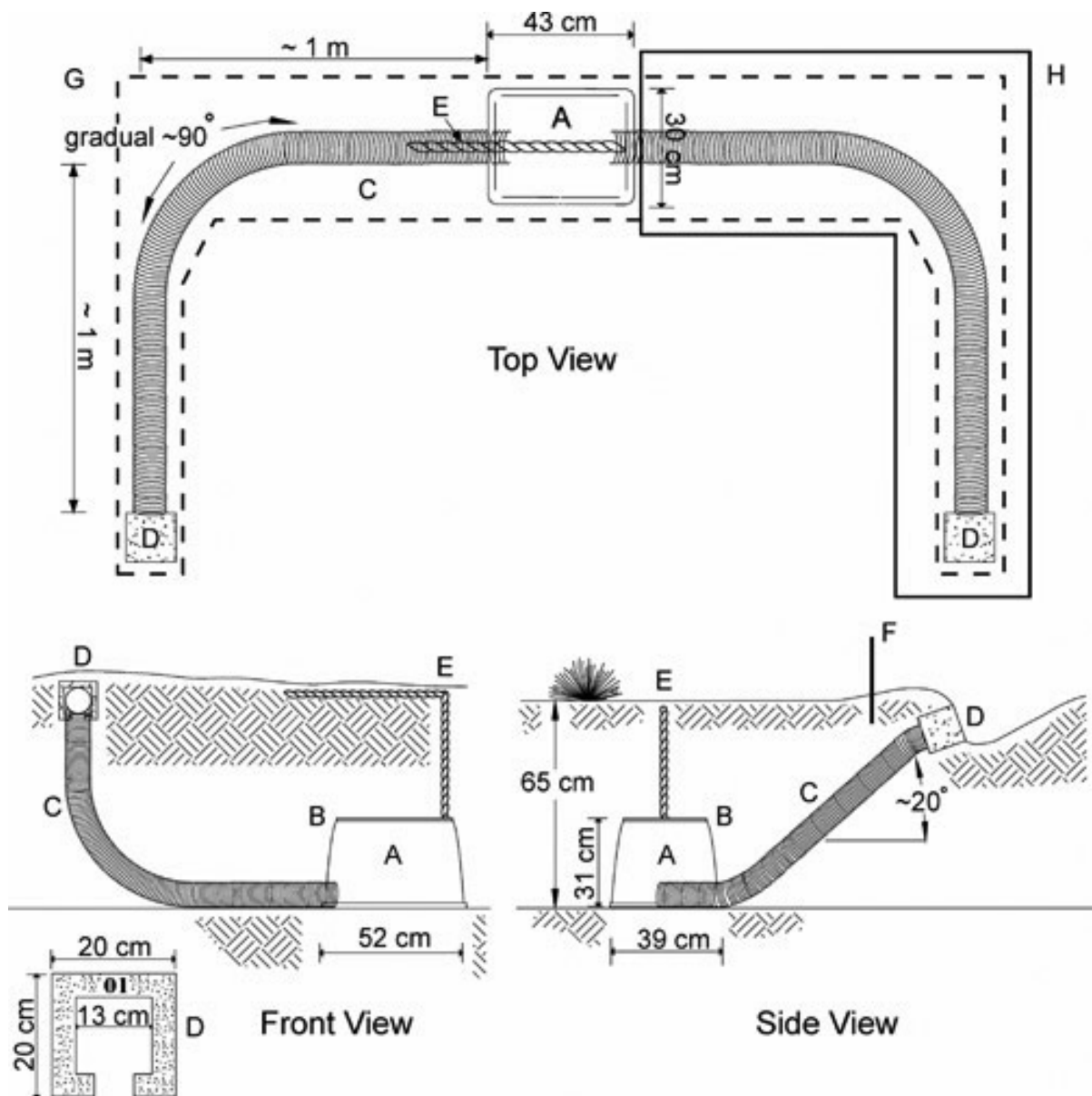
Source: TRA Environmental Sciences, Inc., Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Mowing

- Mowed Yearly Beginning 2015
- Mowed Yearly
- Side Slopes Mowed Less Frequently

Figure 6 Mowing and Maintenance Areas

Byxbee Park Hills



- A - Plastic irrigation valve box, 48 cm long x 35 cm wide x 27 cm high (inside dimensions)
- B - Removable lid
- C - Ca. 2 m of 10-cm diameter perforated flexible plastic pipe
- D - 20 x 20 x 15 cm hollow concrete block
- E - Plastic rope or chain marking location of nest chamber on ground surface
- F - 0.5 m perch post (optional)
- G - Excavation footprint for installation - - -
- H - Optional second entrance

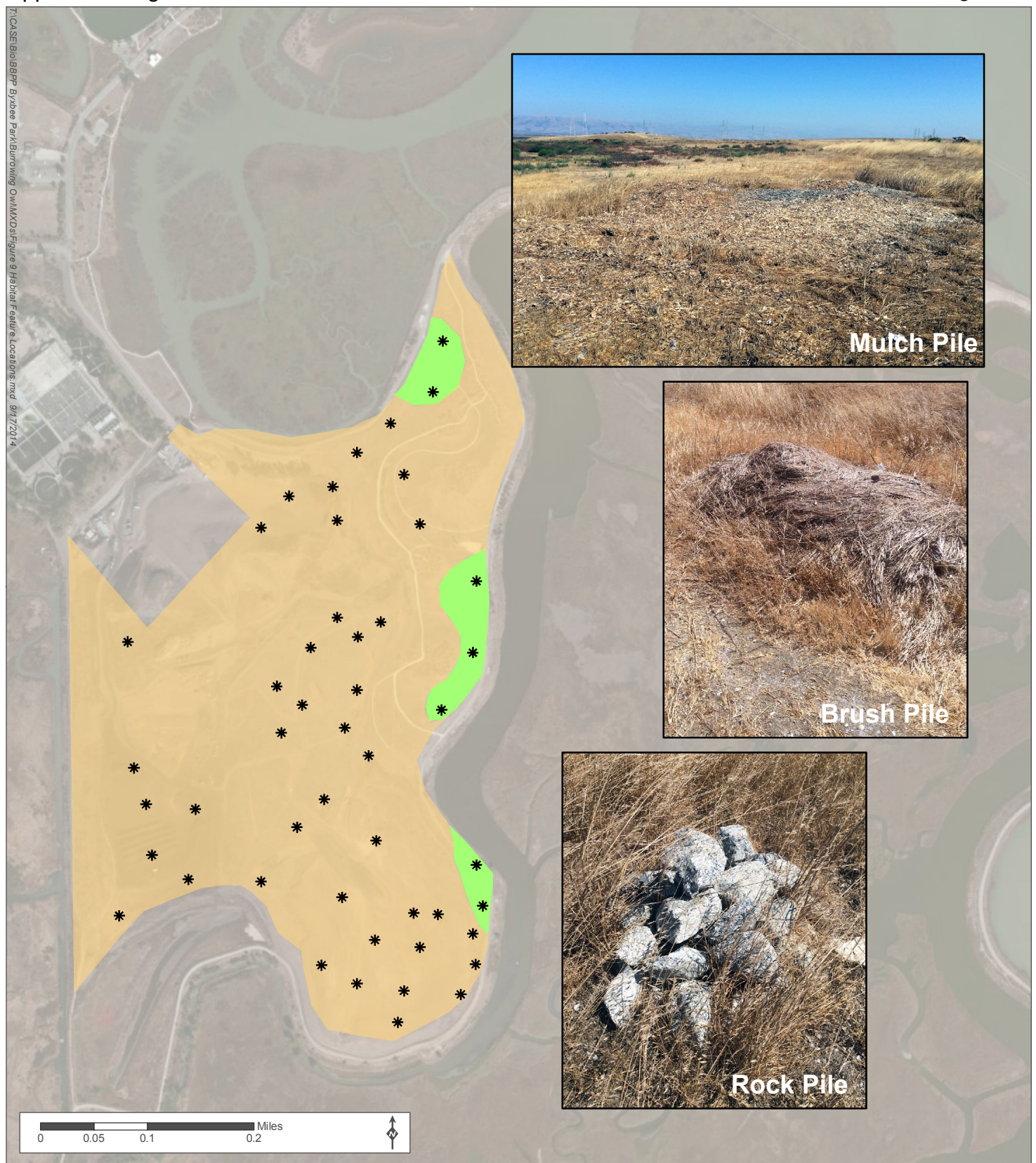
Figure 7 Artificial Burrow Design (Barclay 2008)



- Nest Burrow (2 entrances)
- Satellite Burrow (1 entrance)
- Forage Habitat
- Burrow Habitat

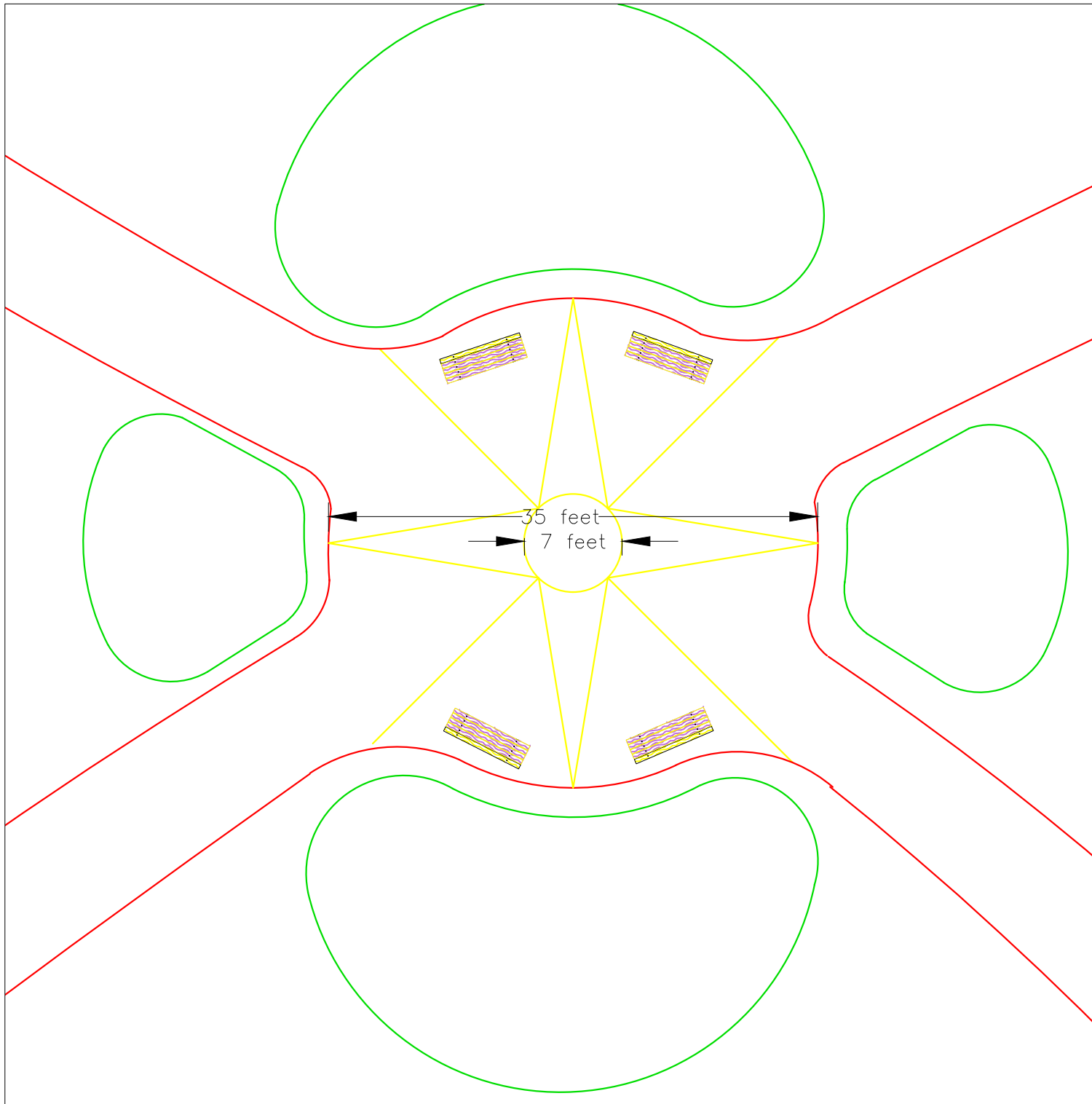
Figure 8 Burrowing Owl Burrow Habitat Locations

Byxbee Park Hills



- * Tentative Habitat Feature Locations
- Forage Habitat
- Burrow Habitat

Figure 9 Tentative Locations for Prey Species Habitat Features



INTERIM PARK CONCEPTS

CITY OF PALO ALTO

PALO ALTO, CA

REVISED COMPASS ROSE

4/8/2015 ES