Appendix E

Wetland Mitigation Plan

Wetland Mitigation Plan (Appendix E) Updates

The Wetland Mitigation Plan will follow the same strategy as the plan proposed in Appendix E of Zentner and Zentner (2018). Wetland mitigation plan objectives, site information, development and avoidance procedures, maintenance plan, performance standards, and monitoring requirements will remain unaltered. However, as the Project will now impact a greater acreage of jurisdictional wetlands (0.30 acre), the size of the mitigation wetland will be increased from 0.50 acre to 0.60 acre to account for a 2:1 mitigation-to-impact ratio that will likely be required by the Corps. Construction of the 0.60-acre mitigation wetland would require the grading of 1.31 acres of land. This wetland will be constructed in the same region of the Eastern Parcel and is depicted in Figure 5 of this appendix. The constructed wetland will restore the ecological function and values of wetlands on the Property, as it will provide a large, contiguous source of on-site hydrology and wetland habitat.

References

Zentner and Zentner. 2018. Pacifica Quarry Reclamation Plan (Walsh Engineering). Prepared for the Preserve at Pacifica. July 25, 2018.

Figures

This Page Intentionally Left Blank

Figure 2.
Site Plan

Reclamation Plan
Rockaway Quarry Reclamation Project
Pacifica, San Mateo County, California

Property Boundary - 86.20 ac.

Project Area - 27.42 ac.

Culverts

Reclamation Areas

- Reclamation Access - 1.13 ac.
- Existing Culvert Replacement - <0.01 ac.
- East Flank - 5.38 ac.
- Hilltop - 4.40 ac.
- Temporary Culvert Installation - <0.01 ac.
- Quarry Face - 4.59 ac.
- Quarry Pit - 8.00 ac.
- Southern Bluff - 2.46 ac.

Mitigation Areas

- Mitigation Area Limit of Work - 0.71 ac.
- Proposed CRLF Mitigation Pond - 0.15 ac.
- Proposed Mitigation Seasonal Wetland - 0.60 ac.

N

0 200 400
Feet

wra
ENVIRONMENTAL CONSULTANTS

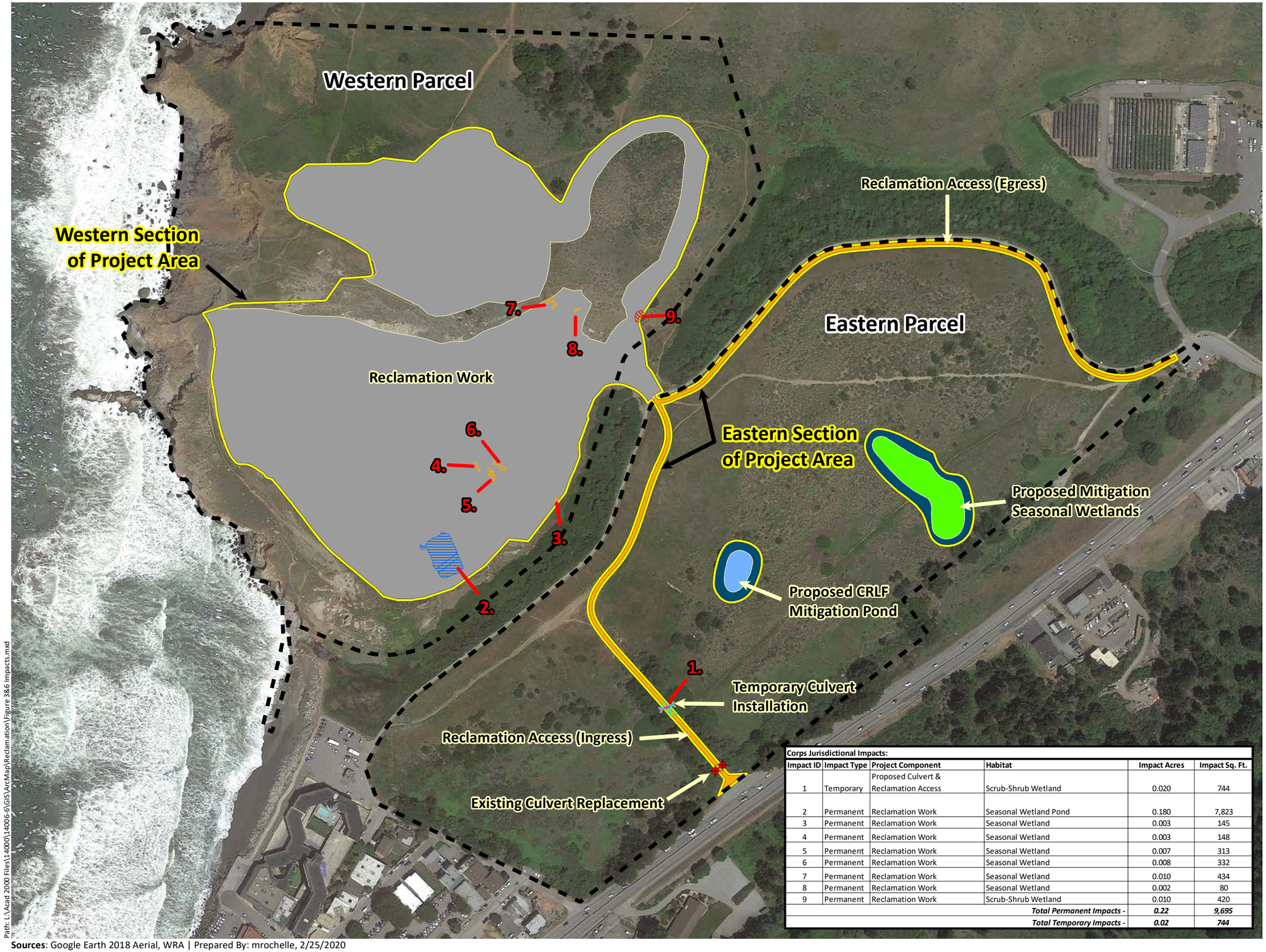
Path: L:\Acad 2000 Files\14000\14006-6\GIS\ArcMap\Reclamation\Exhibit 3 & Figures 1 2 3 Site Plan.mxd

Sources: Google Earth 2018 Aerial, WRA | Prepared By: mrochelle, 2/25/2020

This Page Intentionally Left Blank

Figure 2.
Potential Corps Jurisdictional Impacts

Reclamation Plan
Rockaway Quarry Reclamation Project
Pacifica, San Mateo County, California



Corps Jurisdictional Impacts:

Impact ID	Impact Type	Project Component	Habitat	Impact Acres	Impact Sq. Ft.
1	Temporary	Proposed Culvert & Reclamation Access	Scrub-Shrub Wetland	0.020	744
2	Permanent	Reclamation Work	Seasonal Wetland Pond	0.180	7,823
3	Permanent	Reclamation Work	Seasonal Wetland	0.003	145
4	Permanent	Reclamation Work	Seasonal Wetland	0.003	148
5	Permanent	Reclamation Work	Seasonal Wetland	0.007	313
6	Permanent	Reclamation Work	Seasonal Wetland	0.008	332
7	Permanent	Reclamation Work	Seasonal Wetland	0.010	434
8	Permanent	Reclamation Work	Seasonal Wetland	0.002	80
9	Permanent	Reclamation Work	Scrub-Shrub Wetland	0.010	420
			Total Permanent Impacts -	***0.22***	***9,695***
			Total Temporary Impacts -	***0.02***	***744***

Property Boundary - 86.20 ac.

Project Area - 27.42 ac.

Culverts

Project Components

Permanent Impacts:

Existing Culvert Replacement - <0.01 ac.

Proposed CRLF Mitigation Pond - 0.15 ac.

Proposed Mitigation Seasonal Wetland - 0.60 ac.

Reclamation Work - 21.04 ac.

Temporary Impacts:

Mitigation Area Limit of Work - 0.71 ac.

Temporary Culvert Installation - <0.01 ac

Reclamation Access - 1.13 ac.

Jurisdictional Impacts

Permanent Impacts:

Seasonal Wetland - 0.03 ac.

Seasonal Wetland Pond - 0.18 ac.

Scrub-Shrub Wetlands - 0.01 ac.

Temporary Impacts:

Scrub-Shrub Wetlands - 0.02 ac.

N

0 200 400
Feet

wra
ENVIRONMENTAL CONSULTANTS

Path: L:\Acad 2000 Files\1400\14006-6\GIS\ArcMap\Reclamation\Figure 3&6 Impacts.mxd

Sources: Google Earth 2018 Aerial, WRA | Prepared By: mrochelle, 2/25/2020

Pacifica Quarry Reclamation Plan

Wetland Mitigation Program

Project No.:
1023 ENL

Zentner Planning & Ecology
Oakland, CA

Prepared for:
Preserve @ Pacifica LLC

Date Issued:
April 2017

TABLE OF CONTENTS

I. INTRODUCTION 3

A. EXISTING CONDITIONS 3
B. WETLANDS AND WATERS 4

II. OBJECTIVES 5

A. INTRODUCTION 5
C. IMPACTS AND MITIGATION 5
D. CONSERVATION CONTEXT 5

III. MITIGATION SITE INFORMATION 6

A. LOCATION 6
B. WATERSHED CONTEXT 6
C. OWNERSHIP AND EASEMENTS 7
D. JURISDICTIONAL AREAS 7
E. HISTORIC USES 7
G. LONG TERM CONTEXT 9

IV. LONG-TERM SITE PROTECTION 10

V. DEVELOPMENT AND AVOIDANCE 12

A. BRIEF SUMMARY OF THE DEVELOPMENT PROJECT 12
B. AVOIDANCE 13
A. IMPACTS TO WETLANDS AND WATERS 15
B. COMPENSATION RATIOS 15

VII. MITIGATION WORK PLAN 16

A. INTRODUCTION 16
B. DESIGN REFERENCE SITES 16
C. GOALS FOR MITIGATION 17
D. MITIGATION HABITATS 18
E. AQUATIC FUNCTIONS 18
F. HYDROLOGY AND GRADING 20
G. PLANTING AND REVEGETATION METHODS 21

VIII. MAINTENANCE PLAN 27

A. RESPONSIBLE PARTIES 27
B. MAINTENANCE ACTIVITIES 27
1. Control of Weeds and Exotic Plants 27
2. Supplemental Irrigation 29
3. Protective Devices 29
4. Replacement of Dead or Diseased Plant Materials 29
5. Signage 29

Habitat Restoration 30

In Progress 30

IX. PERFORMANCE STANDARDS 31

A. PROPOSED MITIGATION PERFORMANCE STANDARDS 31

X. MONITORING REQUIREMENTS 33

A. POST-CONSTRUCTION MONITORING 33
B. MONITORING FREQUENCY AND SEASON(S) 33
C. MONITORING METHODS 33
1. Qualitative Monitoring 33
2. Quantitative Monitoring 34
D. AS-BUILT REPORT 36
E. ANNUAL REPORTS 36
F. NOTIFICATION OF COMPLETION 36

XI. DRAFT LONG-TERM MANAGEMENT PLAN 37

1. Monitoring site conditions 37
2. Weed control 38
3. Minimize harmful intrusions 38
5. Reporting, Management and Administration 38

XII. ADAPTIVE MANAGEMENT PLAN 39

XIV. REFERENCES 40

I. INTRODUCTION

This wetland mitigation plan (WMP) has been prepared on behalf of the Preserve @ Pacifica LLC, the Applicant, to address impacts to wetlands and waters subject to the jurisdiction of the California Coastal Commission and, potentially, the Regional Water Quality Control Board (RWQCB)[1]. This WMP details the mitigation and monitoring program including methods, success criteria, contingencies, and development of a long-term management program in accordance with Commission and RWQCB guidance.

A. Existing Conditions

The reclamation site is a former mine dominated by often-steep slopes, non-native plant species and informal accessways. For ease of discussion, the reclamation site includes the following elements from roughly north to south: the Hilltop (the high ground on the north edge of the parcel); the East Flank (the hillside comprised mostly of old quarry debris on the east slope of the parcel); the Quarry Face (the scarp left by mining in the parcel center), the Quarry Floor or Pit (the bowl remaining in the bottom of the old quarry),and the Southern Bluff (the old edge of the Quarry on the south adjacent to the ocean) (**Figure 1**).

The Hilltop is the high ground of the parcel and is located above the Quarry Face and East Flank and south of the adjacent GGNRA's Mori Point. The Hilltop is relatively flat and smooth and extends down over the south slope to a shear zone just above the limestone of the Quarry Face. In contrast with its adjacent landscapes, the surface of the Hilltop has soil and moderate vegetation cover. The invasive pampas grass (*Cortaderia selloana*) and the native coyote bush (*Baccharis pilularis*) are the predominate species.

The East Flank is steeply sloped and is comprised predominately of exposed fill and gains approximately 220 feet in elevation. At the bottom of the East Flank an old access road cuts across and up the slope. The road cuts north across the East Flank and then turns south and continues across the Face. The grade of the slope varies throughout the section with several small, relatively flat, plateaus. The section is moderately vegetated; the lower slope is dominated by pampas grass while the upper, more stable slope contains a variety of native coastal shrubs such as ceanothus (*Ceanothus thyrsiflorus*) and California sage brush (*Artemesia californica*).

The Quarry Face is predominately an exposed limestone face with approximately 170 feet in elevation gain. The lower two thirds of the Face are steep, comprised of exposed limestone, and are sparsely vegetated. Approximately 120 feet above the old

---

[1] The US Army Corps of Engineers (Corps) has disclaimed jurisdiction over the wetlands and waters on the Reclamation Plan site but the RWQCB has not yet determined whether it will do so as well.

Figure 1 has been deleted. See updated Site Plan by WRA above.

quarry floor, two thirds of the way up the Face, an old access road cuts horizontally across the Face. Above the road, the Face gives way to the Hilltop at the geologic shear zone that separates the limestone from greenstone. The access road and upper slope have moderate vegetation cover. Vegetation is predominately non-native and is dominated by pampas grass.

The Quarry Floor or Pit is predominately flat and vegetated with non-native species. Steep slopes, including the Face, surround the Pit to the north, west, and south. To the east, the Quarry Floor abuts the City-owned parcel and Calera Creek. An approximately 7,800 square foot, deep depression, the Quarry Pond, is located near the eastern edge. This is the largest wetland/water on-site (see below for more information). North of the depression is an elevated, predominately exposed rock surface. Approximately 20 cypress (*Cupressus* spp.) trees are located along the southern border of the Quarry Pit. The Quarry Pit is dominated by non-native vegetation including pampas grass and the invasive perennial pepperweed (*Lepidium latifolium*).

The Southern Bluff abuts the Pacific Ocean to the south, is steeply sloped, and is comprised on the surface of predominantly exposed and unstable rock slopes. The slopes are sparsely vegetated with pampas grass. The ridge has moderate vegetation cover comprised predominately of non-native species including fennel (*Foeniculum vulgare*) and mustard (*Brassica nigra*). This area has also been called the "arm and the knob" or other terms as the bluff ends in a promontory including large, highly visible rocks on the southern face.

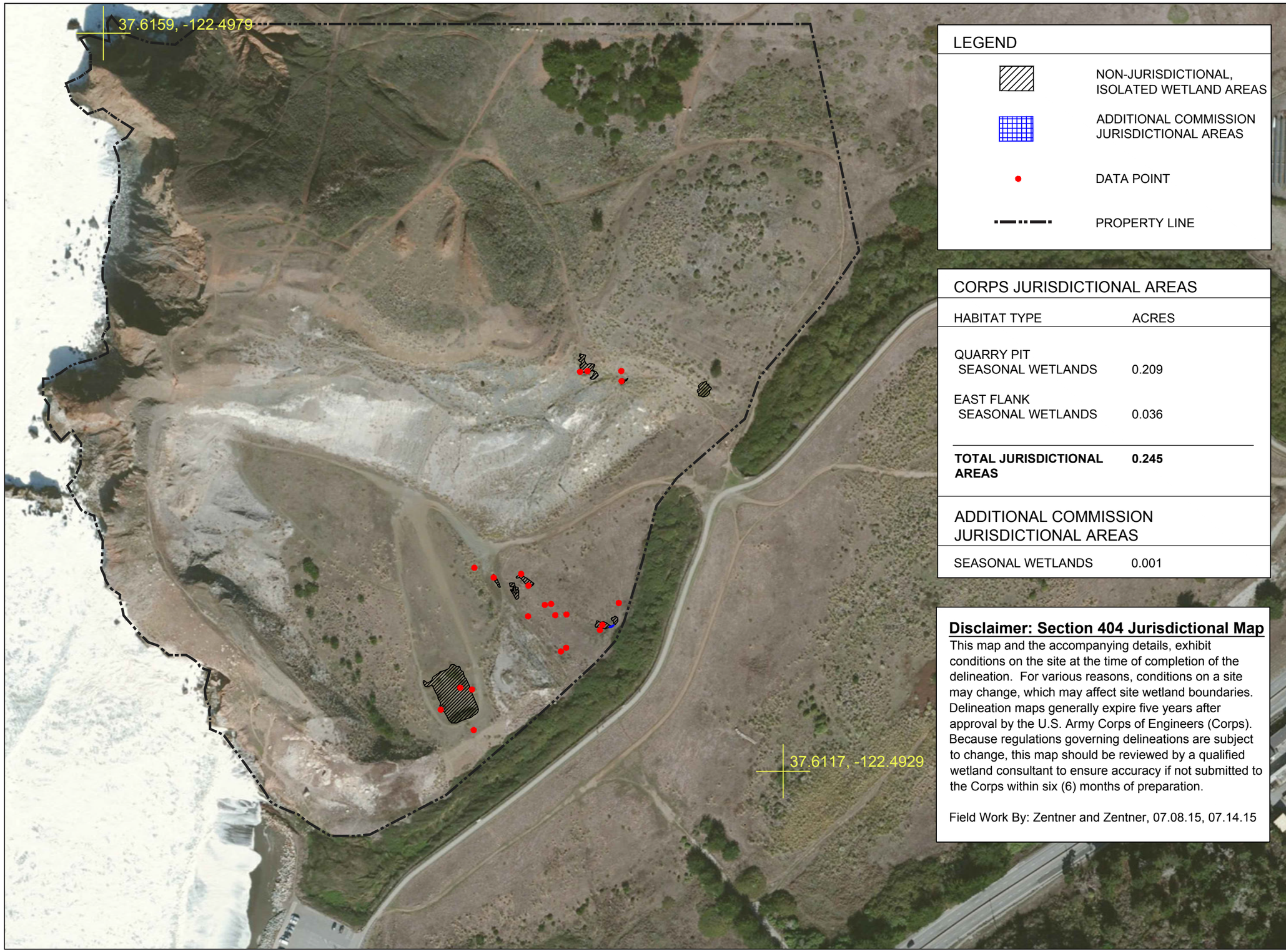
B. Wetlands and Waters

The reclamation site includes two distinct wetlands: the Quarry Pond and several isolated seasonal wetlands just north of the Pond (**Figure 2**). These total 0.246 acres, of which 0.245 acres meet the Corps' three-parameter definition while the remaining 0.001-acre wetland also meets the Coastal Commission 1-parameter definition.

The Quarry Pond is a seasonal pond, also described as an "other water" under the Corps' methodology, with a spotty fringe of wetland vegetation dominated by willows (primarily *Salix lasiolepsis*). During the summer, the bottom of the Pond is dominated by a mix of upland and wetland species.

The small seasonal wetlands north of the Pond are dominated by a mix of FAC and FACW species including rabbit's foot grass (*Polypogon monspeliensis*), birds foot trefoil (*Lotus corniculatus),* bristly ox tongue *(Helminthotheca echioides),* and toad rush (*Juncus bufonius*).

Additional Information can be found in the wetland delineation submitted as part of the Reclamation Plan.



LEGEND

- NON-JURISDICTIONAL, ISOLATED WETLAND AREAS
- ADDITIONAL COMMISSION JURISDICTIONAL AREAS
- DATA POINT
- PROPERTY LINE

CORPS JURISDICTIONAL AREAS

HABITAT TYPE	ACRES
QUARRY PIT SEASONAL WETLANDS	0.209
EAST FLANK SEASONAL WETLANDS	0.036
TOTAL JURISDICTIONAL AREAS	**0.245**

ADDITIONAL COMMISSION JURISDICTIONAL AREAS

SEASONAL WETLANDS	0.001

Disclaimer: Section 404 Jurisdictional Map

This map and the accompanying details, exhibit conditions on the site at the time of completion of the delineation. For various reasons, conditions on a site may change, which may affect site wetland boundaries. Delineation maps generally expire five years after approval by the U.S. Army Corps of Engineers (Corps). Because regulations governing delineations are subject to change, this map should be reviewed by a qualified wetland consultant to ensure accuracy if not submitted to the Corps within six (6) months of preparation.

Field Work By: Zentner and Zentner, 07.08.15, 07.14.15

ZENTNER and ZENTNER
Land Planning and Restoration
95 Linden Street, Ste. 6, Oakland, CA 94607
Phone: 510.622.8110 Fax: 510.622.8116

FIGURE 2
DELINEATION OVERVIEW

PACIFICA QUARRY
PACIFICA, SAN MATEO COUNTY

N

0 100' 200'
1" = 200'

CARTOGRAPHER:
Christopher J. Long

AERIAL SOURCE: 8/24/15 Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

PROJECT NO. 1023

FILE: D: PROJECTS\1023\Adobe \Delin overview.ai

DATE: 2.27.2017

II. OBJECTIVES

A. Introduction

The goal of this WMP is to appropriately mitigate for the impacts resulting from the Pacifica Quarry Reclamation Plan to 0.246 wetlands and waters. This goal will be achieved through the restoration of 0.5 acres of wetlands.

B. Organization

This WMP is organized in accordance with the Corps most recent guidance on Mitigation Plans as described in the Federal Register Vol. 73, No. 70, dated April 10, 2008, Compensatory Mitigation for Losses of Aquatic Resources; Final Rule. The first sections address objectives, selection of the mitigation area, the methods by which the mitigation site will be protected over the long-term. The next sections address the proposed development and avoidance, the basis for mitigation, the mitigation work plan, and the maintenance plan. The final sections deal with performance standards, monitoring requirements, and long-term management.

C. Impacts and Mitigation

The reclamation work will fill 0.246 acres of wetlands and waters (see Figure 2). The proposed on-site mitigation will include the restoration of 0.5 acres of wetland/pond, including both wetlands and waters as described below (**Figure 3**).

1. The Reclamation Plan will fill the Quarry pond and additional seasonal wetlands found on adjacent lands. Both the Pond and these seasonal wetlands are man-made, the result of Quarry activities.
2. The mitigation wetlands will be restored on the eastern parcel adjacent to Calera Creek on former Creek estuary lands. Although detailed historic records are not available, it is likely that the mitigation site was formerly wetlands.
3. The mitigation design duplicates work done at nearby Mori Point to create ponds for California red-legged frogs (CRLF).
4. The mitigation consists of a single pond, with gently sloped sides to be planted with vegetation native to this locale.
5. The wetland will be permanently preserved and managed for habitat functions and values. It will be incorporated into the management for the adjacent Quarry mitigation bank.

D. Conservation Context

The northern portion of the Quarry's eastern parcel is proposed to be restored and preserved as a mitigation bank. This area was once part of the Creek estuary and riparian zone but was filled as part of the Quarry operations. Once this mitigation work and the bank are completed, the two will form an approximately 25-acre open space of restored wetlands and uplands adjacent to Calera Creek and connected to Mori Point.

Figure 3 has been deleted. See updated figure by WRA above.

III. MITIGATION SITE INFORMATION

A. Location

The mitigation wetland will be restored at the northernmost portion of the Quarry's eastern parcel, adjacent to Calera Creek. The pond and its grading will avoid the City's paved trail to the north and the informal access trail across Quarry property to the south (Figure 3). The access in these areas will provide for useful educational opportunities, however.

B. Watershed Context

The mitigation site is near the ocean-terminus of the Calera Creek watershed, a relatively small basin, typical of the steep coastal watersheds of central California. The watershed is approximately 11,500 ft long at its greatest extent (west-east) and about 5,000 feet wide (north-south) for a total area of about 1,300 acres. Only about 110 acres (less than 10%) are urbanized as the primarily residential Vallemar neighborhood. The remainder of the watershed is either public or private open space, much of which is within the GGNRA Sweeney Ridge unit. These lands are typically native-dominated shrubs or woodlands.

Calera Creek is generally intact, although channelized and dominated by non-natives, *e.g.* eucalyptus, as it winds through Vallemar. It is an ephemeral to seasonal stream with flows only during winter and early spring until it crosses the Highway when supplemental water from the City's Treatment Plan provides a significant, perennial boost. Today, the Creek has been restored to a relatively broad and moderately deep channel (Photo 1) as part of the Plant's construction in 2000.

Photo 1: Calera Creek adjacent to the mitigation site; February, 2017.

C. Ownership and Easements

The site is entirely owned by the applicant; there are no easements over the mitigation site. The mitigation wetlands will be protected by a conservation easement held by a qualified land trust and protected in perpetuity.

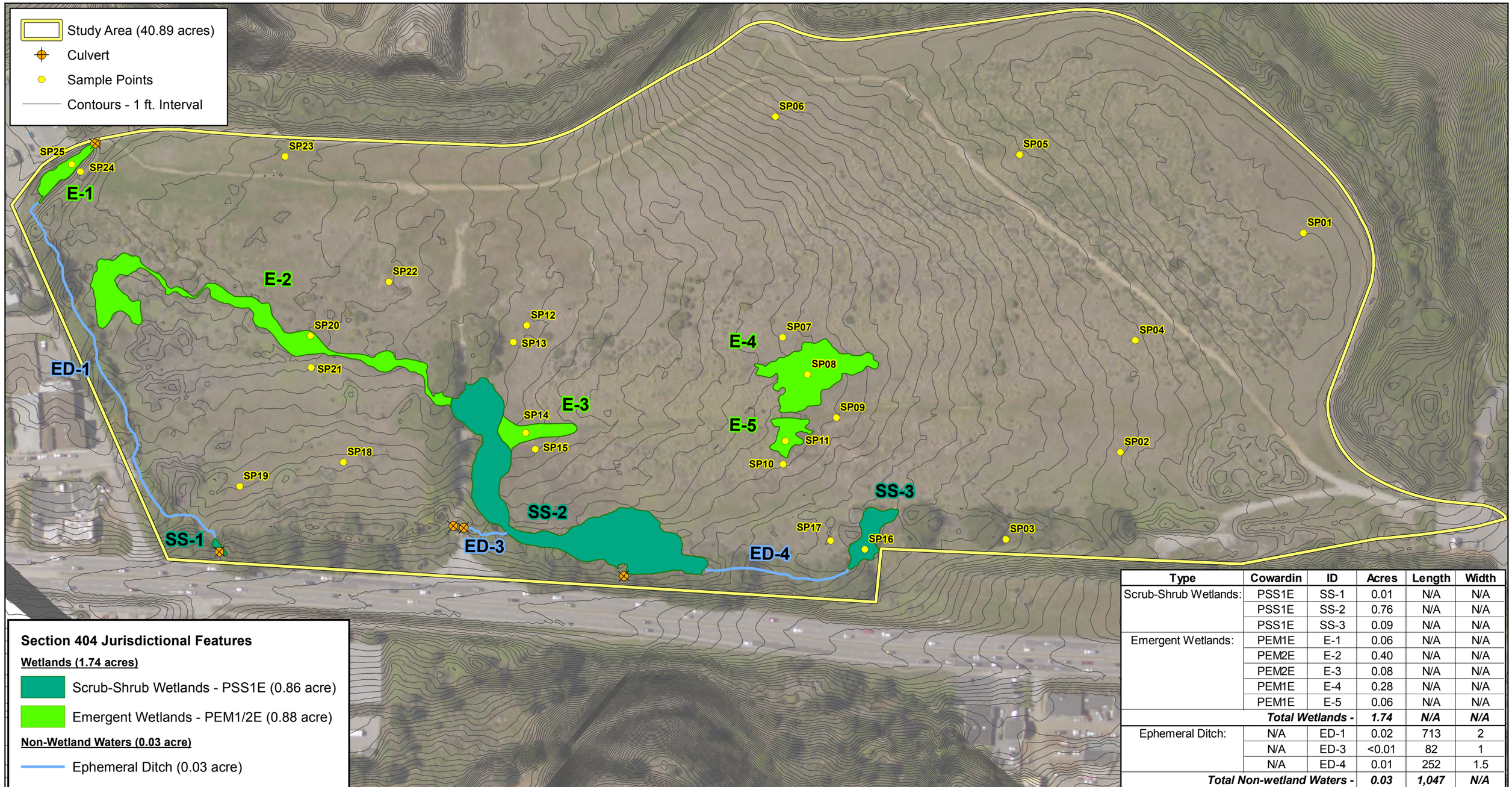
D. Jurisdictional Areas

A Section 404 jurisdictional waters delineation of the eastern parcel was completed by WRA with additional analysis for Coastal Commission wetlands by Zentner and Zentner (**Figure 4**). The Corps delineation has been verified by the Corps.

E. Historic Uses

Based on the 1902 US Coast and Geodetic Survey map, the mitigation site was apparently part of the historic Calera Creek estuary. At some point, Calera Creek was channelized and ran just east of the proposed mitigation wetlands. In 1998, the City received permits to restore the Creek to its current position and fill the old Creek channel and associated wetlands.

The mitigation site and environs have been disturbed for many years, likely decades, as a result of Quarry operations. The mitigation site itself was filled with quarry



Type	Cowardin	ID	Acres	Length	Width
Scrub-Shrub Wetlands:	PSS1E	SS-1	0.01	N/A	N/A
	PSS1E	SS-2	0.76	N/A	N/A
	PSS1E	SS-3	0.09	N/A	N/A
Emergent Wetlands:	PEM1E	E-1	0.06	N/A	N/A
	PEM2E	E-2	0.40	N/A	N/A
	PEM2E	E-3	0.08	N/A	N/A
	PEM1E	E-4	0.28	N/A	N/A
	PEM1E	E-5	0.06	N/A	N/A
Total Wetlands -			***1.74***	***N/A***	***N/A***
Ephemeral Ditch:	N/A	ED-1	0.02	713	2
	N/A	ED-3	<0.01	82	1
	N/A	ED-4	0.01	252	1.5
Total Non-wetland Waters -			***0.03***	***1,047***	***N/A***

Wetlands Potentially Subject to Corps Jurisdiction
Date of Data Collection: August 25, 2015
Date of Corps Verification: July 12, 2016

Pacifica Quarry
San Mateo County, California

FIGURE 4
EASTERN PARCEL
DELINEATION

0 125 250 500 Feet

wra
ENVIRONMENTAL CONSULTANTS

Map Prepared Date: 7/18/2016
Map Prepared By: mrochelle
Base Source: IOCM 2012 Aerial
Data Source(s): WRA

Path: L:\Acad 2000 Files\14000\14006-5\GIS\ArcMap\Delineation.mxd

materials for some indeterminate period (see the geotechnical report and below for more information).

F. Site Ecology

Site soils are mixed fills. The Reclamation Plan geotechnical report contains a bore log (TP1) from this area with a second (TP 2) nearby indicating the underlying soil is primarily a sandy, silty fill to a depth of 8 ft (TP 1) to 5 ft (TP 2). Below this is clay, mixed with indications of old fills, *e.g.* angular gravel inclusions.

Based on the soil borings, the surface fill will be too permeable to host wetlands. The excavation should reach to the depth of the clay, about 5 to 8 ft depending on location, and ensure the subsoil is then compacted to 95-96%.

The site is relatively high and does not include any surface waters. No groundwater was observed in the geotechnical soil borings above 12 ft (TP 1) or 15 ft (TP 2). These boring were made at the conclusion of a very dry series of years and groundwater may reappear at a higher level given the current rain levels. However, the mitigation site is at about 69 to 70 ft (NGVD) and, based on site measurements, about 9 to 10 ft above creek water surface elevations in February 2016. Groundwater may be encountered 10 to 11 ft below the surface, or perhaps higher during a wet year, but the wetlands are more likely to be dependent on surface inflow. Based on our experience, a watershed equal to the size of the projected wetland would be required to ensure sufficient ponding to meet the project performance standards.

Vegetation on-site is primarily pampas grass with coyotebrush and related species. Photo 2 shows a typical view of the mitigation site; see the Vegetation or Special Status Species Assessments submitted for the Reclamation Plan for more information on local ecology.

Photo 2: the mitigation site, seen from the south, February 2017.

The vegetation is dominated by non-native, large grasses, indicative of the relatively good permeability of the soils and past history of disturbance. No sensitive native species are present. The existing vegetation will require clearing prior to the restoration work and inspection to ensure native wildlife are not using the shrubs for cover.

G. Long Term Context

The long-term goal of the mitigation program is to create a high-quality, self-sustaining seasonal wetland/pond and adjacent native-dominated uplands. These habitats will be monitored until the project-specific performance standards are met. Monitoring will occur for 5 years until the standards are met (or longer if the standards are not met) and maintenance is assumed for the first 3 years; both are described in this plan, and the restored habitats should be relatively self-sufficient after this period. Finally, this landscape will be protected by a conservation easement prohibiting future development (see Chapter IV for more information).

IV. LONG-TERM SITE PROTECTION

The long-term protection of the mitigation site will be assured by the following:

1. The wetland mitigation area will be adjacent to and part of the Quarry mitigation bank, currently under review by the Interagency Review Team (IRT). As well, it is adjacent to the City's Calera Creek corridor and the National Park Service's Mori Point.
2. The wetland mitigation area will be demarked by a low fence to keep people and pets out of the wetland. The fence will be three-ft high black or green coated chain link or similar.
3. The wetland mitigation area will include signage at two locations identifying the wetland values and need for isolation.
4. The mitigation area will be protected by a conservation easement that will generally prohibit any activity on or use of the mitigation areas inconsistent with the purpose of the easement.
5. Specifically, the conservation easement and long-term management plan (LTMP; see below for the LTMP) will prohibit:
    - Unseasonable or supplemental watering except for habitat enhancement activities described in the WMP;
    - Use of herbicides, pesticides, biocides, fertilizers, or other agricultural chemicals or weed abatement activities, except weed abatement activities necessary to control or remove invasive, exotic plant species;
    - Incompatible fire protection activities except fire prevention activities as described in the Easement;
    - Use of off-road vehicles and use of any other motorized vehicles;
    - Grazing or other agricultural activity of any kind in the wetlands;
    - Recreational activities including, but not limited to, horseback riding, biking, hunting or fishing;
    - Residential, commercial, retail, institutional, or industrial uses;
    - Any legal or de facto division, subdivision or portioning of the Reserve;
    - Construction, reconstruction or placement of any building, road, wireless communication cell towers, or other improvement, or any billboard or sign except those signs specifically allowed;
    - Dumping soil, trash, ashes, refuse, waste, bio-solids, garbage or any other material;
    - Planting, gardening, or introduction or dispersal of non-native plant or animal species;

- Filling, dumping, excavating, draining, dredging, mining, drilling, removing or exploring for or extraction of minerals, loam, gravel, soil, rock, sand or other material on or below the surface of the mitigation areas;
- Altering the general topography of the mitigation areas, including but not limited to building of roads and flood control work; except as necessary to implement the WMP;
- Removing, destroying, or cutting of trees, shrubs or other vegetation, except for (1) emergency fire breaks as required by fire safety officials , (2) prevention or treatment of disease, (3) control of invasive species which threaten the integrity of the habitat, or (4) completing the WMP;
- Manipulating, impounding or altering any watercourse, body of water or water circulation in the mitigation areas, and activities or uses detrimental to water quality, including but not limited to degradation or pollution of any surface or sub-surface waters; and
- Creating, enhancing, and maintaining fuel modification zones in the wetlands (defined as a strip of mowed land or the planting of vegetation possessing low combustibility for purposes of fire suppression).

6. The mitigation areas will meet specific performance standards and will be relatively self-sufficient, as noted above and described in more detail below, ensuring their long-term ecological functions.
7. At the end of the five-year monitoring period (which may be extended if the mitigation does not meet the performance standards), the Applicant shall coordinate with the Commission and RWQCB (assuming the RWQCB takes jurisdiction over the Quarry wetlands) to determine if the success standards have been achieved. If the permit conditions have not been met, the agencies will identify the appropriate remedial measures. The Applicant shall be responsible for completing all remedial measures and achieving sign-off from the agencies.

V. DEVELOPMENT AND AVOIDANCE

A. Brief Summary of the Development Project

Overall, reclamation is meant to respond to the site's geotechnical issues and create safe slopes, safe access or other conditions that conform to surrounding topography while preserving native habitats and reducing grading to the maximum extent practicable. For example, the northernmost portion of the site (also described as the East Flank) and the coastal bluff contain the only native-dominated vegetation associations on the western parcel and these will be preserved. The following provides an area description; more detail can be found in the Reclamation Plan.

For the hilltop, the Plan seeks to: (1) create a more natural, rounded appearance similar to the pre-mining condition; (2) on the west, provide for a safe accessway between the hilltop and the ocean bluff--the flat hilltop here results in a very steep grade for the trail just downslope of this; and (3) steepen the slope on the south and southeast to provide for the transition to the 2:1 slope above the preserved limestone face. The Reclamation Plan thus calls for grading the unstable materials above the shear zone on the south and southwest to a 2:1 slope and rounding the surface of the Hilltop to create a more naturalistic form while maintaining the elevation and creating a more accessible slope on the west.

The East Flank is an unevenly sloped area that includes both old quarry fills and a buried landslide. As noted above, with the exception of the access road described below, the Plan will not disturb this area. The Reclamation Plan will build an access road that curves across the southern side of the East Flank to the top of the Hilltop, essentially duplicating an existing accessway. This access will be 20 ft wide to accommodate emergency service vehicles and will have earthen swales for drainage, buttressed with coir fabric and other geotechnical features. The new access will replace the existing, heavily eroded trails that currently cross this relatively steep slope. The accessway will also avoid the native-dominated vegetation associations.

The Quarry Face is presently a steep rock face with a geologic shear zone (a structural discontinuity between two different geologic formations) that separates the Face from the Hilltop. The 2015 geotechnical analysis concluded that the Quarry Face is a geologically stable feature that does not require regrading. In accordance with the Reclamation Plan goals, no work will occur on the Quarry Face and it will be preserved.

The Quarry Pit floor is presently an uneven mix of pits, fills and slopes. The Reclamation Plan proposes to fill this to an even elevation of about 50 ft while providing a gentle slope down to Calera Creek at its east edge. Essentially, the Quarry Pit will act as the depository for the fill generated to create stable slopes elsewhere on-site, eliminating the need to truck earth spoils off-site. This also provides for a balance of cut and fill.

The Southern Bluff is a steep-sided remnant of the old hillside transformed by quarry mining and topped by old quarry fills. Loose soil and uneven surfaces on the top of the southern end of the bluff will be regraded to form a stable, gently sloping surface that

will also allow access to ocean views. For the most part, though, the existing elevation of the bluff will be preserved at 90 to 110 ft. The interior slope of the Southern Bluff will be regraded with fill to a stable 2:1 slope and a gentle 5:1 slope in the northwestern-most area. No cut or fill is proposed on the outside (ocean side) of the bluff. The Reclamation Plan will thus preserve the "knob"--the high ground at the easternmost end and the lower elevation dramatic rock formation.

B. Avoidance

The proposed project has been designed with the following features to avoid and minimize impacts.

1. As noted above, the native-dominated areas in the East Flank and coastal bluff will be avoided. Previous reclamation plans called for grading the East Flank.
2. Grading will avoid the riparian vegetation along Calera Creek; the stormwater outfall will be connected at the existing Creek culverts under the access path rather than into the creek.
3. Grading will avoid the southern bluff's notable rock formations, preserving an aesthetic feature of community importance.

Avoidance of the wetlands and waters within the grading envelope is not practicable. As noted above, and shown in Figure 2, these consist of the Quarry Pond and the seasonal wetlands in the field north of the Pond.

The Quarry Pond is an elevated pond at the terminus of the southern slope within the Quarry. Today, about 40% of the Quarry floor and the interior (northern) edge of the southern bluffs drain to the Pond. To provide positive drainage to a sedimentation basin, the quarry floor will be graded to a relatively uniform slope at about elevation 50 ft with the slope trending towards the north to the new basin. This will eliminate almost all of the watershed area that currently drains to the Pond. Additionally, under SMARA and City standards, the Quarry pond is a potential hazard due to its steep sides (1:1 or greater), the slick character of the sideslopes and the depth of water during winter. The Pond also does not have a controlled outlet; it has a surface cut in its southern end that drains to the Creek. If this flowed, it would likely erode the creek banks. Finally, although the Pond is a water feature during the winter, it drains very rapidly during the spring; Karen Swaim (2003), in her review of the site for SFGS, concluded that the Pond did not support adult CRLF because it drained too rapidly in the spring. This is likely due to the relatively high permeability of the soils under the Pond. The lack of perennial wetland vegetation or even much wetland vegetation beyond the willows is further evidence of the soil's high rate or percolation. For these reasons, the Plan chose not to preserve the Pond.

It would be theoretically possible to grade the Quarry floor to drain to the Pond by filling the northern half of the Quarry floor (the location of the proposed basin) so that this area and the remainder of the floor drains towards the Pond. However, this would require an additional 8,000 CY of fill beyond that currently proposed for excavation (including the excavation proposed for the additional wetland mitigation work, which

would not be needed if the Pond were preserved). Once this grading was done, though, a basin would be required as a pre-treatment Best Management Practice (BMP) element to ensure sediment did not reach the Pond. This would considerably reduce the amount of water reaching the Pond, further reducing its hydroperiod. The Plan could also provide a controlled outlet for the Pond in the same fashion as the proposed basin with a riser and culvert; note, though, that the proposed pond is as near the Creek culvert as practicable. Installing a new outlet culvert from the Quarry pond to those culverts would require a lengthy pipe and more disturbance in the Pond. The Plan could also grade back the sides of the Pond making those edges a 3:1 slope, at least down to the high water line, which would reduce the safety concerns significantly. Note, though, that this would remove the willows along the Pond edge, the primary wetland vegetation component of the Pond. However, this grading would not be able to reduce the relatively high soil permeability under the Pond without completely excavating the Pond and then reconstructing it with low permeability soils; in essence, we would have to destroy the Pond to preserve it.

The seasonal wetlands north of the Quarry Pond formed on graded and compacted soils and are isolated features in a relatively level plain. As noted above, this is a low area on the Quarry floor and is proposed for fill. To provide positive drainage to the water quality basin, the floor of the Quarry must drain to the east, largely away from this area. Preserving this area would require preserving a relatively larger area due to the scattered character of these wetlands. In turn, this area would not drain to the basin but would continue to drain (or not drain) internally. While this would likely preserve the wetlands (the impermeable character of the soil here likely means these wetlands require little watershed), their isolated small condition and the extent of human and pet intrusion into these areas will likely continue and the habitat value of these wetlands continue to be very limited.

VI. BASIS FOR MITIGATION

A. Impacts to Wetlands and Waters

The reclamation work will result in the loss of 0.246 acres of wetlands and waters.

B. Compensation Ratios

The applicant proposes to mitigate for the impacts on-site with the restoration of 0.50 acres of wetlands and waters. This results in a 2:1 (restored to lost) ratio. The Coastal Commission typically requires a 4:1 ratio but the wetlands in question are man-made, subject to daily disturbance by pedestrians and their dogs and generally bereft of native vegetation. The wetland mitigation program also includes restoration of 0.5 acres of a native grassland buffer around the wetlands, which are not counted in these ratios.

A conservation easement or deed restriction will be placed over the mitigation area, (see Chapter IV for more information).

VII. MITIGATION WORK PLAN

A. Introduction

This section reviews the proposed mitigation. Mitigation work on-site seeks to create a self-sustaining, native landscape; it will include the following (Figure 3).

1. The entire mitigation area will be a rough circle about 240 ft in diameter, for a total of about 45,000 sq ft.
2. The mitigation area will be excavated to a depth of eight feet to reach the underlying clay layer; this may be shallower if clay subsoils are found above this level. The proposed wetlands area (about two feet above the bottom) will be about 0.5 acres (a rough circle about 160 ft in diameter).
3. The mitigation wetland bottom will be contoured to include several deeper pits and several higher mounds, creating habitat heterogeneity within the wetlands.
4. The sideslopes of the mitigation area will be excavated at a 5:1 (horizontal:vertical) grade. This is a relatively gentle slope, readily planted. Sideslopes will be compacted slightly, to a 93-95% level, consistent with grassland conditions. As well, the slope will be varied along the edge to create a naturalistic condition.
5. Native wetland species will be planted in the wetlands while the buffer will consist primarily of native grasses along with several species of shrubs. See below for more detail on the planting palette.

B. Design Reference Sites

The ponds created at Mori Pt by NPS provide the most useful local reference (Photo 3) Two of these were constructed in 2004 and one modified in 2007 while two more were built in 2007 with one of these modified in 2009.

These ponds have generally but not always ponded. They have also typically hosted CRLG egg masses (Kwan 2014). Based on our and the NPS vegetation sampling (Dahlin 2007) the ponds are generally dominated as shown in Table 1.

Table 1
Vegetation at the Mori Pt Ponds and adjacent lands

Habitat	*Common Name*	*Scientific Name*
Perennially wet	broadleaved cattail	*Typha latifolia*
	small-fruited bulrush	*Scirpus microcarpus*
Seasonally wet	Gray rush	*Juncus patens*
	Soft rush	*Juncus effusus*

	Pacific reed grass	*Calamagrostis nutkaensis*
Seasonally moist	tufted hairgrass	*Deschampsia caespitosa*
	Pacific reed grass	*Calamagrostis nutkaensis*
	California oatgrass	*Danthonia californica*
Dry uplands	coyote brush	*Baccharis pilularis*
	California sagebrush	*Artemisia californica*
	Non-native annual grasses	
	Purple needlegrass	*Nassella pulchra*

Photo 3: Mori Pt wetland/pond used as reference site.

The ponds indicate that these types of wetlands can be successfully restored in this landscape. However, note the difficulty NPS had in restoring ponds that held water. Adequate compaction of the subsoil and its character are critical.

C. Goals for Mitigation

The goal of the wetland mitigation project is to create a high-quality, self-sustaining wetland and restore associated upland habitats to offset impacts of the reclamation work. This goal will be achieved through the creation of an integrated, self-sustaining native landscape.

D. Mitigation Habitats

1. Seasonal wetland/pond

A total of 0.50 acres of seasonal wetland/pond will be constructed as part of the mitigation program. This wetland will be created adjacent to Calera Creek as a shallow pond with gently sloped sides. We anticipate that the pond will fill in December on an average rain year, remain full (to the upper extent of the wetlands) over January and February and gradually draw down to a dry state in early June. The bottom of the pond is likely to be relatively bare (cover less than 30% on average), while the sideslopes should support a dense growth of rushes and sedges.

2. Upland Grassland and Shrub Buffer

The pond will be buffered by a 40 ft wide fringe of native grasses dotted with native shrubs. Grasses will include creeping wildrye (*Elymus triticoides*), purple and nodding needlegrasses *(Stipa pulchra* and *cernua*), and other species. Shrubs will include dwarf coyote bush (*Baccharis pilularis*) and wild rose (*Rosa californica*).

E. Aquatic Functions

The mitigation work at the site will result in a substantial increase in a variety of aquatic functions as shown in the table below.

Table 2

Existing and proposed wetland/water functions

Function	Existing channels and seasonal wetlands	Proposed channels and seasonal wetlands
Dynamic surface water storage	Moderate: relatively deep pool provides good storage	Moderate: relatively deep pool will provide storage
Long-term storage of surface water	Low: relatively high permeability reduces potential	Moderate to High: reduced permeability soils will prolong ponding
Subsurface storage of water	Low to Moderate: perched position reduces potential for stored groundwater to benefit local plants	Moderate to High: extended drawdown will help support local plants
Energy dissipation	Moderate: position at lower end of watershed helps reduce energy of local flows	Moderate: will replace local runoff with vegetated pond, thereby reducing energy in local flows

Nutrient cycling	Low to Moderate: pond holds local inflow but lack of perennial cover reduces potential cycling.	Moderate: High cover by perennial natives promotes nutrient retention and cycling; opportunity limited due to localized watershed
Organic carbon export	Low to Moderate: willow cover provides some nutrients but lack of export reduces opportunity	Moderate: native plant cover will provides nutrient for local cycling but lack of export reduces greater opportunity
Removal of polluting elements and compounds	Low to Moderate: pond plant cover is low, although watershed runoff undoubtedly provides canine input.	Moderate: native perennial vegetation removes polluting elements but inputs expected to be minor
Retention of particulates	Moderate: pond would result in settling of particulates but watershed inputs limited	Moderate; pond with high native cover would result in settling of particulates but watershed inputs likely limited
Maintain characteristic plant communities	Moderate: moderate native cover but very little diversity	High: diverse, native vegetation restored
Maintain distribution and abundance of native wildlife	Moderate: High level of intrusion reduces wildlife use	High: seasonal ponding and plant cover increase wildlife use of wetlands and use/movement in adjacent riparian zone

Dynamic surface water storage refers to the ability of a wetland to interrupt flows for a brief period (less than 1-2 hours) and thus desynchronize flooding. Both the existing pond and the proposed pond will have similar capabilities here; both will also not reach a high score due to the lack of large watersheds that would benefit from this function. Long-term storage of surface water refers to storage for several months. The existing pond has a low score here due to its relatively high permeability while the proposed pond will be designed to hold water for several months. Subsurface storage of water refers to a wetlands ability to hold water in a subsurface, or vadose, zone and gradually release this to local vegetation. The Quarry pond has a low to moderate value here as its perched positions ensure the water is released vertically, rather than to local plants. The presence of the willows, though, indicates that some storage is occurring. The proposed pond, given its landscape position, should be able to provide

subsurface moisture to local vegetation into the summer.

Energy dissipation refers to a wetlands ability to reduce the energy level of flowing water as wetland vegetation or other features increases the frictional head loss. The existing and proposed ponds have similar values for this function as a pond will greatly reduce the energy of flowing water but, in both cases, the watersheds are very limited and the energy lost is minimal. Nutrient cycling refers to the oft-quoted ability of wetlands to transform elements in the water column to plant tissues. The existing pond has a low to moderate value for this function as, while it holds local flows, it has little perennial cover to make this transformation while the proposed pond will have a high level of perennial cover that will promote nutrient cycling. Organic carbon export refers to the capability of a wetland to fuel downstream estuaries by transforming organic debris into simpler carbon forms through microbial and other breakdowns. The existing pond will have a low to moderate score for this function; the willows do provide a carbon source but the lack of invertebrate and other life in the pond points to a low transformation rate. The proposed pond should have at least moderate value for this function due to the high cover by perennial plants and the concomitant high level of invertebrate and microbial activity.

Removal of polluting elements refers to a wetlands ability to biologically and physically transform harmful inputs in plants, sediments or other features. The existing pond has a low to moderate score for this function as, while a pond will cause most material to physically settle out, the lack of plant cover reduces the biological potential and the low input, with the possible exception of doggie detritus, further limits the opportunity. The proposed pond should have at least a moderate score as it combines the physical capability of a pond with high levels of plant cover, which assist in bio-removal. Retention of particulates refers to a wetlands ability to physically sequester harmful inputs in sediments or other features. The existing pond has a moderate value as, while a pond will cause most material to physically settle out, the inputs are likely to be very low. The proposed pond should have at least a moderate score as it combines the physical capability of a pond with high levels of plant cover, which assist in settling.

Maintain characteristic plant community refers to a wetlands capability at supporting native plant associations. The existing pond has a moderate value for this due to the cover by willows; the remainder of the plants are almost entirely non-native. The proposed pond should have a high value for this due to the diversity of plants and the associations. Similarly, maintain native wildlife refers to a wetlands capability in this regard. The existing pond will have a moderate value here; it could be high except for the level of intrusion (noted by Swaim in her analysis) and the moderate plant cover. The proposed pond should have a high value for this function, especially given its proximity to Calera Creek.

F. Hydrology and Grading

The primary means of hydrologic support for the wetland will be direct runoff from and within the approximately 1.0-acre basin. This, coupled with the mesic coastal

climate and a well-compacted subsoil, should be sufficient to provide for ponding. This Plan does not necessarily anticipate groundwater for additional hydrologic support. However, the bottom of the basin will be at or near the water surface elevation of the nearby Calera Creek and groundwater during the winter is likely to saturate the basin bottom and perhaps provide additional support.

As noted above, the bottom of the basin will be within the clay soils found on-site by the geotechnical investigation. Additionally, once excavated, the surface of the basin will be compacted to 95-96%, a level we have found to be appropriate for seasonal wetland basins in primarily clay soils. The surface of the basin will then be inoculated with topsoil taken from the wetlands to be filled at the reclamation site. This will consist of 2 -3 inches of topsoil taken directly from the small seasonal wetlands north of the Quarry pond.

G. Planting and Revegetation Methods

1. Technical Supervision

All revegetation activities will be conducted under the supervision of an experienced Ecological Monitor (EM). The EM and Restoration Contractor (RC) will work closely together to assure that revegetation is accomplished according to plans. Any deviation from the revegetation plans will be approved by the EM. The EM will be on site during initiation of each revegetation task (e.g., site preparation, plant installation, seeding, etc.), and all work will be monitored on a regular basis. The EM will also prepare weekly field memos to document the progress of revegetation.

2. Experienced Contractor

Only contractors with previous experience in native habitat restoration will be considered for this project. By limiting this work to construction personnel that have developed a precise understanding of the nuances and complications of native habitat restoration, the risk of failure or damage to existing habitats is significantly reduced. This also reduces the amount of detail that needs to be included in restoration plans and specifications and allows greater flexibility for making adjustments in the field.

3. Preconstruction Activities

Prior to initiation of plantings, the EM and RC will establish and stake the limits of habitat planting areas. Flagging of the new habitats may involve making adjustments from plan locations as dictated by field conditions.

Access routes, staging areas, and similar features will also be located and staked in the field. Where necessary, orange construction fencing or similar visible barrier will be installed to delimit sensitive areas adjacent to construction areas (see the Reclamation Plan for more detail on this element).

4. Site Preparation

New habitat and restoration areas will be prepared for revegetation as follows:

- Vegetation, trash, debris, and weeds shall be cleared.
- The topsoil salvaged from the seasonal wetlands shall be placed on-site in a demarked and protected area.

5. Supplemental Irrigation System

The proposed plantings will consist almost entirely of small, container stock (shrubs), plugs (graminoids) and seeding. Accordingly, no on-site irrigation system should be necessary. Any supplemental irrigation provided (see below for more detail) shall be done via a watering truck, connection to the local water system or other means.

The planted shrubs and graminoids (grasses, sedges, etc.) will be watered-in at the time of planting. Additional irrigation should not occur beyond this initial watering, however, supplemental watering may be provided if these plants show serious stress due to any prolonged dry spells during monthly monitoring in the first summer/fall.

6. Planting Design

Planting densities in the habitat restoration area will be relatively high, to favor development of dense ground cover typical of seasonal wetlands and native grasslands, which will also serve for erosion control. The plantings will be by planting groups that mimic natural variation within the habitats, which commonly have groupings of dominant and minor species that vary with slope, aspect, shade, drainage and/or soil texture. Each group will include many individuals of one to three dominant species, interspersed with fewer individuals of several minor associates.

7. Timing

Grading for the restoration work will commence in the summer/fall of 2017 (projected). Container and cutting plant materials will be installed between October 1, and February in the same year as reclamation; winter is the optimal period for planting as many plants are dormant and weather conditions are favorable. Any replacement plantings, if required, will also be installed during the winter. Seeding will be conducted between October 1 and November 31 during the same year of construction to take advantage of winter rains for seed germination and growth. Specific planting dates will be based on weather conditions and subject to approval of the EM.

8. Plant Materials

Proposed plant palettes are presented in Tables 3 and 4, below. The species selected are based on three factors: (1) native to the region as defined by local flora and plant lists (see McClintock et al 1990, Anderson and Morgan 1973, and EIP Associates 2006) along with standard flora, e.g. Barbour and Major (1988), Hickman (1993), and Mason 1969); (2) affinity for the specific soil and other conditions found at the mitigation site based on those same and more general flora and our experience; and (3) presence at the Mori Point and other reference sites. Plants are arranged by preference of wetter to drier environments

Table 3

Seasonal Wetland Plant Palette

Common Name	**Scientific Name**	**Size**	Number
Arroyo willow	*Salix lasiolepis*	Cutting	20
Gray rush	*Juncus patens*	Plug	2,000
Baltic rush	*Juncus balticus*	Plug	4,000
Santa Barbara sedge	*Carex barbarae*	Plug	5,000
Tufted hairgrass	*Deschampsia caespitosa*	Plug	2,000
Pacific reed grass	*Calamagrostis nutkaensis*	Plug	2,000
California oatgrass	*Danthonia californica*	Plug	2,000
Creeping wild rye	*Leymus triticoides*	Plug	5,000
Total			**22,020**

The plugs will be placed on one-foot centers. The willows will be placed in clusters of 3 -4 cuttings.

The upland buffer includes grassland with shrub components, described below.

Table 4

Upland Buffer: Plant Palette

Common Name	**Scientific Name**	**Size**	**Number**
Creeping wild rye	*Elymus triticoides*	Plug	4,000
Pacific reed grass	*Calamagrostis nutkaensis*	Plug	2,000
Purple needlegrass	*Stipa pulchra*	Plug	8,000
Nodding needlegrass	*Stipa cernua*	Plug	5,000
Foothill needle grass	*Stipa lepida*	Plug	3,000
CA rose	*Rosa californica*	Tree band	100
Dwarf coyotebrush	*Baccharis pil. Con.*	Tree band	100

Common Name	Scientific Name	Size	Number
Total			**22,200**

The plugs will be placed on one-foot centers. The shrubs will be placed in clusters of 3 -4 plants on the upper slopes of the buffer.

Arrangements will be made well in advance of planting to ensure that plant materials are available at the appropriate planting time and that container plants (the tree bands) are no more than one year old. Sufficient time will be allocated for seed collection and contract growing. Subject to confirmation by the plant suppliers, a minimum lead time of six months will be allocated prior to the anticipated planting dates.

Plants will have healthy, well developed root systems, and will not be rootbound. The EM will inspect a representative sample of all plant stock, and will reject those plants that do not meet these requirements.

The seeding palette in Table 5 below will be used in all temporarily disturbed areas outside the mitigation area.

Table 5
Seeding Palette

Common Name	Scientific Name	Seeding Rate (lbs/acre)
meadow barley	*Hordeum brachyantherum*	3.0
California brome	*Bromus carinatus*	6.0
3-weeks fescue	*Festuca microstachys*	5.0
blue wildrye	*Elymus glaucus*	6.0
yarrow	*Achillea millefolium*	2.5
California poppy	*Eschscholtzia californica*	4.0
sky lupine	*Lupinus bicolor*	1.5
Total		**28**

Seeding will follow installation of plantings. Arrangements for seed collection will be made well in advance (up to one year) to ensure availability of material. If the RC cannot locate adequate seed/plant material collection areas for any of the species, the

RC will contact the EM immediately so that the can assist in locating adequate collection locations.

9. Planting Techniques

All plants will be installed in planting groups and the center point of each planting group will be located in the revegetation area, by the EM. These centers will vary based on proximity to water, slope, exposure and other factors.

a. Plugs

The following specifications will be employed for installing the plugs:

- Planting holes shall be slightly deeper than the plug, by about ¼" to provide for additional soil on top of the plug surface. This will prevent excessive transpiration after planting.
- Roots shall be protected at all times from the sun and/or drying winds.
- After plants are removed from the plug trays, the root ball shall be bent and slightly twisted to free the roots from the tray form.
- Plants shall be set in planting holes so that the crown of the root ball is just below the ultimate soil surface (i.e., finished grade).
- Finely broken-up backfill shall be tamped firmly on top of the plug.
- Immediately following installation, plug planting areas shall be watered with sufficient water to reach the lower roots.

b. Shrubs

The following specifications will be employed for installing the shrubs:

- Planting holes shall have vertical sides with roughened surfaces. Each planting hole shall be partially backfilled with soil excavated from the planting hole.
- Roots shall be adequately protected at all times from the sun and/or drying winds.
- After plants are removed from containers, the sides of the root ball shall be scarified to promote development of new roots. Any roots wrapped around the sides of the container shall be pulled loose from the root ball.
- Plants shall be planted with the roots untangled, and spread out in the planting hole to promote even root penetration.
- Plants shall be set in planting holes so that the crown of the root ball is at or just above the ultimate soil surface (i.e., finished grade).
- Finely broken-up backfill shall be tamped firmly around the root ball, making certain not to depress the crown of the plant.

- The top of the root collar shall be exposed rather than covered with soil; however, the sides of the root ball shall not be exposed.
- Immediately following installation, each plant shall be deep soaked with sufficient water to reach the lower roots.

c. Seed Installation Technique

Seed will be sown via hydroseeding or manual spreading and then raked in and watered.

10. Plant Protection

Shrubs may be subject to herbivory that could result in damage or loss of plants. Based on the recommendation of the EM, any or all of the following corrective measures may be implemented during plant installation, if it is determined that plants may be jeopardized by wildlife:

- Plants susceptible to browsing shall be protected using wire cages, tree shelters (e.g., hardware wire cages, etc.), or exclosure fencing (e.g., temporary rabbit fences).
- Wire screening shall be installed around the roots of plants to prevent damage attributed to subterranean herbivores (e.g., gophers).
- Protective devices shall be maintained in place for at least three years, or until herbivory is no longer a threat to the survival of the plants.

VIII. MAINTENANCE PLAN

This section describes the maintenance activities which the Applicant will implement on the restoration site during the time period between initiation of the restoration project and agency confirmation of completion and approval (the Establishment Period). After agency confirmation that the restoration project is meeting the performance standards, long-term maintenance will begin.

A. Responsible Parties

The Applicant is responsible for all maintenance activities described below.

B. Maintenance Activities

1. Control of Weeds and Exotic Plants

Weed control is likely to be the foremost issue for maintenance. Table 6 shows the invasive species found on or near the mitigation site or likely to occur. (See Appendix B the Vegetation Assessment for a complete list) These are arranged by their California Invasive Plant Council (IPC) class (Cal-IPC 2006).

TABLE 6

Invasive species on or near the mitigation site

Species		IPC class	Frequency of Occurrence
Common Name	**Latin Name**		
Pampas grass	*Cortaderia jubata*	High	Co-Dominant
Himalayan blackberry	*Rubus armeniacus*	High	Common
Poison hemlock	*Conium maculatum*	Moderate	Co-Dominant
Mediterranean barley	*Hordeum marinum*	Moderate	Co-Dominant
Italian thistle	*Carduus pycnocephalus*	Moderate	Co-Dominant
Rose clover	*Trifolium hirtum*	Moderate	Co-Dominant
Wild oat	*Avena fatua*	Moderate	Co-Dominant
Ripgut grass	*Bromus diandrus*	Moderate	Common
Rye grass	*Festuca perrensis*	Moderate	Co-Dominant
Ox-tongue	*Helminthotheca echioides*	Limited	Abundant
Monterey Cypress	*Hesperocyparis macrocarpa*	Limited	Co-Dominant

As noted in the Reclamation Plan, the Quarry today is dominated by non-native, invasive species. Similarly, the mitigation site is dominated by non-native invasives; the exceptions are the coyotebush and a patch of purple needle grass off-site to the east.

The invasive species are likely to re-occur in the graded areas. Maintenance will work to reduce the cover of species rated High by the IPC to the meet the performance standards and to prevent aggressive weeds from out competing native plant species for resources (e.g., space, water, nutrients, and light). Once sprouted, these invasive weeds will be removed mechanically to the maximum extent practicable through hand-pulling, mowing and similar strategies. A pre-emergent herbicide may be used on the uplands immediately after planting should the EM determine that invasive seed volume in the topsoil inoculant is likely to be high.

If post-planting mechanical control is not effective or practicable, an EPA-approved broadleaf-specific systemic herbicide may be applied to the uplands; no herbicides will be applied in the wetlands. Herbicides will be applied under the direction of a licensed applicator and not under conditions in which drift into sensitive areas might occur.

Herbicides are the most practicable option in many cases where the invasives are broad-leaved species, e.g. *Lepidium*, while the planted species are graminoids. In this case, however, pampas grass is likely to be the most aggressive invasive and an herbicide targeting this species would be likely to affect the target native grasses. Weed control on this site will require an adaptive management approach, in which several strategies are tried and the more successful tested and tried again until a practicable approach is found.

Weed control after planting will, accordingly, include the following steps.

1. Complete an early spring (February-March) survey of the mitigation area to identify sprouted material. Complete identification should be practicable due to the growth of the plugs compared to seedling growth. Define areas that are heavily dominated by broadleaf and/or graminoid invasives.
2. Design area-specific weed control program. If weeds are an issue, they will likely be an issue in the uplands, not the wetlands (we have very few wetland weeds in this region) and the weeds will be mixed in with the planted material. If the weeds are primarily annual grasses, mowing prior to flowering will reduce the annuals and preserve the planted material (which are all perennials). If the weeds are primarily large broadleaved species, *e.g.* thistles or bristly ox-tongue, hand pulling may suffice. If the weeds are small broadleaved species, e.g. *Oxalis*, it would probably be best to leave then in place as the perennials will gradually replace them. However, the weeds are widespread broadleaved species, *e.g.* hemlock, a spray program will likely be the most effective control.

3. Review results of weed control in the annual vegetation survey. Identify results in the annual report and provide additional recommendations to meet performance standards.

2. Supplemental Irrigation

Artificial irrigation will only be supplied if needed and only during the first summer/fall after planting to facilitate the establishment of plants. At the direction of the EM, irrigation may be continued on an as-needed basis during the second and third years following initial planting to facilitate root development, so that plants will be sufficiently established to survive without artificial irrigation beyond the third year. However, irrigation shall not extend beyond this and will not be required as part of the long-term management.

The amount and frequency of irrigation of each planting area will be determined through monitoring soil moisture conditions and plant vigor during the initial irrigation period. The goal is to provide deep, infrequent watering to encourage deep rooting of all perennial species.

3. Protective Devices

Protective devices, *e.g.* tubex tree shelters, if installed, will be maintained in good condition. Additional devices will be installed or other measures taken if monitoring indicates shrub damage from herbivory. However, these will all be removed prior to the onset of long-term management.

4. Replacement of Dead or Diseased Plant Materials

Planting densities given above and the performance standards assume a certain level of mortality during the monitoring period as well as potential colonization of the site by native species. As long as the performance standards are met, replacement of plant materials will not be necessary. If mortality levels exceed the performance standards, however, the cause of mortality will be investigated and corrective actions taken as necessary to resolve any problems prior to plant replacement. Plants will be replaced only during the appropriate time of year as noted above. Note, though, that plant replacement will not be required as part of the long-term management.

5. Signage

Signage will be used to inform the general public of the sensitivity of the preserve area and that unauthorized trespass is prohibited. Signs can also help generate good will that may facilitate preserve management. Two signs of approximately two feet by two feet in size will be placed along the adjacent accessways. Text on the signs will be similar to the example shown below:

Habitat Restoration
In Progress

Help protect the re-establishment of native plants and wildlife. Please do not disturb restoration site.

Questions or Comments?
510-622-8110

ZENTNER and ZENTNER
Land Planning and Restoration

Signs will be maintained in good condition and any missing signs will be immediately replaced.

IX. PERFORMANCE STANDARDS

This WMP proposes to create seasonal wetlands that are functionally superior to the habitats being lost through the reclamation work. The success of achieving these goals will be determined by comparing the mitigation habitats with the performance standards established for each habitat type. Success will be evaluated five years after construction or two years after all artificial support (e.g., irrigation, replacement of any failed plantings) has ceased.

A. Proposed Mitigation Performance Standards

The performance criteria, provided in Tables 7 and 8, will be used to determine completion of the permittee's mitigation responsibilities. Fulfillment of these criteria will indicate that the mitigation area is progressing well toward the habitat characteristics, functions, and values that constitute the long-term goals of the mitigation. The wetlands will be monitored annually and performance standards should be met by the fifth year of monitoring.

1. Wetlands

The wetland restoration work should promote both ponding and the cover by native perennials. These two factors are the most significant with regards to the functional analysis: both contribute strongly to water storage, nutrient, pollutant and sediment transformation/sequestration as well as the maintenance of native plant and wildlife communities. Consequently, construction of a high value wetland/pond system will require the establishment of an appropriate hydroperiod and native-dominated perennial wetland vegetation. As well invasive, exotic species must be kept in check.

Table 7

Wetlands 5-Year Performance Criteria

Habitat Element	Year 5 Performance Criteria
Ponding	2 ft of depth in an average year
Hydroperiod	inundation/saturation for 3 months in an average year
Average Number of Natives	≥3 species per plot avg
Vegetation Cover	≥75% per plot avg
Relative hydrophyte Cover	≥60% per plot avg

Relative Cover of Natives	≥60% per plot avg
Relative cover of Native Perennials	≥40% per plot avg
Invasive cover	<10%
Extent	0.50 acres

These standards will be measured within the vegetated portion of the wetland/pond. We anticipate that about 30% of the wetland/pond will have low cover as this area will be inundated for several months, too long to support native wetland vegetation and too short to support perennial marsh species (cattails, tules, etc.).

2. Upland Buffers

The native grassland habitat will serve as upland buffers and escape cover to the restored wetland. The buffer should create higher value uplands with a greater diversity and cover of native species and low cover of non-native invasive species.

Table 8

Upland Buffer 5-Year Performance Criteria

Habitat Element	Year 5 Performance Criteria
Native Grassland	
Average Number of Natives	≥3 species per plot avg
Vegetation Cover	≥80% per plot avg
Relative Cover of Natives	≥20% per plot avg
Invasive cover	<10% per plot avg
Shrubs	
Number of Shrubs	80% of planted
Height of Shrubs	All Class 2 (>24")

X. MONITORING REQUIREMENTS

A. Post-Construction Monitoring

After completion of mitigation construction, all the elements discussed below will be monitored by the Applicant for five years or until the performance standards are met, whichever comes first. Monitoring results, including photographs, will be submitted as an annual report to the appropriate agencies by August 15 of each monitoring year.

B. Monitoring Frequency and Season(s)

This project will require a monthly walk-through by an ecologist or maintenance technician for the first year and bi-annual reviews thereafter, unless vandalism or other acts appear to threaten the integrity of the wetlands. Specific monitoring activities shall occur at the frequency and season(s) indicated in Table 9. Also, see the maintenance description above for additional detail site reviews focused on weed control.

Table 9

Monitoring Frequency & Seasons

Category	Frequency and Seasons
Hydrology	Monthly, November to May of each year
Vegetation	Annually, in late spring or early summer
Maintenance activities	As completed
Wetland extent	Spring, in first and last year

C. Monitoring Methods

Performance monitoring will include both qualitative and quantitative assessment. Qualitative monitoring will occur during periodic inspections of the restoration area. These inspections will occur frequently (approximately every month) during the first year and bi-annually in subsequent years as noted above. Quantitative monitoring will take place annually until the Year Five performance criteria are met and will typically occur annually in the late spring or early summer beginning the first year after planting.

1. Qualitative Monitoring

Qualitative monitoring methods will include visual observation and photo documentation from set stations. There is no specific performance criteria associated with this monitoring.

a. Visual Observation

During monitoring events, the EM will document the condition of the restoration area based on visual observations. Current conditions, potential problems (i.e., vandalism, fence damage, presence of exotic plant species, herbivory, erosion, etc.), and any recommended actions will be documented in a Field Memo that will be provided to the Applicant. Any recommended actions in a given will also be documented in the annual Monitoring Report for that year.

b. Photo Documentation

Annual photographs of the restoration area will be taken from preset photo stations during quantitative data collection events. Additional photographs will be taken of any potential problem areas. All photographs will be logged and representative photos included in each annual report.

2. Quantitative Monitoring

a. Hydrology

Wetland hydrology will be assessed with at least 2 data gauges in the restored wetlands. These will be used to assess to hydro-period (duration of inundation and/or of saturation within 12 inches of the surface) and ponding in the created wetlands.

Rainfall will be tabulated on a daily basis during the rainy season from a local source and the depth and extent of ponding defined in comparison to rainfall and the measured depth.

b. Wetland Extent

The extent of the constructed wetlands will be mapped using the Commission's delineation methodology in the first and fifth year of the post-construction monitoring. The results of the mapping will be included in the annual report and mapped on the baseline figure.

c. Vegetation

Vegetation monitoring will be conducted in the same fashion for both of the habitat types, using permanent 10 foot by 10 foot plots. A total of 10 vegetation plots are to be randomly placed following planting, with 6 in the wetlands and 4 in the native grassland buffer.

The percent cover of unvegetated ground and of each species will be recorded from these plots in the late spring or early summer of each year during the monitoring period (beginning at the end of the first growing season), using Braun-Blanquet cover classes. Other data will then be calculated from the cover data for each plot, using the mid-point of the range for each code (Table 10, below).

Table 10

Braun-Blanquet Cover Classes

Percent Cover	Braun-Blanquet Code	Value Used for Calculations
75-100%	5	87.5%
50-75%	4	62.5%
25-50%	3	37.5%
5-25%	2	15%
many-5%	1	2.5%
Few	+	.1%
one individual	r	.01%

Plants will also be categorized as either "wetland species" or other species. Indicator status will be based on the most current National Wetland Plant List for this region. For comparison to performance criteria, values for all stands within a habitat type will also be averaged. Formulas are described in Table 11, below.

Table 11

Vegetation Cover Calculations

Cover Calculation	**Formula**
Total Species Cover (totals can exceed 100 with shading or 'overlap' between species.)	Sum of cover for all species.
Vegetation Cover	100 minus non-plant cover
Relative Cover by Native Species	Sum of cover for the native species / Total Species Cover.
Relative Cover of Hydrophytes	Sum of cover for the wetland species /Total Species Cover.

d. Maintenance Activities

All maintenance activities will be reported in the annual monitoring report, including the date and a short description of the work involved. Maintenance activities to be reported include mowing, herbicide use, replacement of dead or unhealthy shrubs, replacement of plantings, major debris removal and irrigation line repair.

D. As-built Report

An as-built report containing updated drawings and actual limits of restored habitats will be prepared and submitted to the permitting agencies within 90 days of mitigation work completion. The report will include, but not be limited to, modifications to the original design, finish contours and boundaries of mitigation sites and wetland hydrology, planting locations, and the contacts of all contractors and subcontractors who worked on the project.

E. Annual Reports

Monitoring reports will be submitted annually beginning the first year after construction and continuing until the project meets the performance standards. Reports will include both raw data (as appendices) and summary tables and graphs of the data required to assess project progress. These reports will be due by the 15th of September each year a report is required, e.g. the Year One report will be due September 15th 2017 (projected). In addition to evaluating the progress relative to the performance standards quantitatively and qualitatively, the reports will include representative photographs taken each year from permanent photo stations. The reports will include a list of names, titles, and companies of all persons who prepared the reports and who participated in the monitoring.

F. Notification of Completion

The Applicant will notify the permitting agencies following completion of the monitoring period, or at the time the Year 5 success criteria have been met. As part of this notification, a jurisdictional delineation will be provided as noted above, which shows the boundaries of wetlands and waters at the mitigation site.

XI. DRAFT LONG-TERM MANAGEMENT PLAN

A. Introduction

The purpose of this draft long-term management plan (LTMP) is to ensure the project site is managed, monitored, and maintained in perpetuity consistent with the WMP and conservation easement. This LTMP would take effect upon the project meeting its performance standards, at the conclusion of the Establishment Period. By this point, the wetland and upland habitats in the mitigation area should be self-sustaining and require little active management. Long-term management should consist primarily of minor landscape maintenance and trash removal.

The land manager for implementation of the LTMP will be the applicant. This LTMP describes the management activities after the Establishment Period and identifies the annual tasks associated with those activities.

As noted above, the monitoring and management issues on this site will be the following.

1. Monitoring of site conditions.
2. Weed control.
3. Minimizing harmful intrusions, including trash
4. Community planting and education

However, as noted in the Establishment Period Maintenance Plan (Chapter VIII), all work will include adaptive management techniques and, as the site evolves, these management tasks may be modified.

B. Long-term Management Tasks

1. Monitoring site conditions

Objective: Monitor, conserve and maintain the mitigation area's wetlands.

Task 1.1: On a twice yearly basis, the mitigation area will be walked by a project biologist to qualitatively and quantitatively monitor the condition of the habitats. Topographic conditions, hydrology, erosion, sedimentation, vegetation cover and composition and invasive species will be noted in writing and mapped in reference to specific landmarks.

Task 1.2: During the bi-annual inspections, photographs will be taken from four standard reference sites covering a majority of the site, using the same reference sites used during the Establishment Period. Site notes and photographs will then be documented and filed.

Task 1.3: After the first inspection of the year, typically in early spring, the project biologist will review the results of the inspection with the maintenance staff and develop a program and schedule of maintenance activities for the year.

2. Weed control

Objective: Monitor and maintain control over non-native, invasive species.

Task 2.1: On an annual basis, but separate from the annual wetland survey noted in Task 1.1., a project biologist will survey the site for infestations of non-native invasives. The project biologist will then provide the locations of these infestations to the maintenance staff with appropriate recommendations for their control.

Task 2.2: Subsequent to the annual weed survey, infestations of non-native invasive weeds in the uplands shall be mown and, if broad-leaved perennials, spot-sprayed with an appropriate herbicide. Mowing and herbicides are not allowed in site wetlands.

3. Minimize harmful intrusions

Objective: Minimize disturbance of the mitigation area by the public. Enhance the appreciation of wetlands, native habitats and native wildlife by K-12 students through educational activities.

Task 4.1: On an annual basis, the maintenance staff will maintain and repair the access signage and fence.

Task 4.2: On an annual basis, the maintenance staff will collect and dispose of any trash and repair any trespass impacts.

Task 4.3: On an annual basis, the project biologist will organize and host a community planting and educational activity at the mitigation area. The goal of the activity will be to educate local residents as to the value of the habitats and the importance of their protection.

5. Reporting, Management and Administration

An annual report summarizing the results of the site reviews and maintenance actions will be submitted to the permitting agencies by September 15 of each year. As well, any actions taken in the mitigation area or activities occurring in the area that are not consistent with the terms of the conservation easement shall be reported along with any enforcement actions taken.

XII. ADAPTIVE MANAGEMENT PLAN

The restoration area will be managed in an iterative manner, i.e., where the monitoring program shows an area is tending towards an unsuccessful conclusion, the EM and RC shall take immediate action to correct that trend. These actions would include site modification, replanting, and similar measures. The mortality or lack of vigor in the plants would make most problems and the logical solution evident.

Each monitoring report shall include any recommendations the EM feels are required to ensure the project meets the performance standards. If no comments are received within thirty days after submittal of an annual report, the EM shall proceed to implement the recommendations contained within the monitoring report, with the exception of any recommendations that include actions that are subject to regulatory authority, *e.g.*, work within wetlands. Such actions are not pre-approved by this mitigation plan and would require additional authorizations.

Implementation of the final WMP and careful construction monitoring by the EM and RC are likely to ensure project success. If any portion of the project does not meet the final standards, however, additional monitoring and remedial work shall be required until the project meets the performance standards. Catastrophic events may occur and these are outside the control of the applicant.

XIV. REFERENCES

Anderson, William and R. Morgan. 1973. A Flora of Pescadero Marsh. Pub by Santa Cruz City Museum and CNPS, Santa Cruz Chapter. 12 pp. This copy hand annotated by RM, presumably R. Morgan.

Barbour, M. G., Major, J. 1988. Terrestrial Vegetation of California. California Native Plant Society, Sacramento, California. 1002 pp.

Dahlin, Kyla. 2007. Plant community classification and mapping project: Mori Point GGNRA. Drafyt 1.2.2007. 144 pp

EIP Associates. 2006. Survey Report for Special Status Plants at the Pacifica Quarry Reuse Project Site in San Mateo County, California. September, 2006.

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss. 169 pp.

Geocon. 2015. Geotechnical investigation for Quarry reclamation. Prepared for the Reserve at Pacifica LLC. Geocon project no E8867-04-02. 15 pp w appendices.
Hickman, J. C., ed. 1993. The Jepson Manual. University of California Press, Berkeley. 1400 pp.

Kwan, Ruby. 2014. Final Report: 2014 California red-legged frog survey Mori point and Milagra ridge. Prepared for the National Park Service. September 15, 2014. 11 pp.

Mason, H. L. 1969. A Flora of the Marshes of California. University of California Press, Berkeley. 879 pp.

McClintock, Elizabeth, Paul Reeberg, and Walter Knight. 1990. A Flora of the San Bruno Mountains, San Mateo County, CA. CNPS Special Publication Number 8. 223 pp.

Reed, P. B. Jr. 1988. National List of Plant Species that Occur in Wetlands: California (Region 0). U.S. Fish and Wildlife Service Biological Report 88 (26.10). 135 pp.

US Army Corps of Engineers, San Francisco and Sacramento Districts. 2008. Mitigation and Monitoring Proposal Guidelines.

USGS. https://geo-nsdi.er.usgs.gov/metadata/open-file/98-137/metadata.faq.html