ATTACHMENT 14

Vernal Pool and Quino Checkerspot Butterfly Mitigation Plan for the Southwest Village Specific Plan

Vernal Pool and Quino Checkerspot Butterfly Mitigation Plan for the Southwest Village Specific Plan San Diego, California Project No. 614791

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November 11, 2024

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Acronyms and Abbreviations

CDFW	California Department of Fish and Wildlife
City	City of San Diego
CRAM	California Rapid Assessment Method
DSD	Development Services Department
DSM	digital surface model
MMC	Mitigation Monitoring and Coordination
MSCP	Multiple Species Conservation Program
PEP	plant establishment period
plan	Mitigation Plan
project	Southwest Village Specific Plan project
c	Quino checkerspot butterfly
RECON	RECON Environmental, Inc.
RWQCB	Regional Water Quality Control Board
Specific Plan	Southwest Village Specific Plan
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VPHCP	Vernal Pool Habitat Conservation Plan
VPMMP	Vernal Pool Management and Monitoring Plan

1.0 Introduction

This mitigation plan (plan) details the process for mitigating impacts to vernal pool habitat associated with the project-level components of the Southwest Village Specific Plan (project). The Southwest Village Specific Plan (Specific Plan) is in the community of Otay Mesa, within the city of San Diego (Figures 1 and 2). The project is within Township 19 South, Range 01 West, of the U.S. Geological Survey (USGS) 7.5-minute topographic map, Imperial Beach, California quadrangle (see Figure 2; USGS 1996) and is presented on the City of San Diego 800-foot-scale map numbers 138-1761 (Figure 3). The project includes the adoption of the Specific Plan, which is a policy framework intended to guide the future development of residences; commercial and retail spaces; public facilities including an elementary school, parks, and trails; and open space and habitat conservation areas within a 490-acre area. The project also includes development of Phase 1 and 2 of the Specific Plan, which would result in impacts to vernal pool and Quino checkerspot butterfly (*Euphydryas editha quino*; Quino) habitat which are addressed in this plan. Impacts from the project are discussed in more detail in the project-specific biological resources report (RECON Environmental, Inc. [RECON] 2024).

This mitigation plan is prepared in accordance with the California Environmental Quality Act, the City of San Diego's (City) Multiple Species Conservation Program (MSCP), as implemented through the Land Development Code – Biology Guidelines (City of San Diego 2018), and the City of San Diego's Vernal Pool Habitat Conservation Plan (VPHCP; City of San Diego 2019). The mitigation design includes elements in support of Quino and western burrowing owl (*Athene cunicularia hypugaea*) as recommended in the U.S. Fish and Wildlife Service Recovery Plan for Quino Checkerspot Butterfly and the Burrowing Owl Conservation and Management Plan for San Diego County (San Diego Zoo Institute for Conservation Research 2017), respectively. In addition, the design would provide habitat for San Diego button-celery (*Eryngium aristulatum* var. *aristulatum*), San Diego fairy shrimp (*Branchinecta sandiegoensis*), Riverside fairy shrimp (*Streptocephalus wootonii*), Crotch's bumble bee (*Bombus crotchii*), and western spadefoot (*Spea hammondii*), which are sensitive species known to occur within the project area and/or within vernal pools and disturbed wetlands throughout the project area. The goal of this plan is the re-establishment of 3.86 acres of vernal pool surface area, enhancement of 0.05 acre of existing vernal pools, preservation and enhancement of 0.961 acre of Quino habitat, restoration of 0.704 acre of Quino habitat, and improvements for western burrowing owl. This plan includes a discussion of existing conditions, an implementation and maintenance plan, adaptive management, performance standards, and monitoring and reporting requirements.

In accordance with the VPHCP Section 5.3.1, this vernal pool mitigation plan will be submitted to the City of San Diego (Development Services Department [DSD] Environmental Analysis Section and Planning Department MSCP staff) and resource agencies for approval as part of the development review process and will be included as an attachment to the Southwest Village Specific Plan California Environmental Quality Act document.

Project Location

RECON

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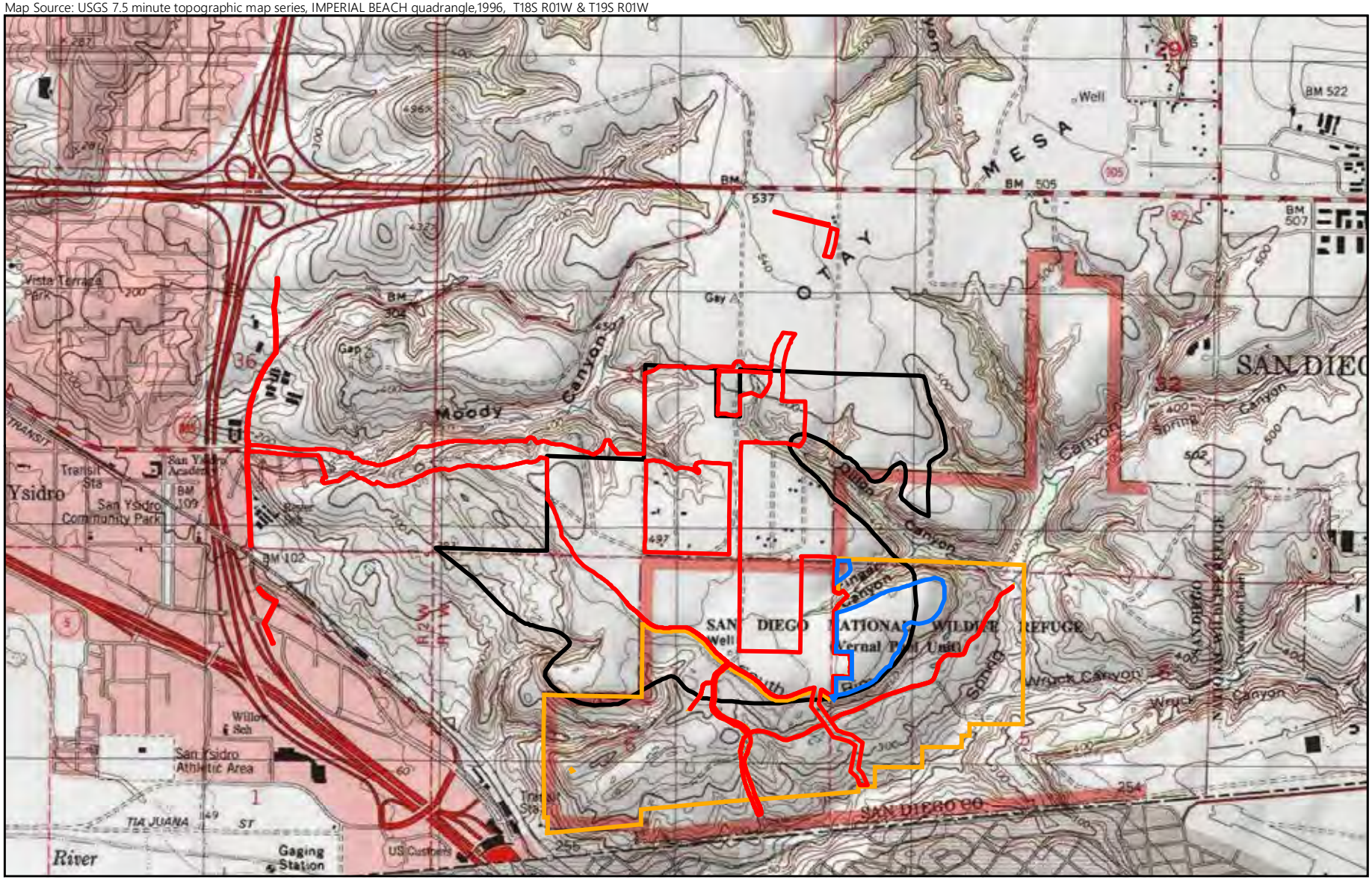
FIGURE 1
Regional Location

Map Source: USGS 7.5 minute topographic map series, IMPERIAL BEACH quadrangle,1996, T18S R01W & T19S R01W



Project-level Analysis Area

Specific Plan Boundary

Vernal Pool Mitigation Sites

Land to be Conserved and Managed by the City

FIGURE 2
Vernal Pool Mitigation Sites
on USGS Map

RECON

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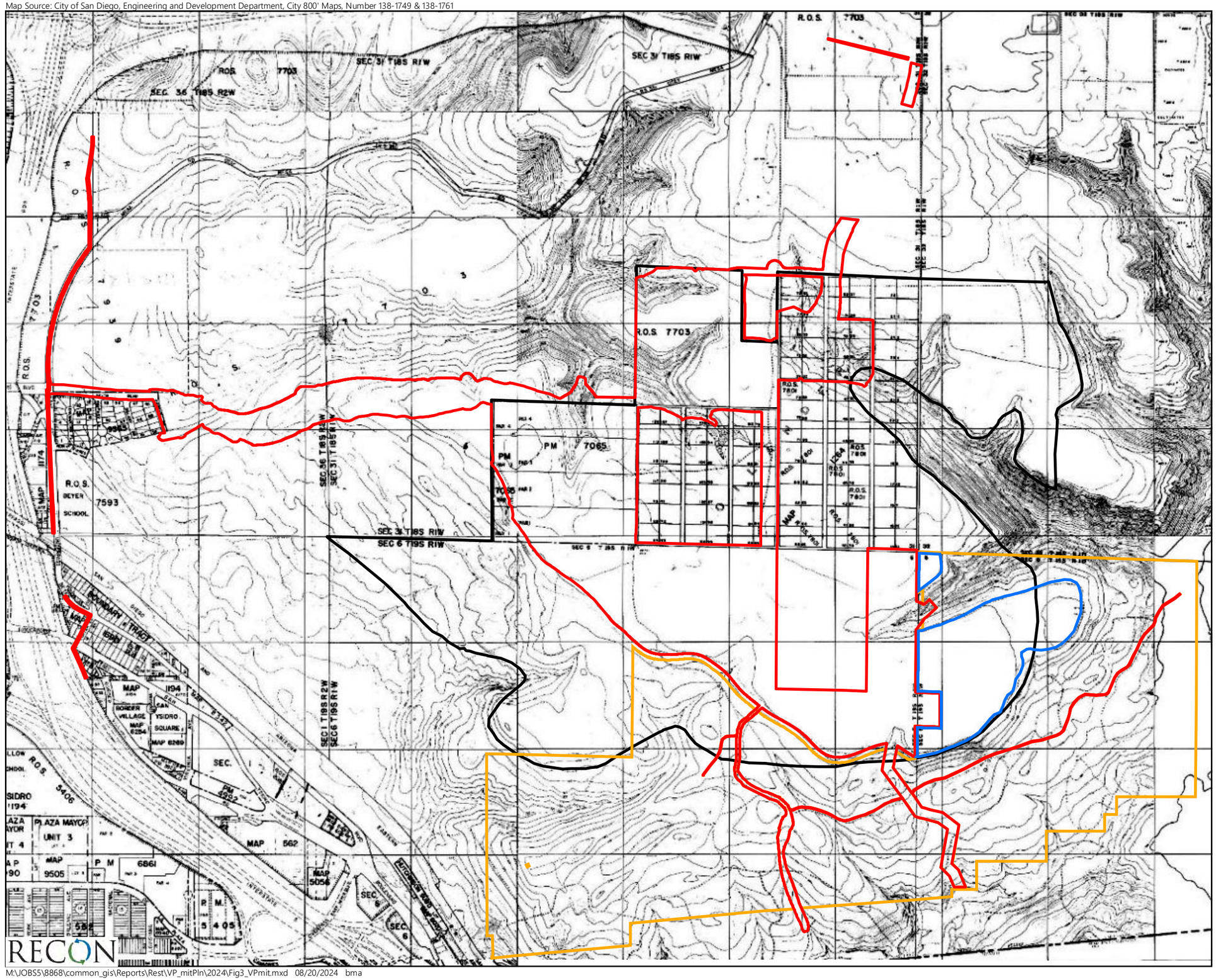
Map Source: City of San Diego, Engineering and Development Department, City 800' Maps, Number 138-1749 & 138-1761



Project-level Analysis Area
Vernal Pool Mitigation Sites
Land to be Conserved and Managed by the City
Specific Plan Boundary

0 Feet 800

FIGURE 3
Vernal Pool Mitigation Sites on City 800' Map

RECON

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1.1 Mitigation Location

Vernal pool and Quino mitigation are planned to occur within two vernal pool mitigation sites (mitigation sites), the northern mitigation site and southern mitigation site. The mitigation sites are located in the community of Otay Mesa within the city of San Diego, and more specifically within the Otay Mesa Community Plan. The mitigation sites are south of State Route 905, east of Interstate 805, and between Dillon Canyon to the north and Spring Canyon to the southwest (see Figures 1 and 2). The areas surrounding the mitigation sites are topographically varied, ranging from flat mesa tops to steep canyon slopes and drainage bottoms (see Figure 2).

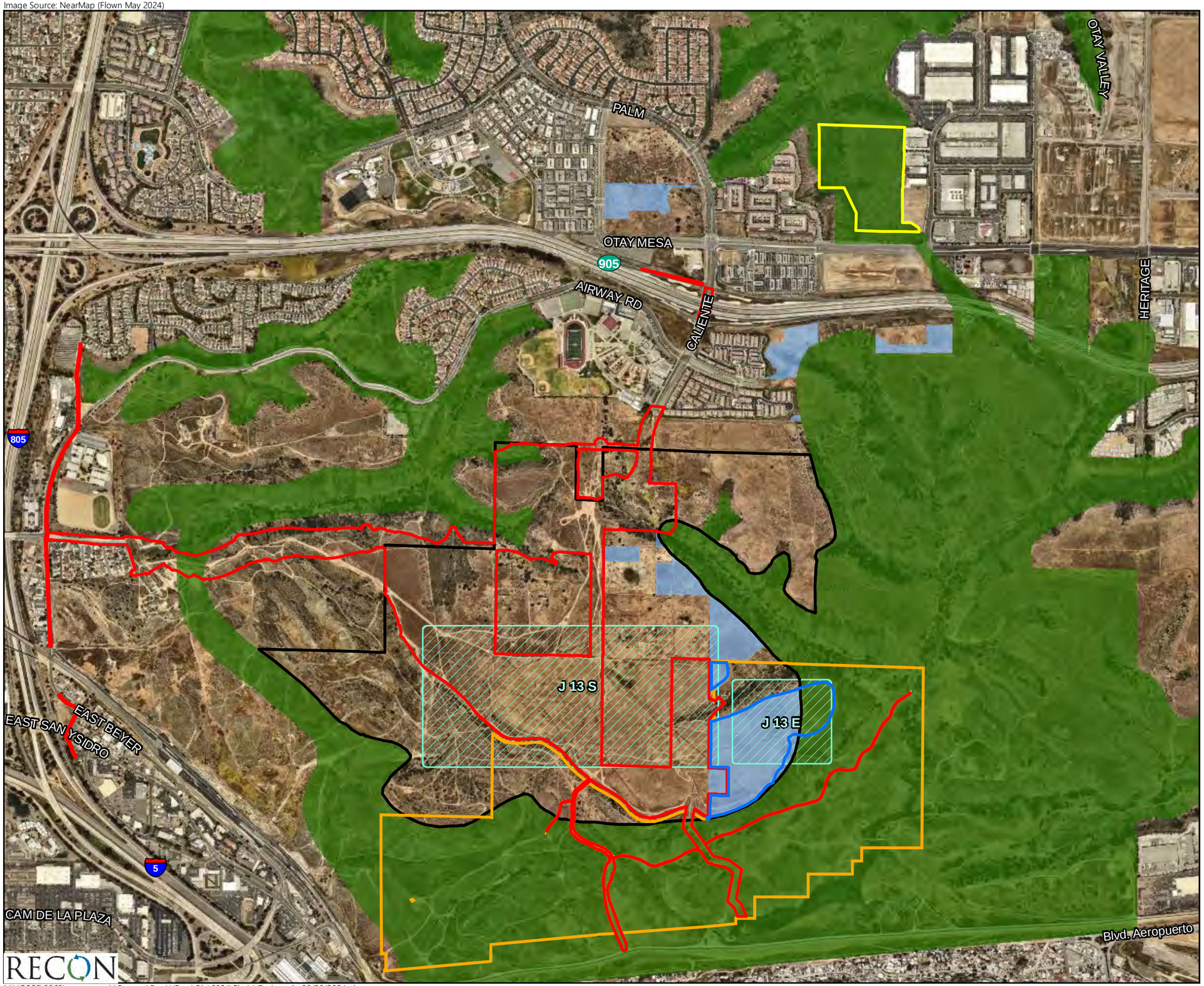
The northern mitigation site is surrounded by open space to the north, east, and south (Figure 4). The City of San Diego's Multi-Habitat Planning Area (MHPA) occurs to the north (see Figure 4). The southern mitigation site is surrounded by open space to the north, east, and south with the MHPA occurring to the east and south (see Figure 4). The mitigation sites are located adjacent to the impact site, which occurs to the west of both sites (see Figure 4). The mitigation described herein is specifically to address impacts associated with the areas labeled "Project-Level Analysis Area" on Figures 2 through 4. Lands surrounding the vernal pool mitigation sites are planned to be conserved associated with development of Phase 1 and 2 of the Specific Plan. These planned conservation areas are labeled "lands to be conserved and managed by the City" as shown on Figures 2 through 4. Impacts within the project site would occur in phases described in the biological resources report (RECON 2024) and accordingly vernal pool mitigation would be implemented in phases.

1.2 Mitigation Requirements

The project would result in impacts to both waters of the U.S. and State, as well as City wetlands (Figures 5a.1–5c.6). Only mitigation for impacts to City vernal pools and disturbed wetlands are discussed in this plan. These impacts are summarized in Table 1.

As detailed in Table 1, the impacts addressed in this mitigation plan include 0.04 acre of vernal pool resources located within the Southwind property boundary. If the Southwind project is constructed first, that project would be responsible for mitigation. Impacts within the Candlelight project area, as detailed in Figure 44 of the biological resources report, are not addressed in this mitigation plan as impacts within that project site would be mitigated consistent with that project's wetland permits and prior entitlements. The location of these properties is shown in Figures 5a.2, 5b.2, and 5c.2. This mitigation plan assumes the project would be required to mitigate for the Southwind project impacts; however, if either the Candlelight or Southwind developments were to proceed ahead of the project discussed in this plan, the first project to create impacts would be required to mitigate.

Image Source: NearMap (Flown May 2024)



Project-level Analysis Area
Vernal Pool Mitigation Sites
Land to be Conserved and Managed by the City
Specific Plan Boundary
City of SD Vernal Pool Complex
Cal Terraces Reference Site
City of SD MHPA
VPHCP MHPA

0 Feet 1,200

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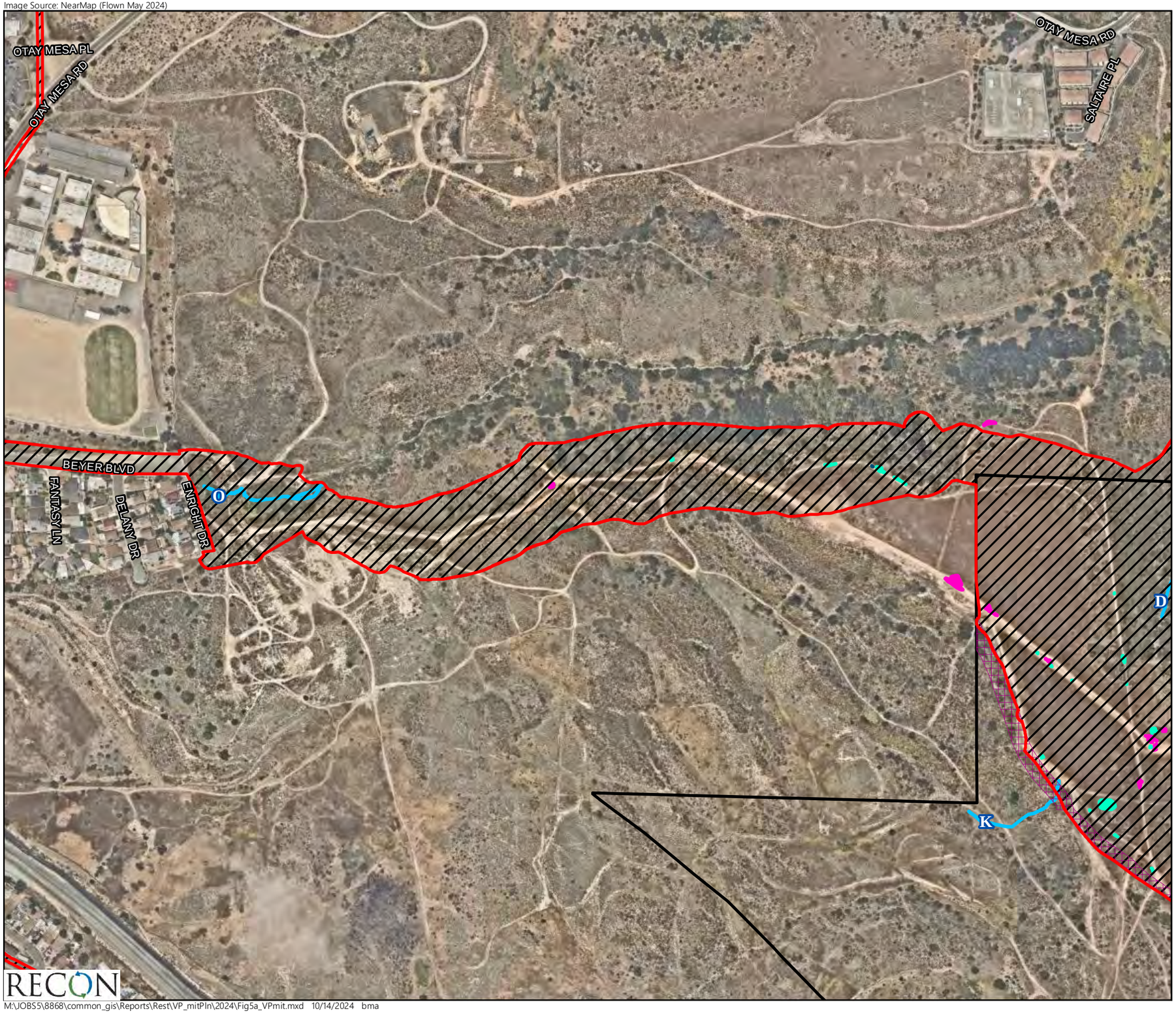
FIGURE 4
Vernal Pool Mitigation Sites, MHPA, and Mitigation Lands on Aerial Photograph

Image Source: NearMap (Flown May 2024)



Project-level Analysis Area
Southwest Village Project Impacts
Brush Management Zone 2
Specific Plan Boundary

Waters of the U.S. (USACE)

Vernal Pool
Vernal Pool with Fairy Shrimp
Wetland
Non-wetland Waters (Waters ID)

0 Feet 400

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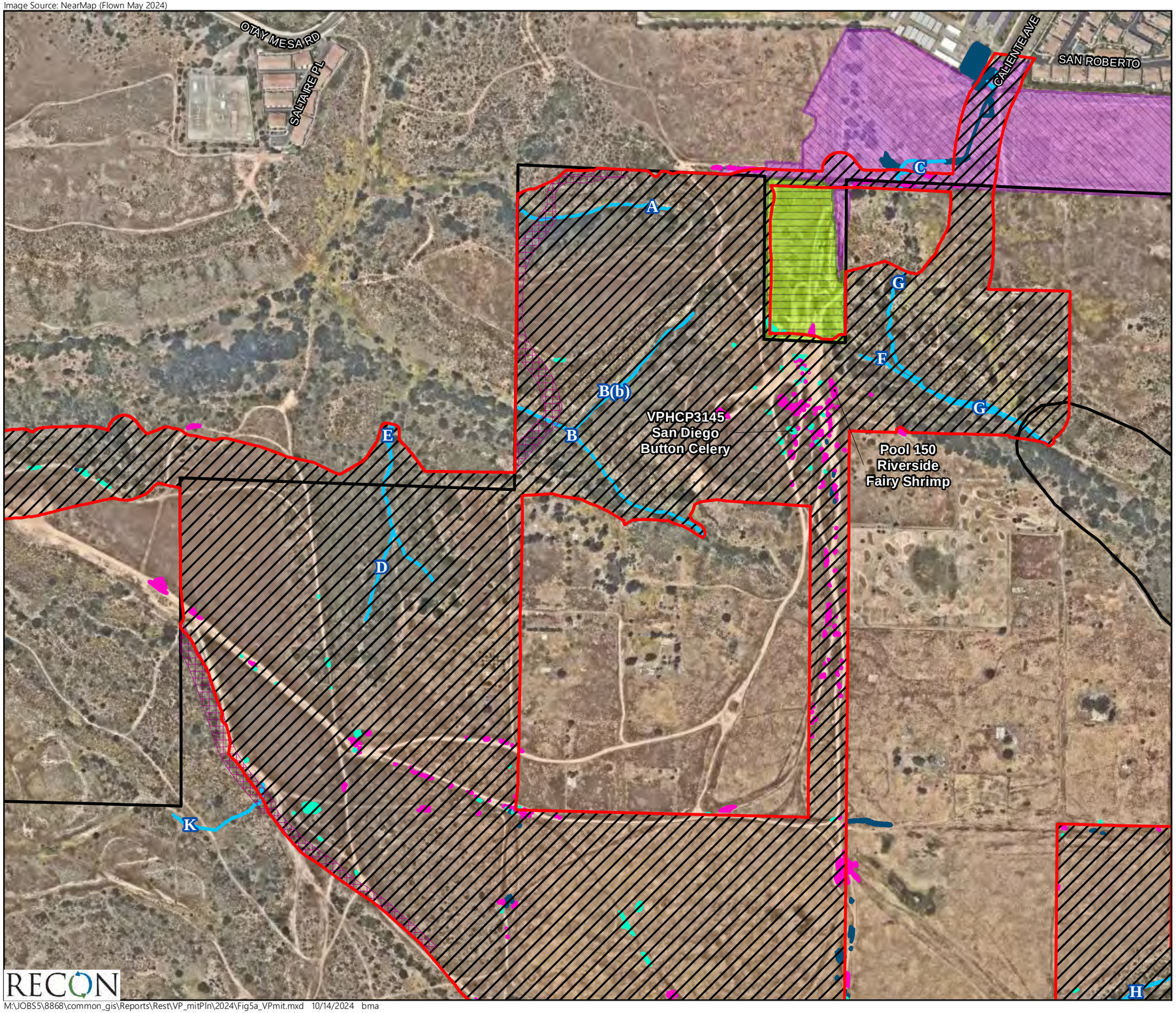
FIGURE 5a.1
Impacts to Potential USACE Waters of the U.S.

Image Source: NearMap (Flown May 2024)



Project-level Analysis Area
Southwest Village Project Impacts
Brush Management Zone 2
Candlelight Project Impacts
Southwind Project Impacts
Land to be Conserved and Managed by the City
Specific Plan Boundary

Waters of the U.S. (USACE)

Vernal Pool
Vernal Pool with Fairy Shrimp
Wetland
Non-wetland Waters (Waters ID)

0 Feet 400

RECON

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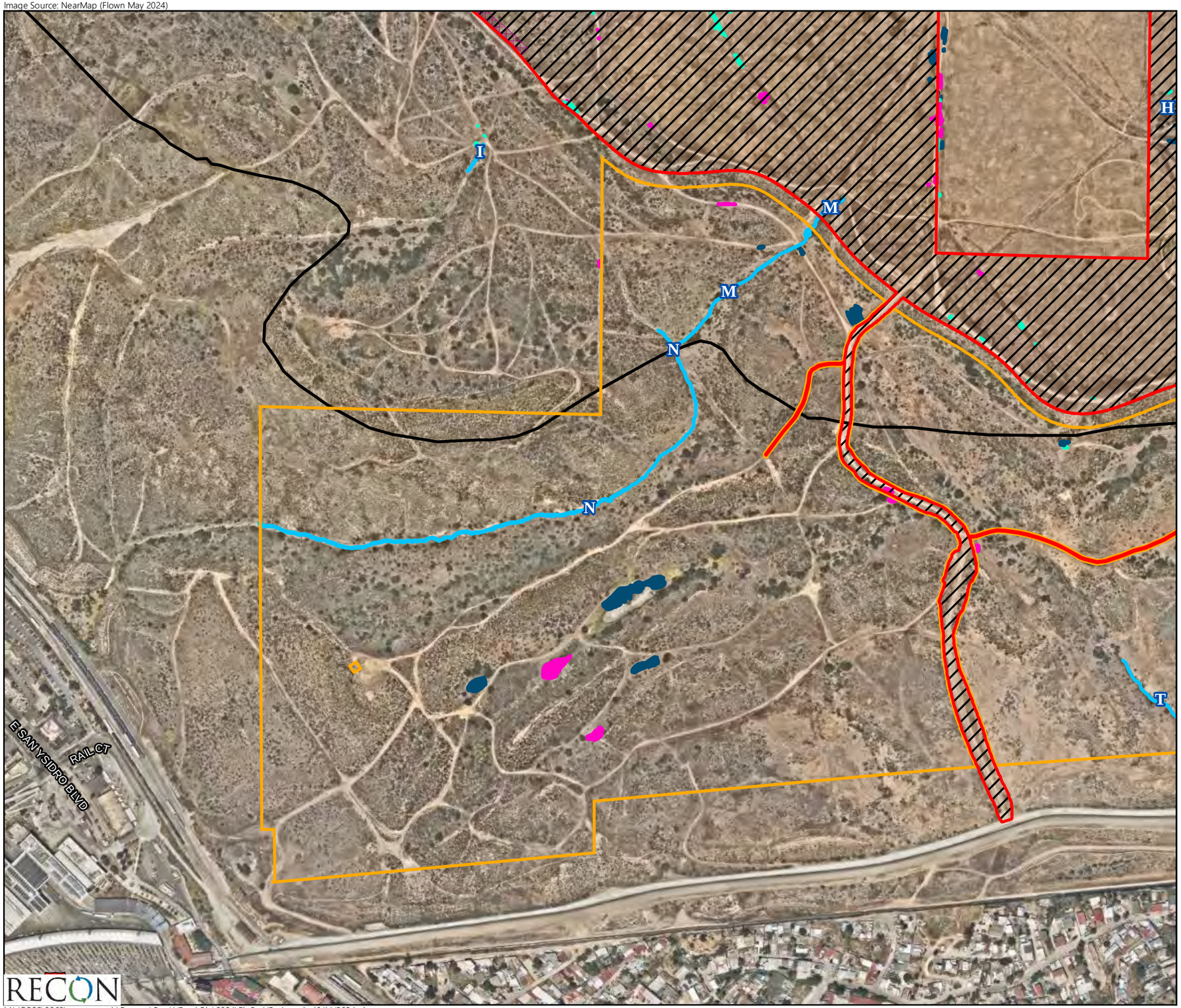
FIGURE 5a.2
Impacts to Potential USACE Waters of the U.S.

Image Source: NearMap (Flown May 2024)



Project-level Analysis Area
Southwest Village Project Impacts
Brush Management Zone 2
Land to be Conserved and Managed by the City
Specific Plan Boundary

Waters of the U.S. (USACE)

Vernal Pool
Vernal Pool with Fairy Shrimp
Wetland
Non-wetland Waters (Waters ID)

0 Feet 400

RECON

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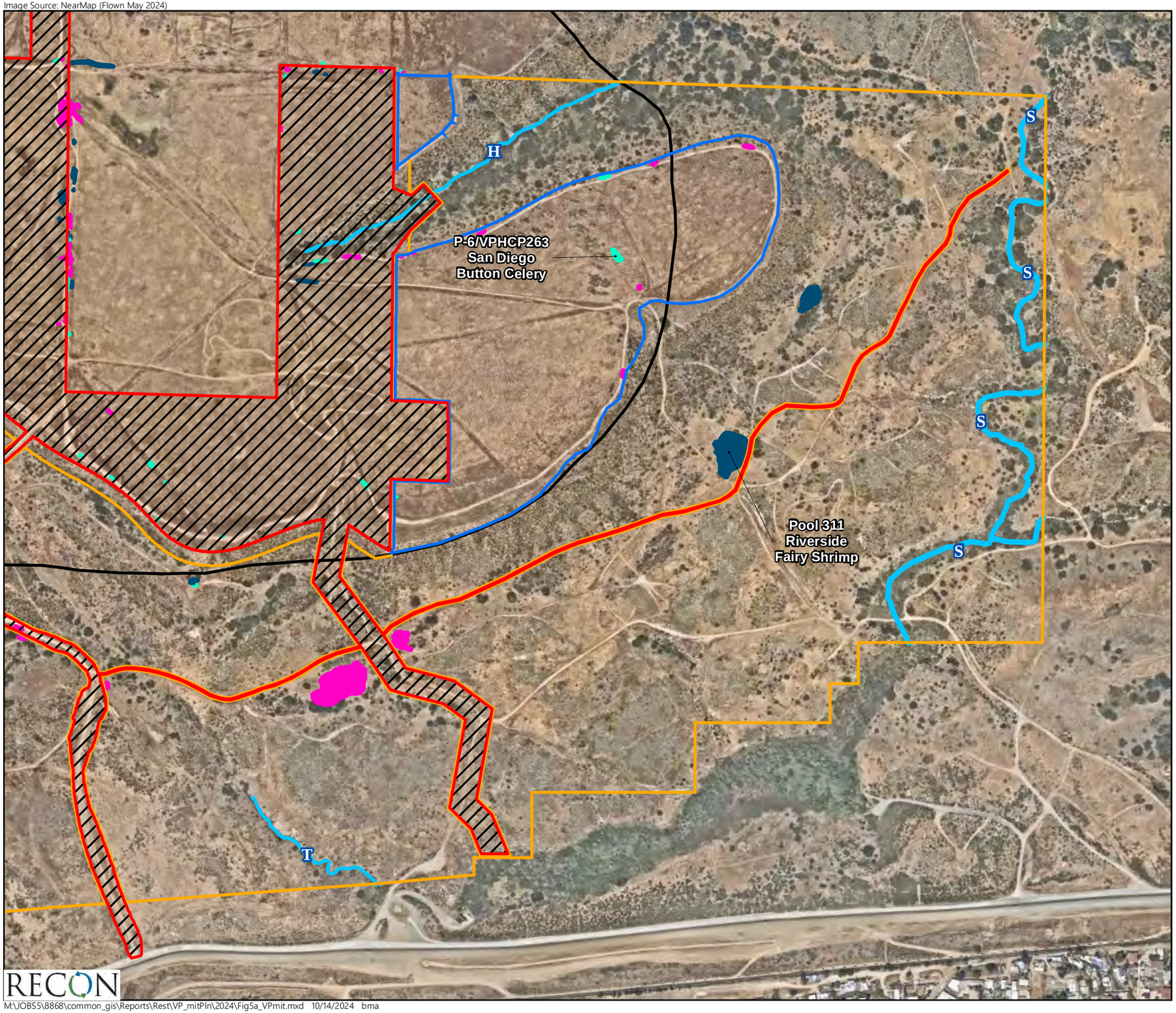
FIGURE 5a.3
Impacts to Potential USACE Waters of the U.S.

Image Source: NearMap (Flown May 2024)



- Project-level Analysis Area
- Southwest Village Project Impacts
- Vernal Pool Mitigation Sites
- Land to be Conserved and Managed by the City
- Specific Plan Boundary

Waters of the U.S. (USACE)

- Vernal Pool
- Vernal Pool with Fairy Shrimp
- Wetland
- Non-wetland Waters (Waters ID)

0 Feet 400

RECON

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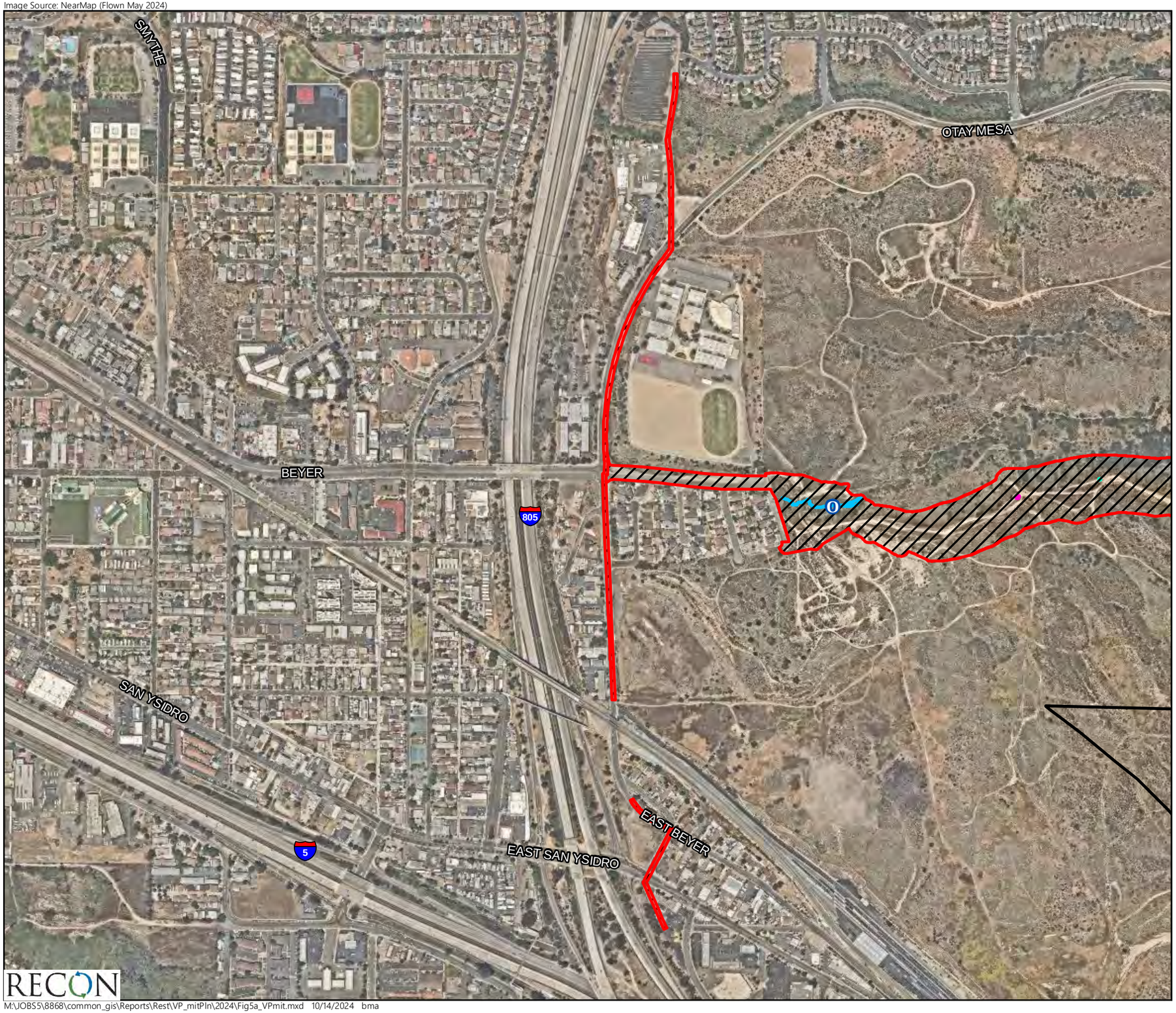
FIGURE 5a.4
Impacts to Potential USACE Waters of the U.S.

Image Source: NearMap (Flown May 2024)



Project-level Analysis Area
Southwest Village Project Impacts
Specific Plan Boundary

Waters of the U.S. (USACE)

Vernal Pool
Vernal Pool with Fairy Shrimp
Non-wetland Waters (Waters ID)

0 Feet 600

RECON

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FIGURE 5a.5
Impacts to Potential USACE Waters of the U.S.

Image Source: NearMap (Flown May 2024)

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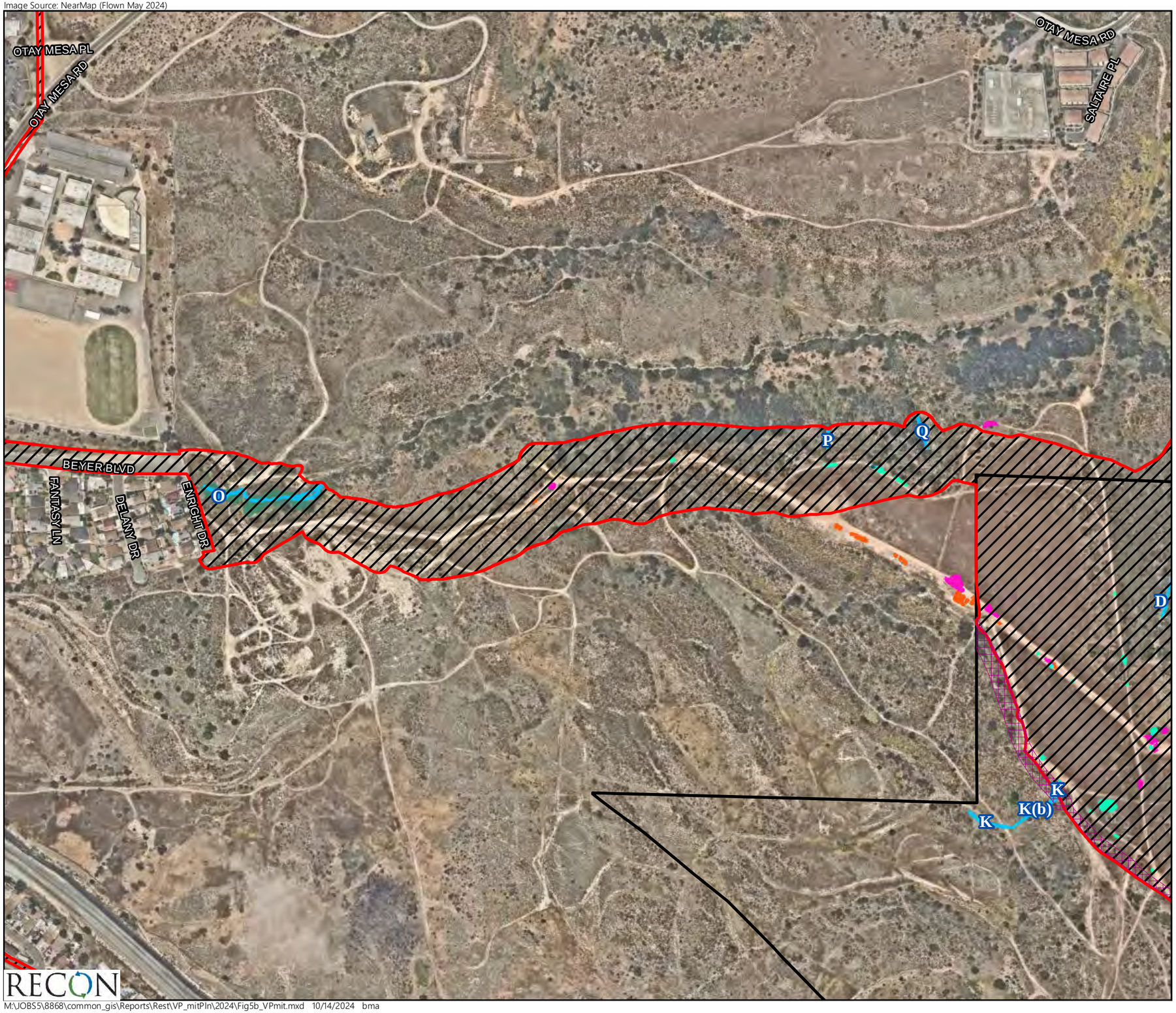
FIGURE 5a.6
Impacts to Potential USACE Waters of the U.S.

Image Source: NearMap (Flown May 2024)



Project-level Analysis Area
Southwest Village Project Impacts
Brush Management Zone 2
Specific Plan Boundary

Waters of the State (RWQCB)

Vernal Pool
Vernal Pool with Fairy Shrimp
Seasonal Basin
Wetland

Waters of the State (CDFW)

Wetland

Waters of the State (RWQCB & CDFW)

Non-wetland Waters

0 Feet 400

RECON

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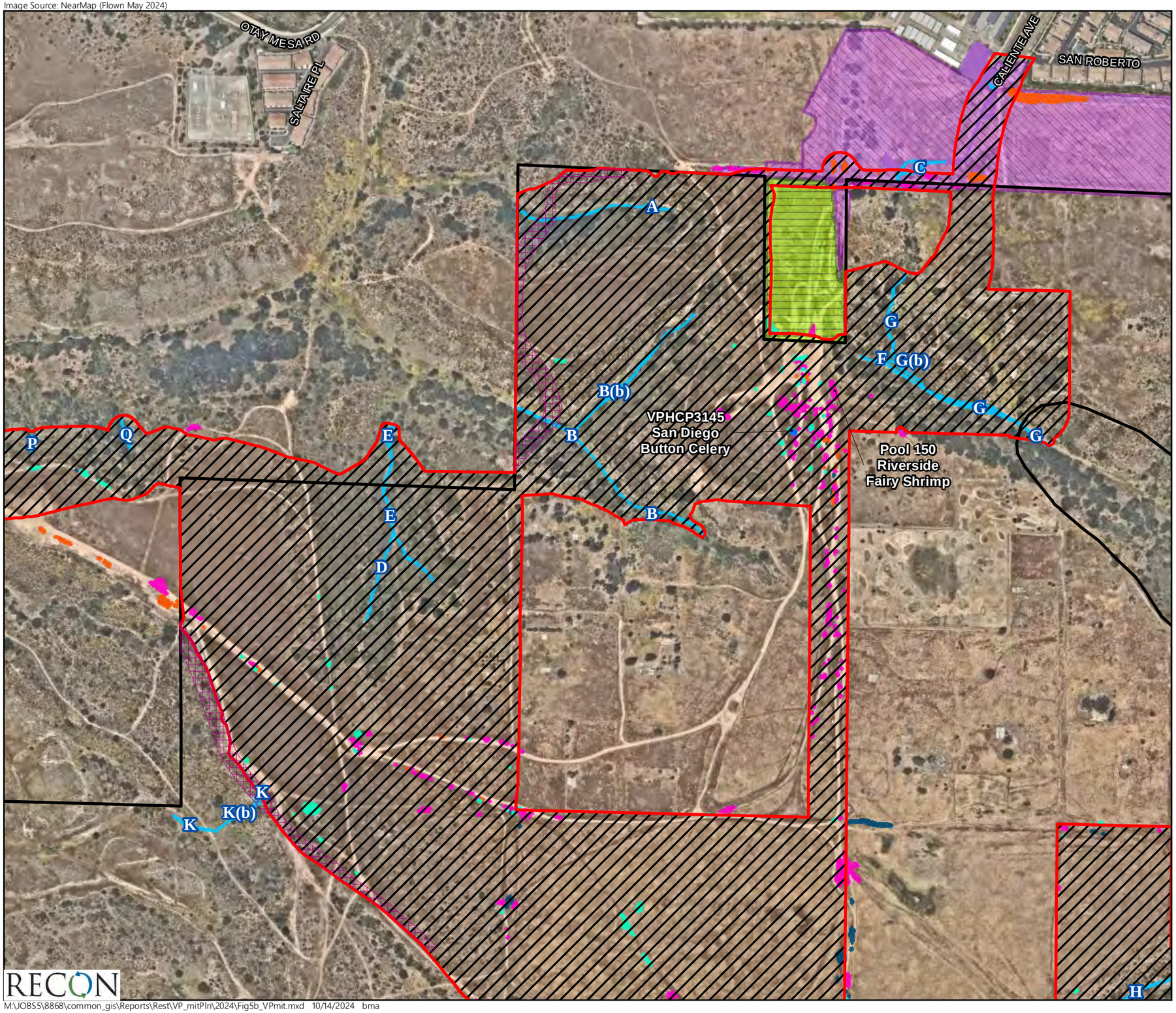
FIGURE 5b.1
Impacts to Potential
CDFW & RWQCB Waters of the State

Image Source: NearMap (Flown May 2024)



Project-level Analysis Area
Southwest Village Project Impacts
Brush Management Zone 2
Candlelight Project Impacts
Southwind Project Impacts
Land to be Conserved and Managed by the City
Specific Plan Boundary

Waters of the State (RWQCB)

Vernal Pool
Vernal Pool with Fairy Shrimp
Seasonal Basin
Wetland

Waters of the State (CDFW)

Wetland

Waters of the State (RWQCB & CDFW)

Non-wetland Waters
Vernal Pool
Wetland

0 Feet 400

RECON

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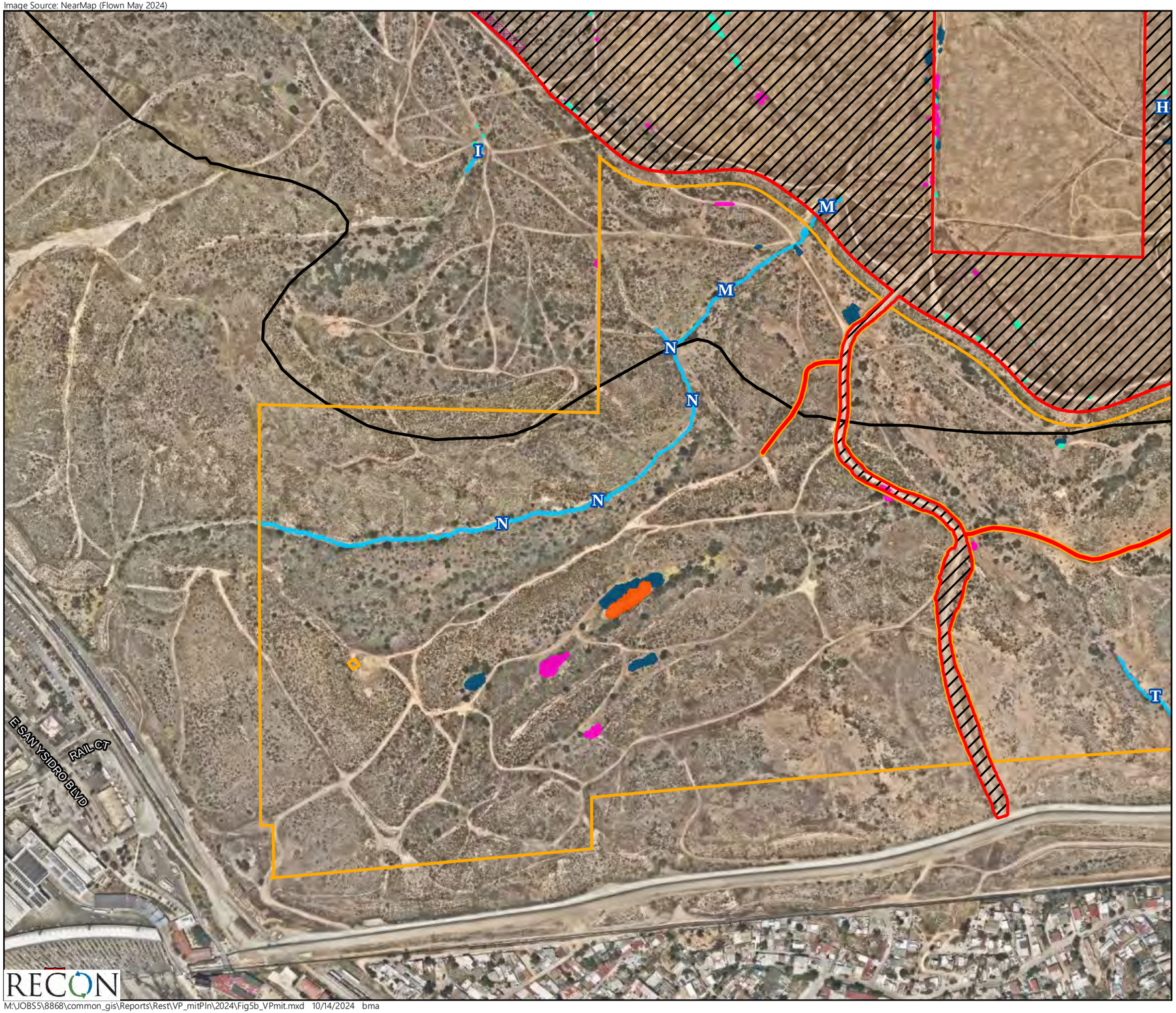
FIGURE 5b.2
Impacts to Potential
CDFW & RWQCB Waters of the State

Image Source: NearMap (Flown May 2024)



Project-level Analysis Area

Southwest Village Project Impacts

Brush Management Zone 2

Land to be Conserved and Managed by the City

Specific Plan Boundary

Waters of the State (RWQCB)

Vernal Pool

Vernal Pool with Fairy Shrimp

Seasonal Basin

Wetland

Waters of the State (RWQCB & CDFW)

Non-wetland Waters

0 Feet 400

FIGURE 5b.3
Impacts to Potential
CDFW & RWQCB Waters of the State

RECON

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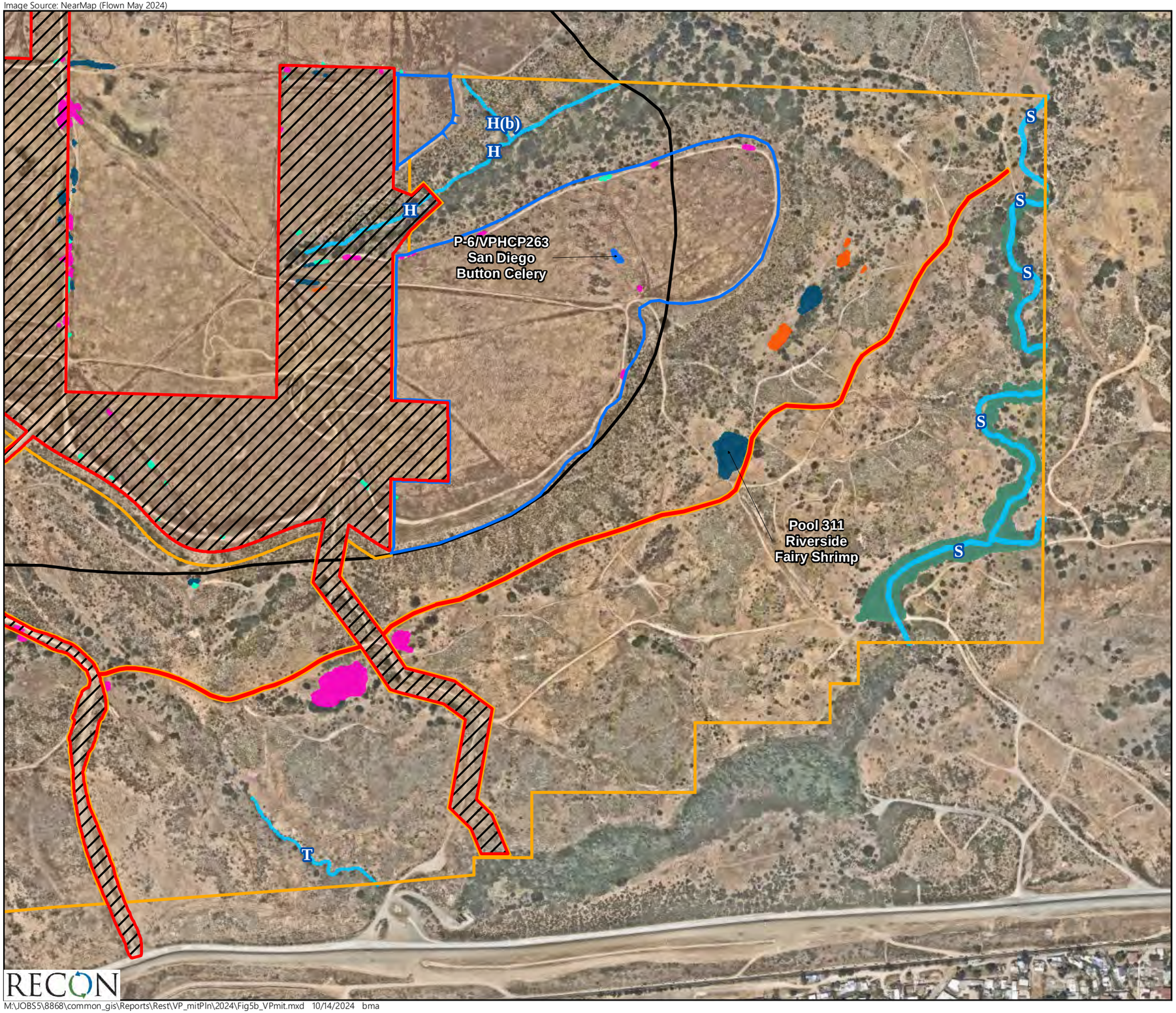
Image Source: NearMap (Flown May 2024)



Project-level Analysis Area
Southwest Village Project Impacts
Vernal Pool Mitigation Sites
Land to be Conserved and Managed by the City
Specific Plan Boundary

Waters of the State (RWQCB)

Vernal Pool
Vernal Pool with Fairy Shrimp
Seasonal Basin
Wetland

Waters of the State (CDFW)

Wetland

Waters of the State (RWQCB & CDFW)

Non-wetland Waters
Vernal Pool

0 Feet 400

RECON

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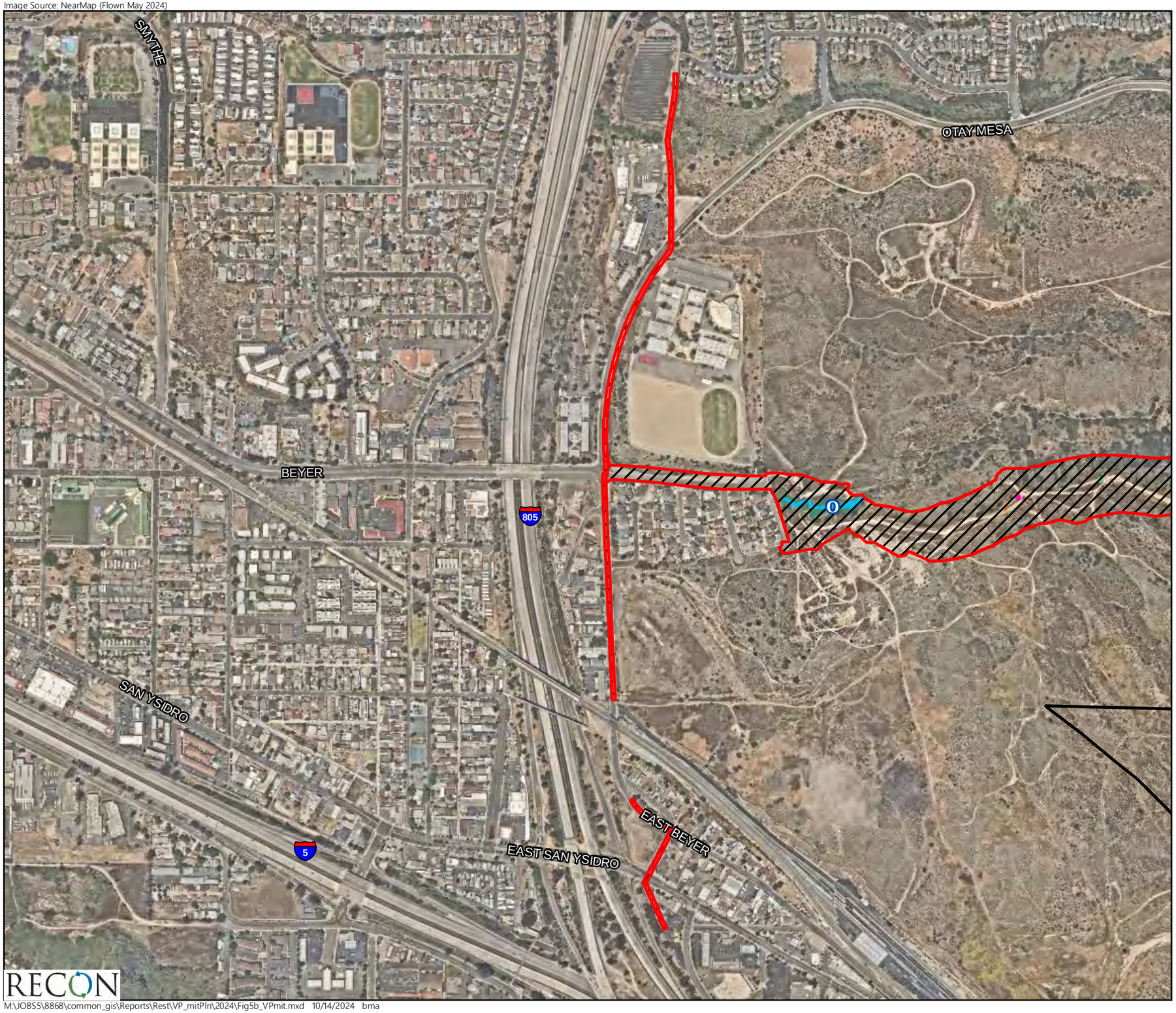
FIGURE 5b.4
Impacts to Potential
CDFW & RWQCB Waters of the State

Image Source: NearMap (Flown May 2024)



Project-level Analysis Area

Southwest Village Project Impacts

Specific Plan Boundary

Waters of the State (RWQCB)

Vernal Pool

Vernal Pool with Fairy Shrimp

Seasonal Basin

Waters of the State (CDFW)

Wetland

Waters of the State (RWQCB & CDFW)

Non-wetland Waters

0 Feet 600

RECON

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FIGURE 5b.5

Impacts to Potential

CDFW & RWQCB Waters of the State

Image Source: NearMap (Flown May 2024)

Project-level Analysis Area

Southwest Village Project Impacts

0 Feet 160

FIGURE 5b.6
Impacts to Potential
CDFW & RWQCB Waters of the State

RECON

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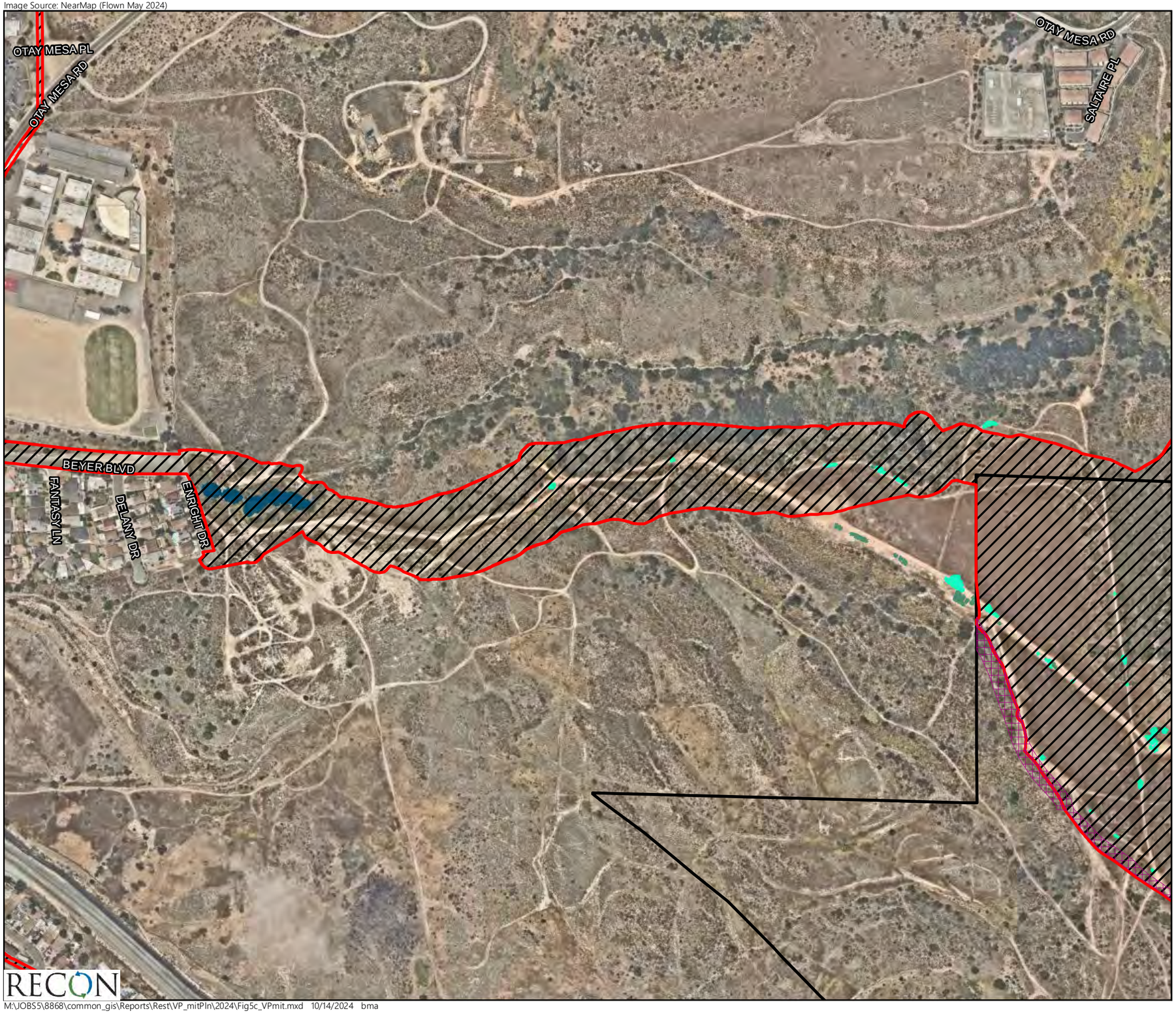
Image Source: NearMap (Flown May 2024)



Project-level Analysis Area
Southwest Village Project Impacts
Brush Management Zone 2
Specific Plan Boundary

City of San Diego Waters

Vernal Pool
Wetland
Disturbed Wetland

0 Feet 400

RECON

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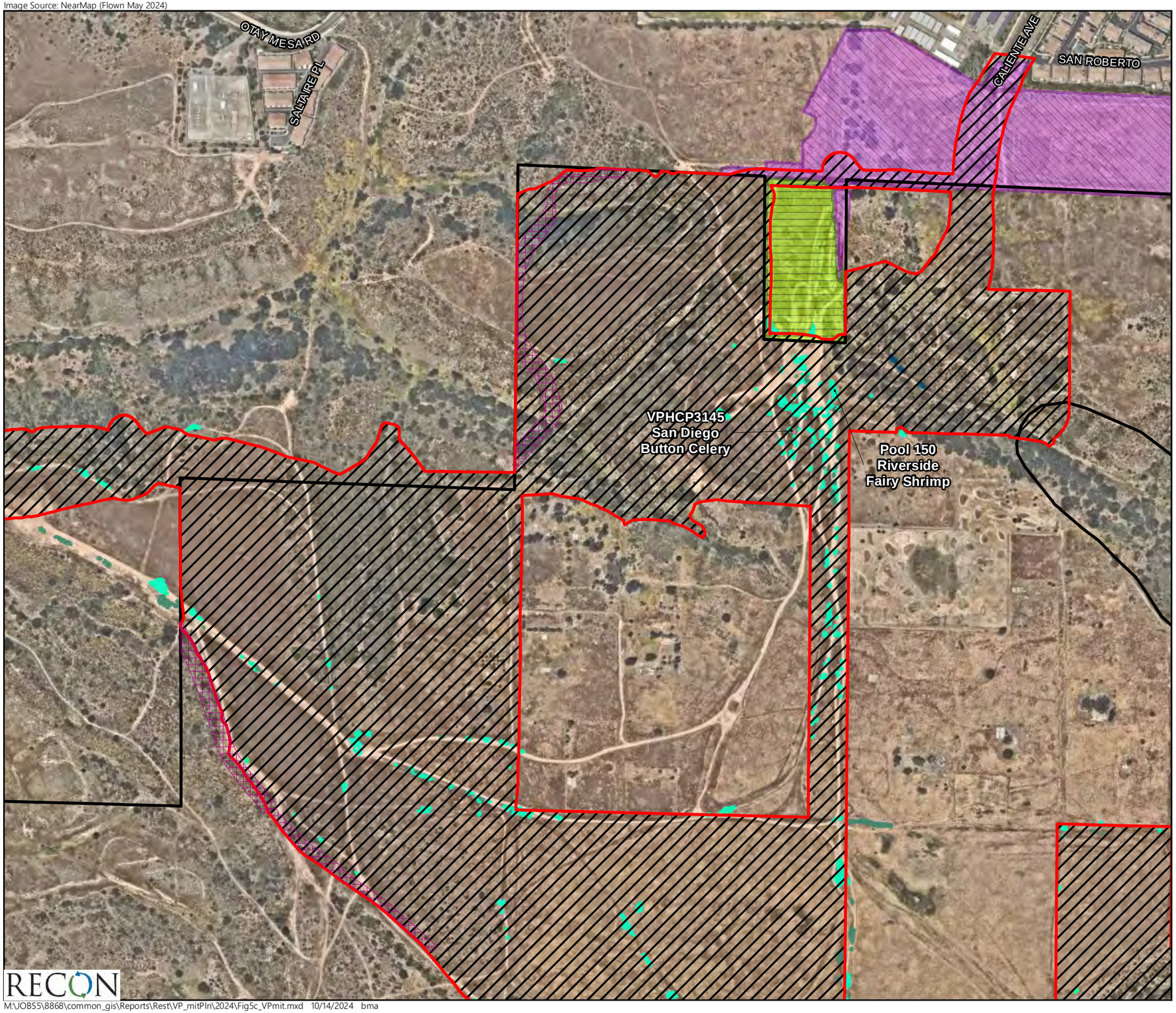
FIGURE 5c.1
Impacts to City of San Diego Wetlands

Image Source: NearMap (Flown May 2024)



Project-level Analysis Area
Southwest Village Project Impacts
Brush Management Zone 2
Candlelight Project Impacts
Southwind Project Impacts
Land to be Conserved and Managed by the City
Specific Plan Boundary

City of San Diego Waters

Vernal Pool
Wetland
Disturbed Wetland

0 Feet 400

RECON

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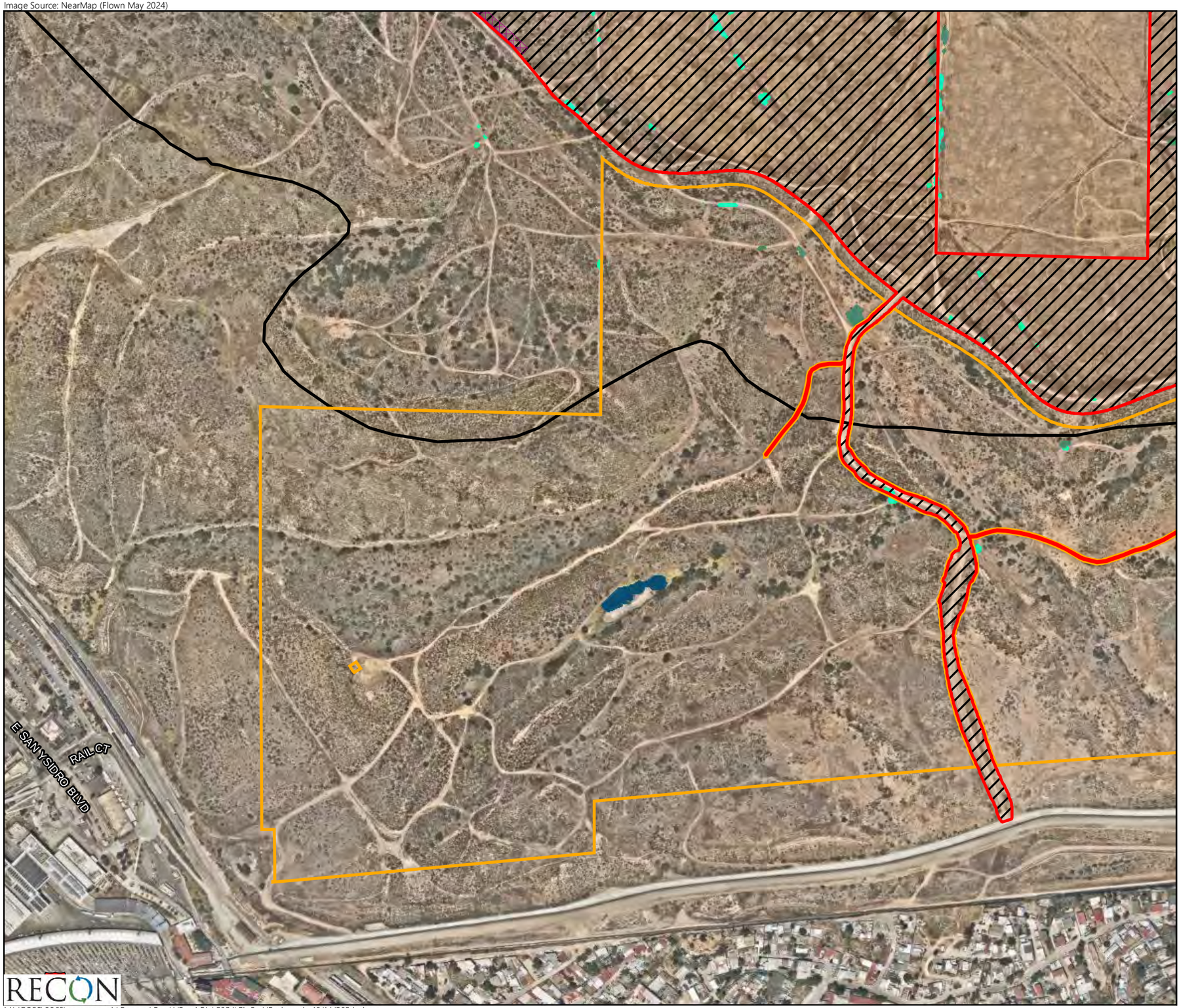
FIGURE 5c.2
Impacts to City of San Diego Wetlands

Image Source: NearMap (Flown May 2024)



Project-level Analysis Area
Southwest Village Project Impacts
Brush Management Zone 2
Land to be Conserved and Managed by the City
Specific Plan Boundary

City of San Diego Waters

Vernal Pool
Wetland
Disturbed Wetland

0 Feet 400

RECON

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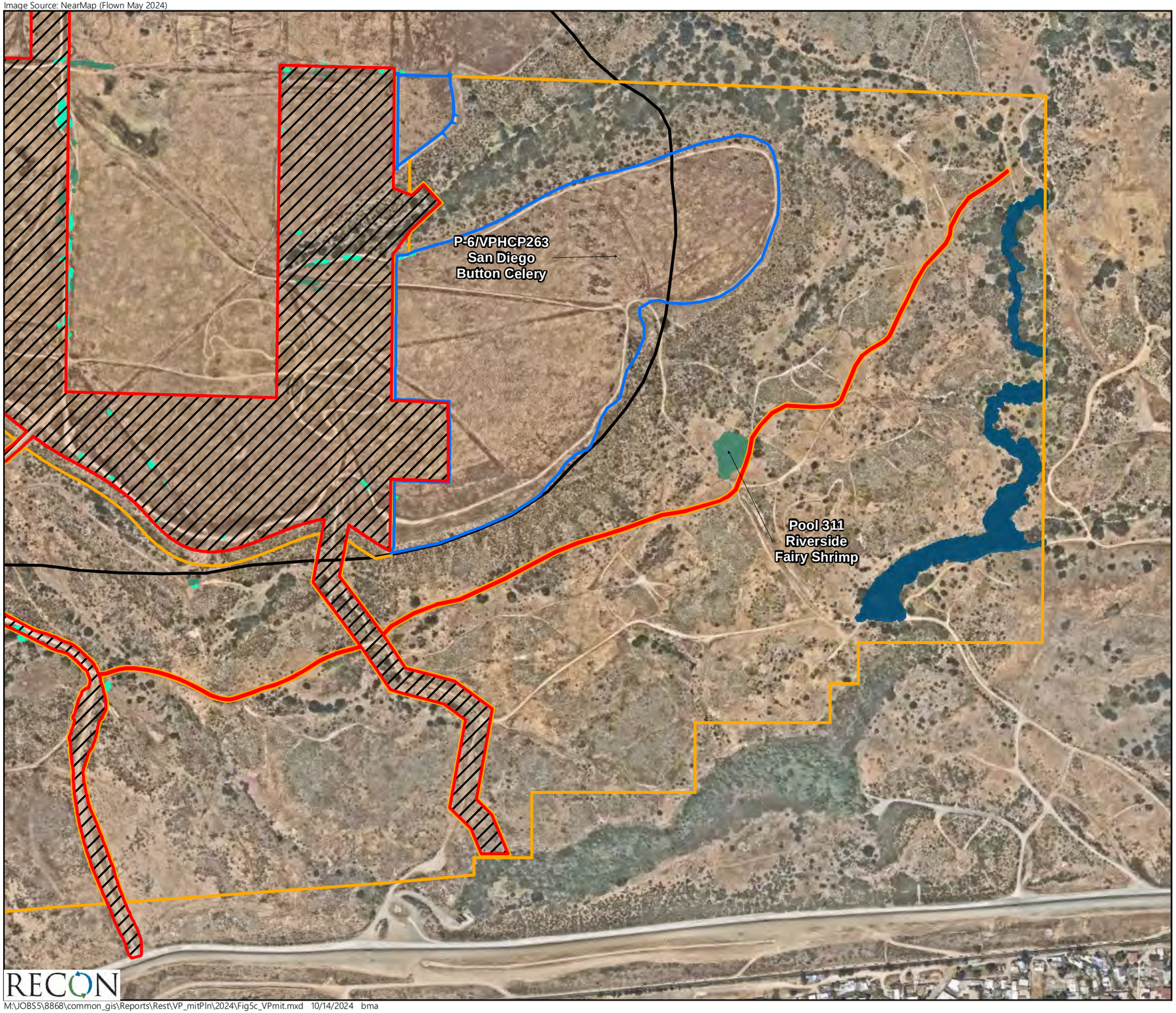
FIGURE 5c.3
Impacts to City of San Diego Wetlands

Image Source: NearMap (Flown May 2024)



Project-level Analysis Area
Southwest Village Project Impacts
Vernal Pool Mitigation Sites
Land to be Conserved and Managed by the City
Specific Plan Boundary

City of San Diego Waters

Vernal Pool
Wetland
Disturbed Wetland

0 Feet 400

RECON

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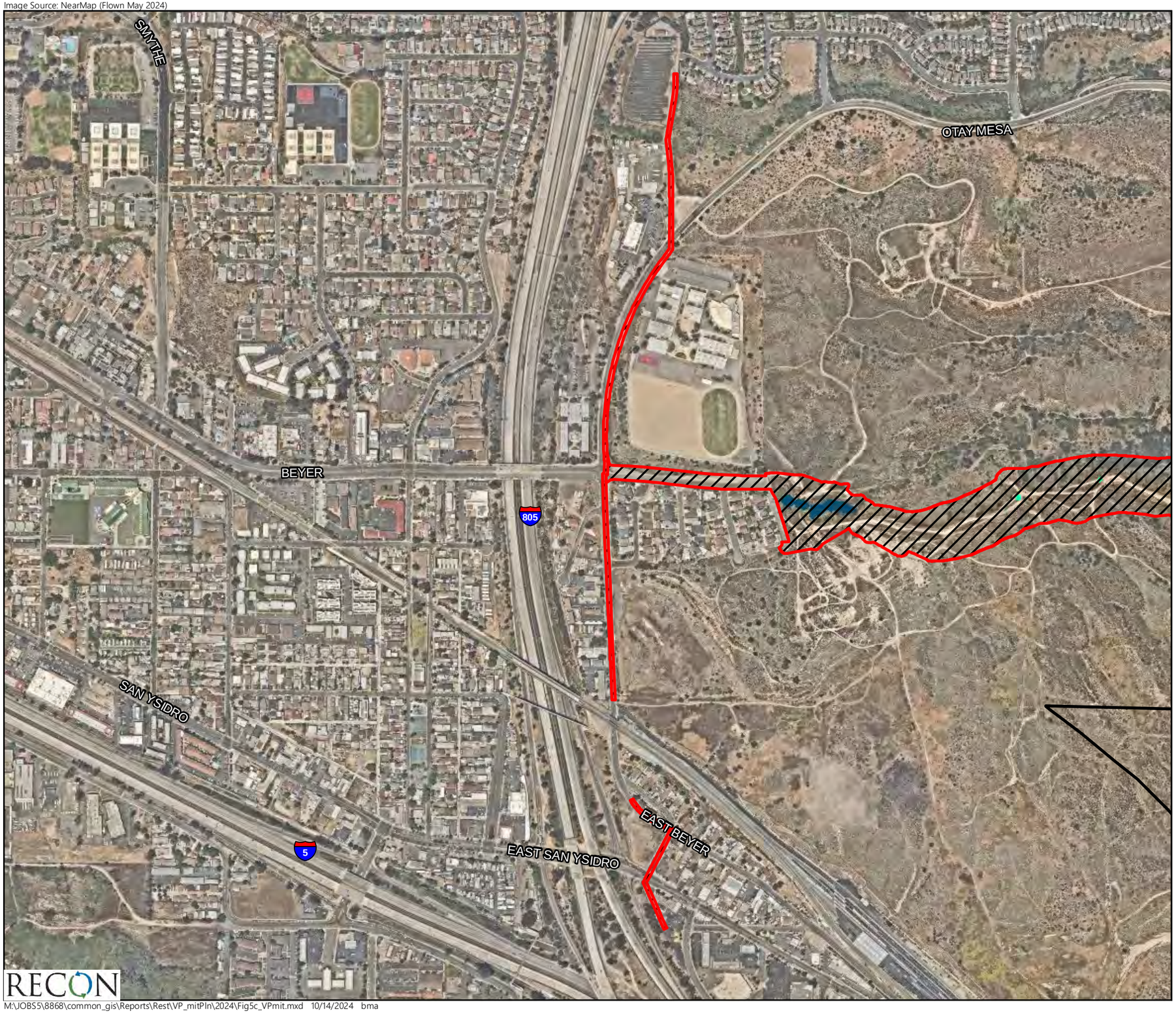
FIGURE 5c.4
Impacts to City of San Diego Wetlands

Image Source: NearMap (Flown May 2024)



Project-level Analysis Area
Southwest Village Project Impacts
Specific Plan Boundary

City of San Diego Waters

Vernal Pool
Wetland
Disturbed Wetland

0 Feet 600

RECON

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FIGURE 5c.5
Impacts to City of San Diego Wetlands

Image Source: NearMap (Flown May 2024)

Project-level Analysis Area

Southwest Village Project Impacts

0 Feet 160

FIGURE 5c.6
Impacts to City of San Diego Wetlands

RECON

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Also included within this plan is mitigation for impacts to vernal pools associated with the unrelated Alta Del Mar project (formerly known as Shaw Lorenz), located in the Del Mar Mesa area of the city of San Diego. This site was issued a Biological Opinion from the U.S. Fish and Wildlife Service (USFWS; FWS-SD-08B0023/08F0016R001 dated November 5, 2007; Attachment 1) which requires mitigation of 0.12 acre of vernal pools. Through negotiations with the USFWS (Attachment 2), the replacement mitigation would be provided at Southwest Village at a 2:1 mitigation ratio to account for mitigation occurring outside of the watershed.

Impacts to wetland waters of the U.S., waters of the State, and City wetlands would include the loss of vernal pools and disturbed wetlands which are characterized as isolated ponding features, similar to vernal pools. Some of the vernal pools and disturbed wetlands to be impacted support listed fairy shrimp species, western spadefoot, and the listed plant species San Diego button-celery (see Figures 5a.1–5c.4). San Diego fairy shrimp is the most common fairy shrimp species in these vernal pools. One vernal pool supports Riverside fairy shrimp, and one vernal pool supports San Diego button-celery. Currently, take authorization for listed fairy shrimp and button-celery is covered under the adopted City VPHCP (2019) when a project is found consistent with the conditions contained in the VPHCP. As detailed in the biological resources report, San Diego Fairy Shrimp are assumed present in all directly and indirectly impacted disturbed wetlands and vernal pools (totaling 1.06 acres). Impacts to vernal pools and disturbed wetlands with fairy shrimp (present or assumed present) would be mitigated at a 2:1 ratio consistent with the City's mitigation requirements for vernal pools with fairy shrimp. Mitigation for impacts to these two fairy shrimp species and button-celery would be through the introduction of these species into the newly re-established vernal pools within the mitigation sites. Additionally, western spadefoot was identified in some of the impacted pools and impacts will be mitigated through the implementation of this plan.

The proposed compensatory mitigation for impacts to City vernal pools, disturbed wetlands and sensitive species, such as San Diego fairy shrimp, Riverside fairy shrimp, western spadefoot, and button-celery, would involve in-kind mitigation to be accomplished through vernal pool re-establishment and enhancement (see Table 1). The northern and southern vernal pool mitigation sites total 33.708 acres and would provide 3.86 acres (167,991 square feet) of vernal pool surface area re-establishment and 0.05 acre (2,066 square feet) of vernal pool surface enhancement. This would meet and exceed the necessary 2.15 acres (see Table 1 for applicable ratios) of vernal pool and disturbed wetland mitigation required to comply with the City VPHCP and Biology Guidelines. While the City's VPHCP and disturbed wetland mitigation ratios would require 2.15 acres of mitigation, a higher mitigation acreage is addressed in this plan to account for higher mitigation ratios likely required by other regulatory agencies. Wetland mitigation requirements of the U.S. Army Corps of Engineers (USACE), California Department of Fish and Wildlife (CDFW) and Regional Water Quality Control Board (RWQCB) would be provided consistent with permit requirements.

Table 1 Direct and Indirect Vernal Pool and Disturbed Wetland Impacts and Required Mitigation					
Impacted City Wetland	Direct Impact Acreage	Indirect Impact Acreage	Total Direct and Indirect Impact Acreage[3]	Mitigation Ratio	Required Mitigation
Vernal Pools[1]	0.83	0.05	0.88	2:1	1.76
Vernal Pools with Button-celery	0.01	-	0.01	3:1	0.03
Disturbed Wetlands	0.11	0.07	0.18	2:1	0.36
Total mitigation requirement for Southwest Village Project-Level Areas					*2.15*
Vernal Pools with Fairy Shrimp (Alta Del Mar)[2]	-	-	-	-	0.24
Total Acreage[4]	**0.95**	**0.12**	**1.06**	**-**	**2.39**

[1]If the Southwind project proceeds ahead of this project, the total vernal pool impact acreage would be reduced by 0.04 acre, resulting in a reduced vernal pool mitigation requirement of 0.08 acre.
[2]Replacement mitigation for 0.12 acre (5,227 square feet) of failed Alta Del Mar vernal pool mitigation at a 2:1 ratio is proposed within the Southwest Village vernal pool mitigation area to address Alta Del Mar permit requirements in coordination with the U.S. Fish and Wildlife Service.
[3]Per the Biological Resources Report for the Southwest Village Specific Plan, the project would directly and indirectly impact 1.06 acres of vernal pool surface area supporting San Diego fairy shrimp with 0.03 of that acreage supporting Riverside fairy shrimp, which requires mitigation at a 2:1 ratio.
[4]Any mathematical errors are due to rounding.

In addition to mitigation for impacts to vernal pools and disturbed wetlands, listed fairy shrimp, 1.33 acres of western spadefoot habitat, and button-celery, this plan also provides mitigation for impacts to 0.93 acre of Quino habitat as well as includes a project design feature to support suitable habitat for western burrowing owl foraging and nesting. Once restored, the northern and southern mitigation sites would provide 0.93 acre of Quino habitat restoration, 0.96 acre of Quino habitat enhancement/preservation, and 0.27 acre of berm and buffer to support burrowing owl nesting and breeding with the rest of the site supporting burrowing owl foraging.

1.3 Restoration Goals and Objectives

The goal of this plan is to mitigate permanent impacts to vernal pool and Quino habitat, while supporting western burrowing owl through the enhancement of suitable breeding and foraging habitat. To meet these requirements, this plan describes restoration methods and techniques for the following:

- Re-establishment of 3.86 acres of vernal pool basins;
- Enhancement of 0.05 acre of vernal pool basins (existing vernal pools);
- Restoration of 29.80 acres of vernal pool watershed and native upland habitat;
- Restoration of 0.93 acre and enhancement/preservation of 0.96 acre of Quino habitat;
- Providing 1.33 acres of replacement habitat for western spadefoot; and
- Enhancement of western burrowing owl breeding and foraging habitat (0.27 acre of berm and buffer to support owl nesting and breeding, with the rest of the site supporting burrowing owl foraging).

The terms "establishment," "restoration" (including "re-establishment" and "rehabilitation"), and "enhancement" as used in this plan are defined per USACE regional compensatory mitigation guidelines (USACE 2015) and the City Biology Guidelines (City of San Diego 2018) as follows:

1. Establishment (Wetland creation per the City bio guidelines): "Manipulation of the physical, chemical, or biological characteristics present at an upland site to develop an aquatic resource that did not previously exist. Establishment results in a gain in aquatic resource area and functions." None of the pools included in this plan meet the definition of establishment.

2. Restoration: "Manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing the natural/historic functions to a degraded aquatic resource. For the purpose of tracking net gains in aquatic resources area, restoration is divided into two categories: re-establishment and rehabilitation."

   Re-establishment (Wetland restoration per the City bio guidelines): "Manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions." All of the proposed pools in this mitigation plan are defined as re-establishment pools as vernal pools have historically been present throughout Otay Mesa and historic aerials dating back to 1953 indicate that the mitigation site once supported vernal pool basins. Re-establishment of these pools represents the return of an aquatic resource area that has not existed within the mitigation site for decades.

   Rehabilitation: "Manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing the natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function but does not result in a gain in aquatic resource area." None of the pools included in this plan meet the definition of rehabilitation.

3. Enhancement (Wetland enhancement per the City bio guidelines): "Manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area." For a portion of the mitigation proposed in this plan, enhancement would involve the removal of non-native weed species, introduction of vernal pool endemic seed, and improvement of adjacent topography to improve vernal pool ponding, which would improve the functionality of the pools but not increase area.

1.4 Vernal Pool HCP Consistency Analysis

The following section includes a consistency analysis with Section 5.3.2 of the City VPHCP (2019). The analysis of the conditions for the compensatory mitigation in Section 5.3.2 of the VPHCP are listed in Table 2 by number and letter, and the section of this plan where that condition is addressed is listed next to the corresponding number and letter.

Table 2 City of San Diego Vernal Pool HCP Consistency Analysis	
VPHCP Section 5.3.2	Corresponding Section in this Plan
1a: Biologist/Vernal Pool Restoration Specialist Qualifications	Section 4.1.2
1b: Construction Site Conservation Measures	Section 4.2
1c: Vernal Pool Watershed Enhancement to Meet Success Criteria	Section 4.4.6
1d: Activities Commence in Summer-Fall Season Prior to or Concurrent to Project	Section 4.4
1e: Discussion and Table of Activities at Each Vernal Pool	Attachment 3 includes planned pools restoration activities
1f: 0.5-Foot Contours for Topographic-Based Plans	Section 4.4.4 6-inch topographic contour map used for hydraulic analysis
1g: Hydraulic Analysis of Vernal Pools and Watershed	Section 4.4.4 Attachment 4 includes the Hydraulic analysis
1h: Last Resort Inoculum from Donor Vernal Pools	Section 4.4.3
1i: Planting to Mimic Natural Distribution and Inoculum to be Evenly Spread Within Pools	Sections 4.4.3 and 4.4.6
1j: Plant Palette and Seed Mix Description	Section 4.4.6
1k: Native Plants and Animals to be Established in Enhanced Pools and Surrounding Habitat	Section 4.4.6
1l: Artificial Watering Permitted to Establish Plants	Section 4.4.7
1m: Hand Weeding Only in Vernal Pool Area	Section 5.1
1n: Permittable Herbicide and Pesticide Application Conditions	Section 5.1
1o: Final Implementation Schedule for All Vernal Pool Impacts and Enhancements	Section 4.4
1p: 5 Year Monitoring Minimum to Ensure Success Criteria Listed Are Met	Section 6.0
1q: Restoration of Fairy Shrimp Success Criteria and Sampling Guidelines	Section 6.4.4 and 7.1.4
1r: Requirements for Post-Construction Monitoring of Sites During Rainy Season	Section 7.1.1
1s: Monitoring Success Criteria For: Vernal Pool and Upland Restoration Areas, Weed Cover, and Container Plant	Section 7.0
1t: Project Completion vs. Proposals for Remedial Action	Section 8.0
1u: Annual Reporting to Wildlife Agencies	Section 7.3
2: Long-Term Management, Maintenance, and Monitoring Plan Outline	Section 9.0

2.0 Baseline Information

The VPHCP (City of San Diego 2019) and Vernal Pool Management and Monitoring Plan (VPMMP; City of San Diego 2020) identify the mitigation sites as part of vernal pool complex J 13 E and J 13 S (see Figure 4). The J 13 E complex was identified in the Recovery Plan for Vernal Pools of Southern California (USFWS 1998) as necessary to establish populations of Otay Mesa mint (*Pogogyne nudiuscula*), Orcutt's grass (*Orcuttia californica*), and Riverside fairy shrimp. The J 13 S complex was identified in the Recovery Plan for Vernal Pools of Southern California (USFWS 1998) as necessary to

protect and manage extant populations of San Diego button-celery and establish viable populations of Otay Mesa mint and Orcutt's grass.

A summary of additional baseline information for the vernal pool mitigation sites is provided below. Topics covered include soils, hydrology, jurisdictional waters, vegetation, and sensitive species.

2.1 Soils and Topography

The proposed vernal pool mitigation sites occur within the soil series referred to as Huerhuero loam 2 to 9 percent slopes (U.S. Department of Agriculture 1973; Figure 6). This soil series on-site consists of moderately well-drained loams that have clay subsoil and were derived from sandy marine sediments. Permeability is very low, and the runoff is slow to medium. The erosion hazard is slight to moderate. The vegetation supported on these soils is primarily non-native grassland with some scattered Diegan coastal sage scrub species.

This Huerhuero loam soil type currently supports existing vernal pools being impacted or preserved as part of the project. Therefore, the soil within the proposed on-site mitigation site is suitable for the re-establishment of vernal pool basins and habitat.

Figure 7 depicts the existing site topography overlain on historic aerial imagery from 1966 where vernal pool and mima mound topography can be observed throughout the sites, particularly along the north and eastern rim of the southern mitigation area.

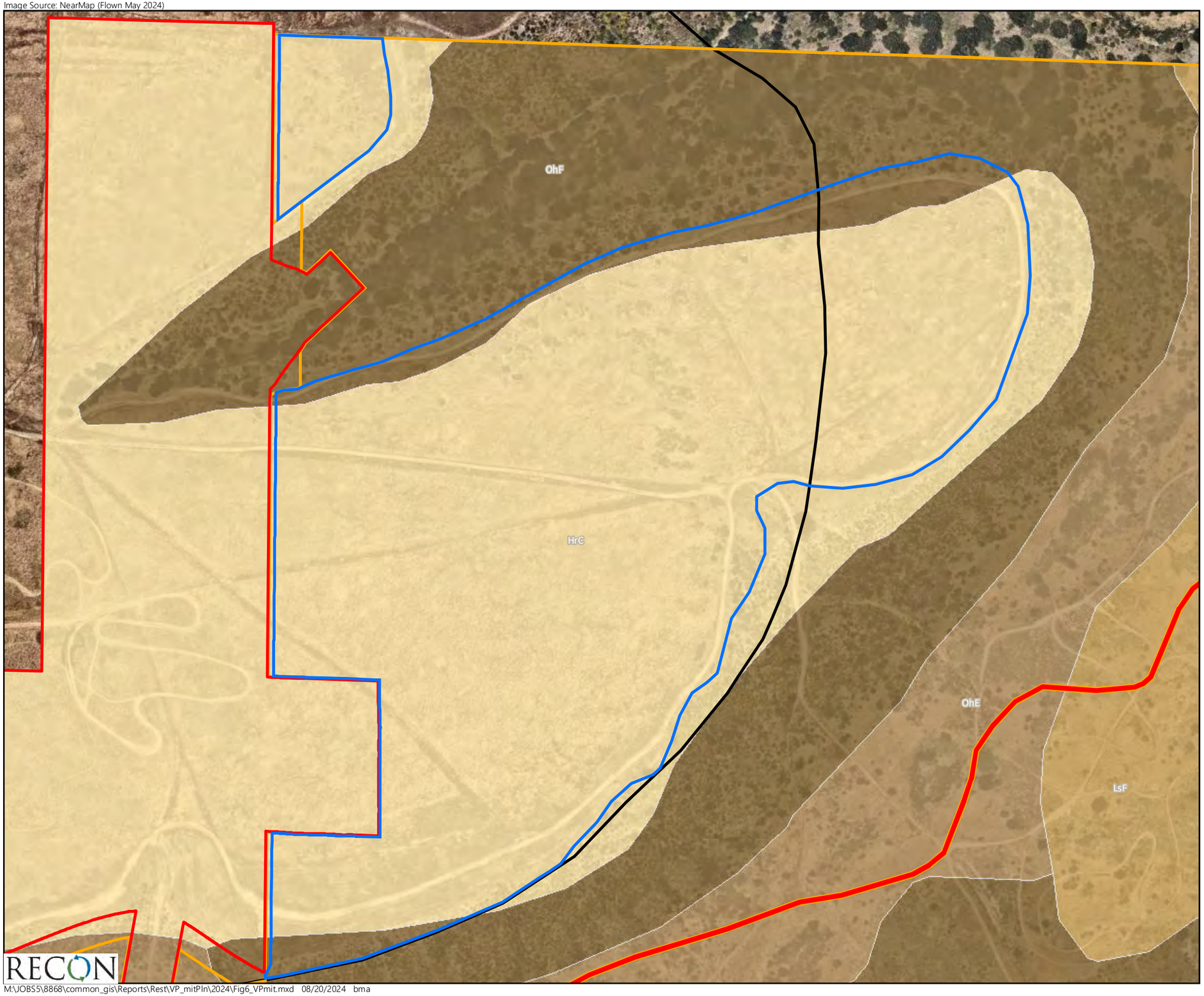
2.2 Hydrology

The vernal pool mitigation sites are primarily flat and do not contain any drainages or streams; however, existing vernal pools as mapped by the City's VPHCP (City of San Diego 2019) are present within the site. During the jurisdictional delineations conducted by RECON, additional pools with vernal pool hydrology and/or vegetation were mapped (see Figure 5).

In coastal southern California, annual precipitation is highly seasonal, with most of the rainfall occurring in the winter and early spring, from December through April. The first major rainfall event of the season typically functions to wet and recharge soils that dried during the summer drought. Thus, the first rainfall event rarely fills vernal pools, with surface ponding typically occurring from subsequent storms.

The formation of surface ponding in vernal pools requires very low permeability soils that create a perched water table, combined with topographic depressions to capture and hold precipitation. The shape and ponding capacity of the perched water table is influenced by soil permeability, overall site slope, and subsoil permeability (presence of sand, clay lenses, or holes in the hardpan). This surface shape ultimately determines the depth and duration of ponding.

Image Source: NearMap (Flown May 2024)



Project-level Analysis Area
Vernal Pool Mitigation Sites
Specific Plan Boundary
Land to be Conserved and Managed by the City

Soil Type

HrC Huerhuero loam, 2 to 9 percent slopes
LsF Linne clay loam, 30 to 50 percent slopes
OhE Olivenhain cobbly loam, 9 to 30 percent slopes
OhF Olivenhain cobbly loam, 30 to 50 percent slopes

0 Feet 200

RECON

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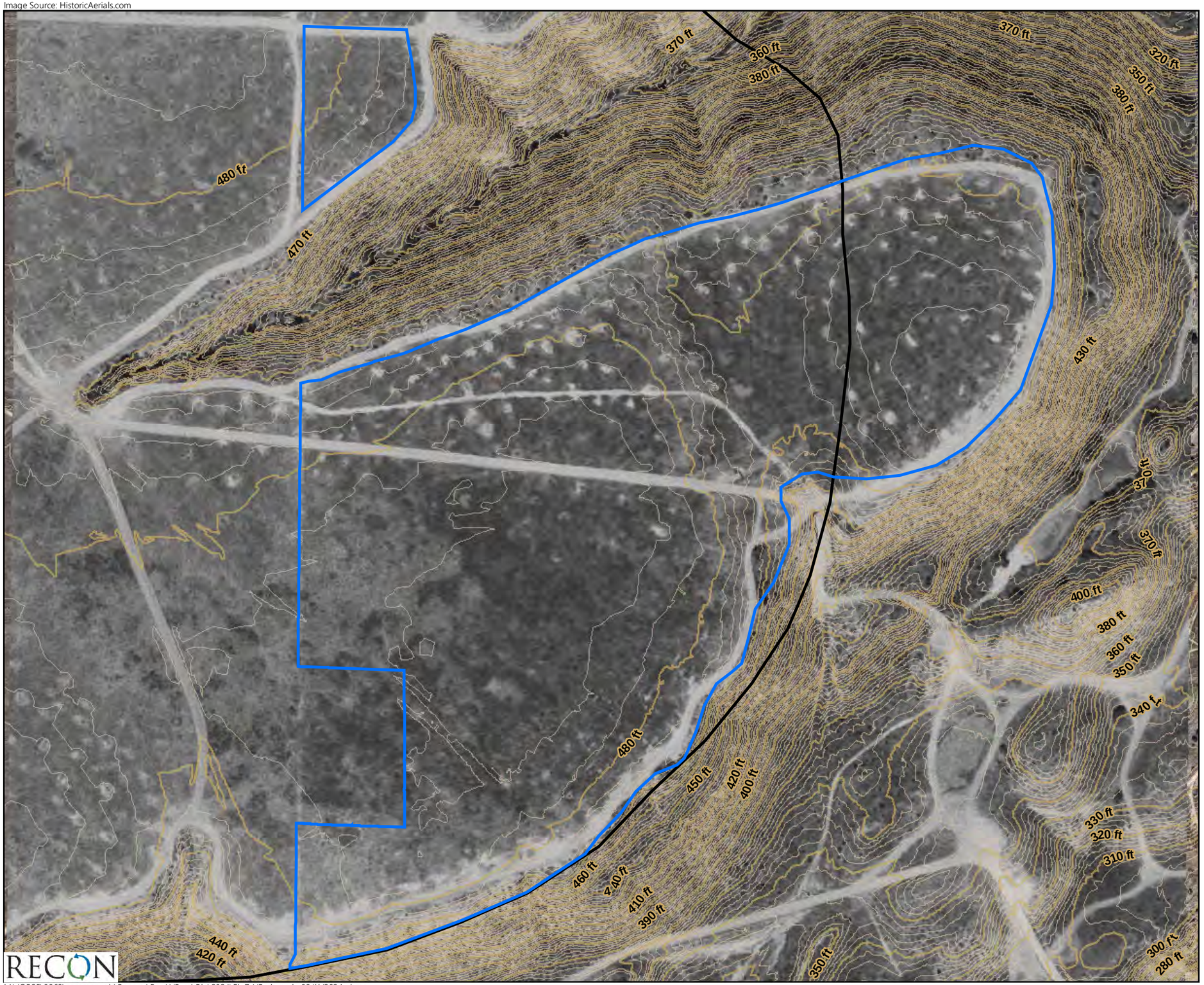
FIGURE 6
Vernal Pool Mitigation Sites on Soils Map

Image Source: HistoricAerials.com



Vernal Pool Mitigation Sites

Specific Plan Boundary

0 Feet 200

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FIGURE 7
1966 Historic Aerial Photograph
with Existing Topography

The depth and duration of ponding is highly dependent upon the magnitude, number, and time between each storm, as well as climactic determinants of evaporation and transpiration (temperature, humidity, sunlight, and wind). A seasonal hydrologic regime characterizes the natural inputs to the vernal pools and other isolated waters of the U.S. and waters of the State on the site. The local watersheds of many of these pools have been altered by vehicular activity, dumping, and historical agriculture.

2.3 Vegetation

The vernal pool and Quino checkerspot mitigation sites are located on mesa tops adjacent to open space canyon areas and are primarily vegetated with annual non-native grassland species with scattered patches of Diegan coastal sage scrub along the perimeter. Maritime succulent scrub also occurs in the canyons to the east and south of the sites (see Figure 7). Within the vernal pool and Quino checkerspot mitigation sites, a few vernal pools and road ruts (with fairy shrimp) exist that would be preserved. Federally listed plant species that occur within the mitigation sites include San Diego button-celery. Additional sensitive plant species found within and adjacent to the mitigation sites are shown on Figures 8 and 9. All native habitat and sensitive plant species found within the mitigation sites would be avoided and protected per the mitigation measures included in Section 4.2.

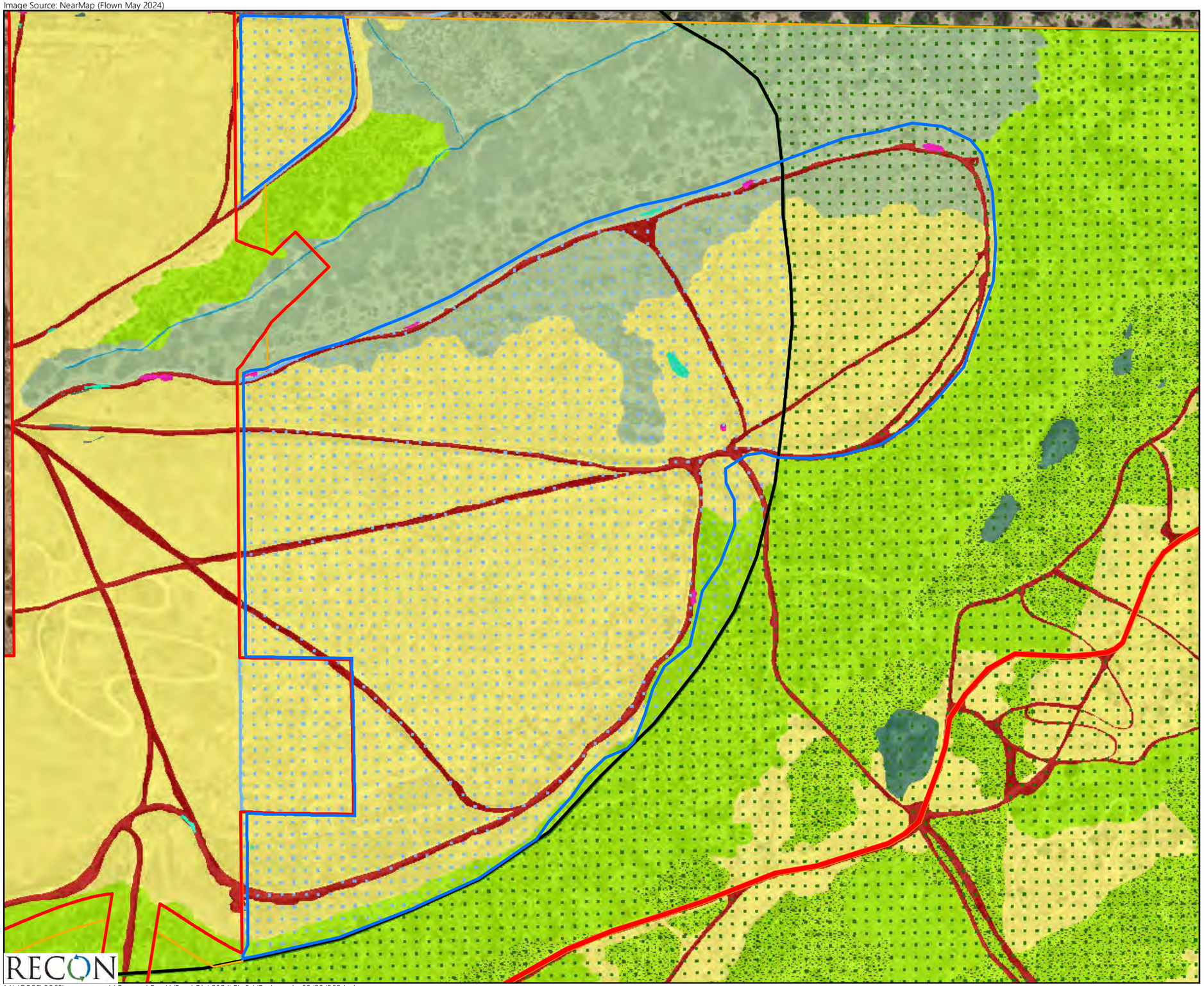
2.4 Wildlife Species

Wildlife diversity is fairly low within the mitigation site, as may be expected for an area dominated by non-native grassland. The majority of wildlife species detected are typical of grassland habitat and disturbed area. Sensitive wildlife species observed within the mitigation sites are shown in Figure 10. This includes the results of a fairy shrimp surveys conducted over several years and a western spadefoot survey conducted in 2024 which detected two vernal pools/disturbed wetlands that support both the San Diego fairy shrimp and western spadefoot in the northern portion of the site.

A Quino checkerspot butterfly was observed in 2019 during focused surveys, as detailed in the project-specific biological resources report (RECON 2024). This butterfly species is not a covered species under the MSCP. The Quino checkerspot butterfly was found within the proposed southern mitigation site. The plantain patches mapped in the mitigation sites as part of the Quino checkerspot butterfly surveys are shown in Figure 11. These areas would all be avoided and protected during restoration activities per the mitigation measures included in Section 4.2.

Crotch's bumble Bee was not observed within the vernal pool mitigation sites but has been observed within the surrounding lands to be conserved; therefore, the species is assumed present.

Image Source: NearMap (Flown May 2024)



- Project-level Analysis Area
- Vernal Pool Mitigation Sites
- Specific Plan Boundary
- Land to be Conserved and Managed by the City
- City of SD MHPA
- VPHCP MHPA

Southwest Village Vegetation

- Diegan Coastal Sage Scrub
- Maritime Succulent Scrub
- Disturbed Maritime Succulent Scrub
- Non-native Grassland
- Vernal Pool
- Vernal Pool with Fairy Shrimp
- Disturbed Wetland
- Natural Flood Channel
- Disturbed Land

0 Feet 200

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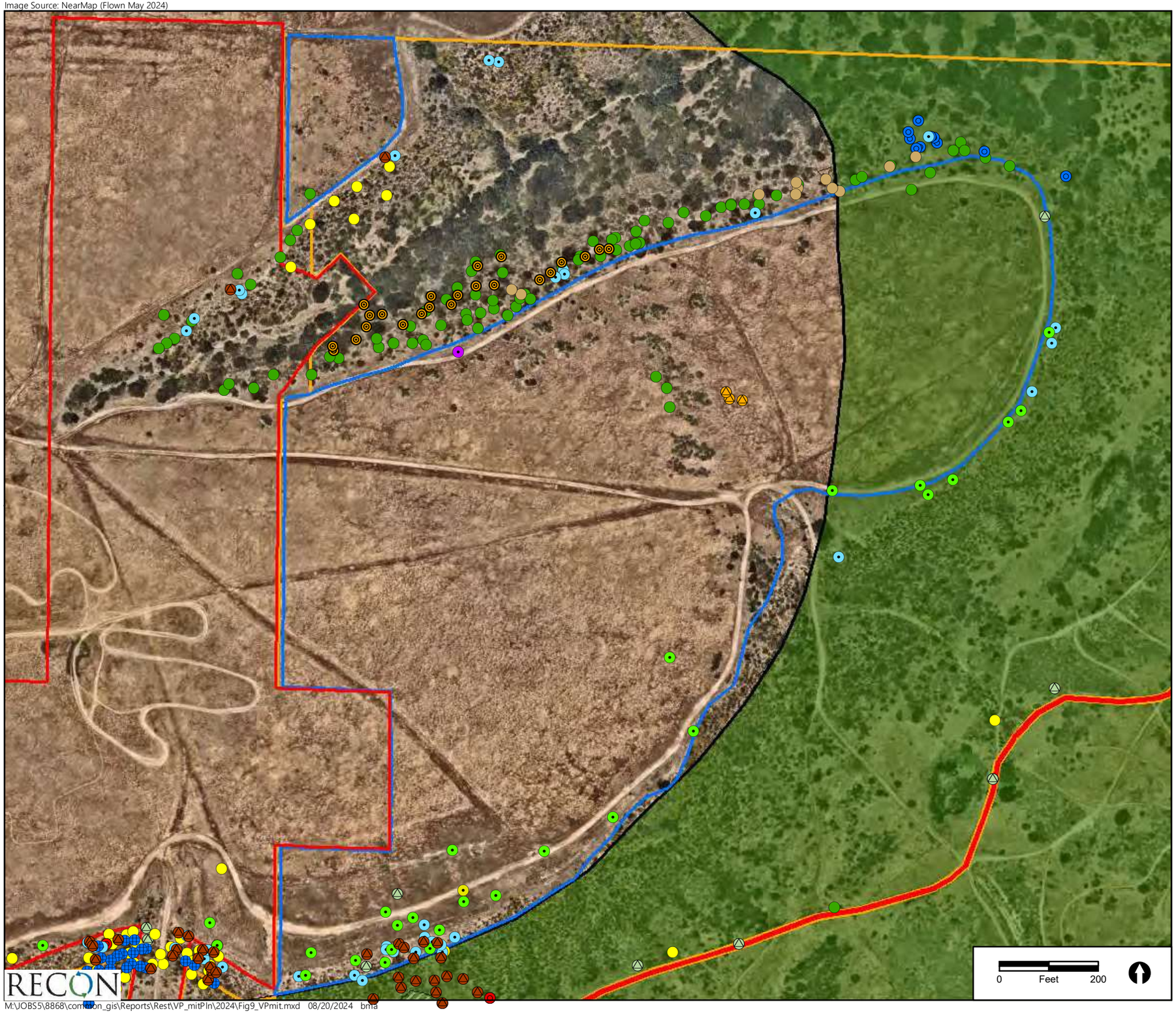
FIGURE 8
Existing Biological Resources - Vegetation Communities/ Land Cover Types within the Vernal Pool Mitigation Sites

Image Source: NearMap (Flown May 2024)



Project-level Analysis Area
Vernal Pool Mitigation Sites
Land to be Conserved and Managed by the City
Specific Plan Boundary
City of SD MHPA

Sensitive Plants

San Diego Bur-sage (*Ambrosia chenopodiifolia*)
Ashy Spike-moss (*Selaginella cinerascens*)
Cliff Spurge (*Euphorbia misera*)
Golden-ray Pentachaeta (*Pentachaeta aurea* ssp. *aurea*)
San Diego Barrel Cactus (*Ferocactus viridescens*)
San Diego County Viguiera (*Bahiopsis laciniata*)
Bobtail Barley (*Hordeum intercedens*)
Dwarf Pepper Grass (*Lepidium latipes*)
Palmer's Grapplinghook (*Harpagonella palmeri*)
San Diego Button Celery (*Eryngium aristulatum* var. *parishii*)
San Diego County Needle Grass (*Stipa diegoensis*)
Seaside Cistanthe (*Cistanthe maritima*)
Snake Cholla (*Cylindropuntia californica* var. *californica*)
Variegated Dudleya (*Dudleya variegata*)

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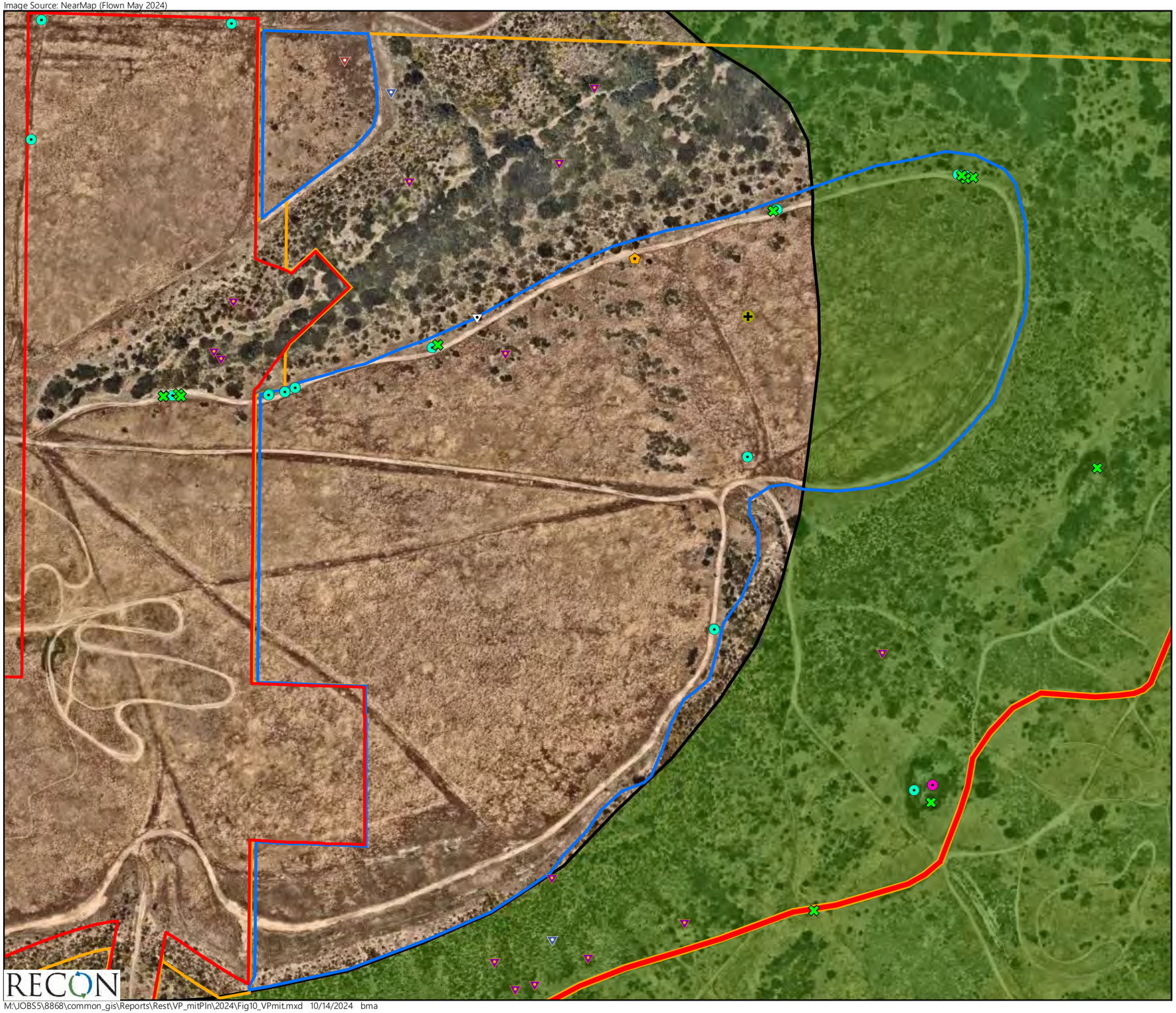
FIGURE 9
Existing Biological Resources - Sensitive Plant Species within the Vernal Pool Mitigation Sites

Image Source: NearMap (Flown May 2024)



Project-level Analysis Area
Vernal Pool Mitigation Sites
Land to be Conserved and Managed by the City
Specific Plan Boundary
City of SD MHPA

Sensitive Animals

Birds

- Southern California Rufous-crowned Sparrow (*Aimophila ruficeps canescens*)
- Coastal California Gnatcatcher (*Polioptila californica californica*)
- Cooper's Hawk (*Accipiter cooperii*)
- White-tailed Kite (*Elanus leucurus*)

Mammals

- San Diego Black-tailed Jackrabbit (*Lepus californicus bennettii*)

Reptiles

- Western Spadefoot (*Spea hammondii*)

Insects

- Quino Checkerspot Butterfly (*Euphydryas editha quino*)

Crustaceans

- Riverside Fairy Shrimp (*Streptocephalus woottoni*)
- San Diego Fairy Shrimp (*Branchinecta sandiegonensis*)

0 Feet 200

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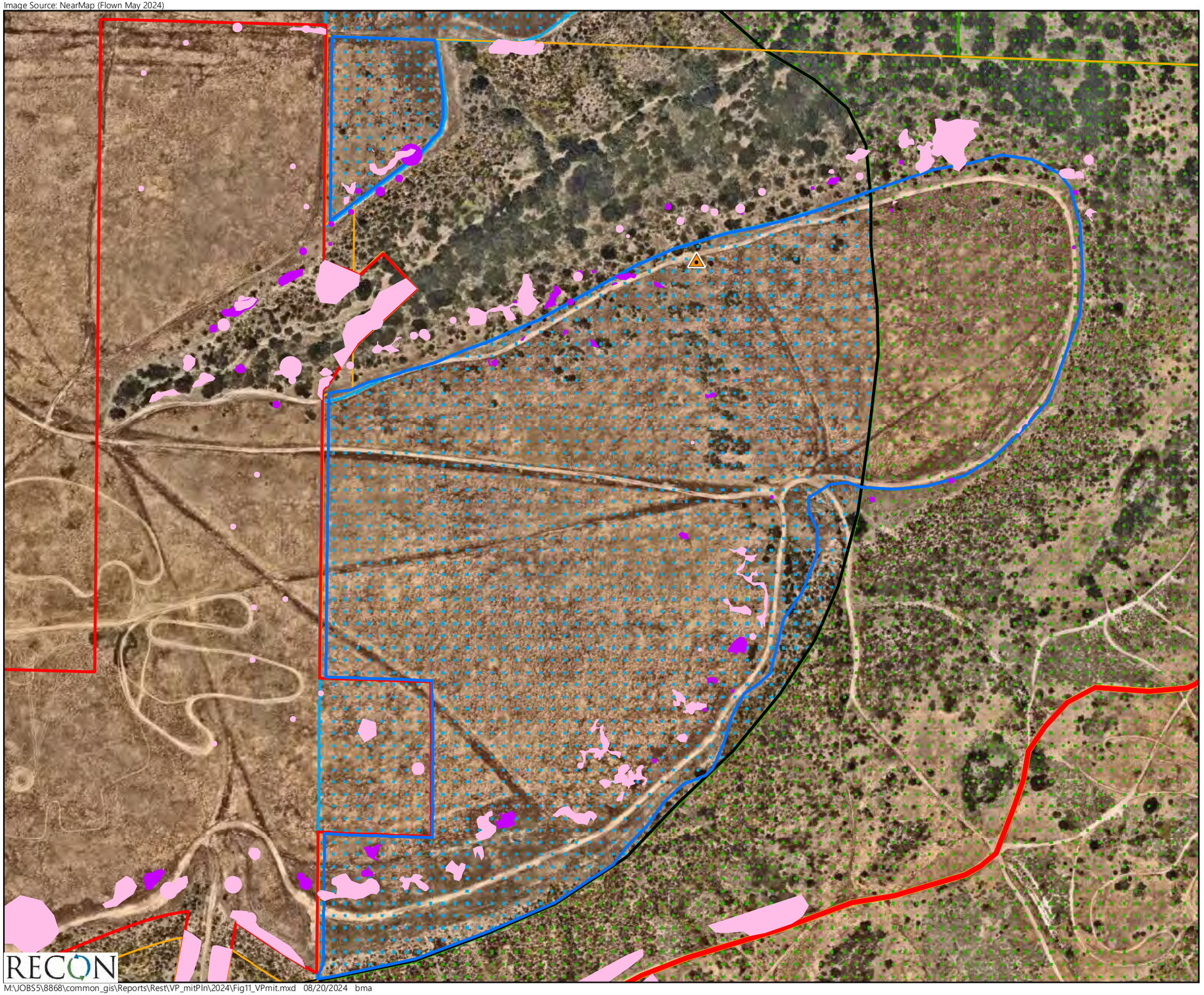
FIGURE 10
Existing Biological Resources - Sensitive Animal Species within the Vernal Pool Mitigation Sites

Image Source: NearMap (Flown May 2024)



- Project-level Analysis Area
- Vernal Pool Mitigation Sites
- Specific Plan Boundary
- Land to be Conserved and Managed by the City
- City of SD MHPA
- VPHCP MHPA
- Host Plant
- Nectar Plant

Observation

- Quino Checkerspot Butterfly (*Euphydryas editha quino*)

0 Feet 200

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FIGURE 11
QCB Habitat and QCB Observation within the Vernal Pool Mitigation Sites

3.0 Site Protection Instrument

The mitigation area would be conveyed to the City as part of the overall conveyance of the project mitigation and conservation lands. After conveyance, assurance of long-term conservation and management of the mitigation area would be provided by the City's MSCP Subarea Plan. The City would additionally require a covenant of easement to be placed over the mitigation lands to ensure their protection during restoration and enhancement activities.

A non-wasting endowment or similar secure funding method in an amount approved by the City based on a Property Analysis Record, or similar cost estimation method, would secure the ongoing funding for the perpetual long-term management, maintenance, and monitoring of the mitigation area. The non-wasting endowment must be established prior to, or concurrently with implementation of long-term management.

4.0 Mitigation Work Plan

This section describes the design and implementation of compensatory mitigation. Implementation of the re-establishment/enhancement/restoration mitigation efforts would be conducted under the direction of a qualified restoration biologist (vernal pool restoration specialist with at least five years of vernal pool restoration experience) to be approved by the City and Wildlife Agencies. Implementation would occur in three phases, in accordance with each phase of project implementation and impacts. Re-establishment/enhancement/restoration activities shall commence the first summer-fall season prior to, or concurrently with, the initiation of project impacts.

4.1 Mitigation Roles and Responsibilities

4.1.1 Ownership Status

As described in the City's Biology Guidelines, a responsible entity and funding source for the long-term maintenance and management of the vernal pool mitigation sites is required. The City Parks and Recreation Department would be the long-term manager for the parcel containing the mitigation sites and the applicant would provide long-term funding as determined by a Property Analysis Record (to be developed upon approval of this Plan and the Habitat Management Plan). The fee title of the parcel containing the mitigation site would go to the City Parks and Recreation Department.

4.1.2 Restoration Specialist

The restoration specialist or team should have a minimum of five years of vernal pool restoration experience in coastal southern California. The restoration specialist or team must be able to demonstrate an understanding of the special growing requirements of vernal pool plant species as they relate to the establishment and enhancement of vernal pools. The restoration specialist or team must have the necessary State and Federal permits to work with listed vernal pool plants and animal species. Additionally, the restoration specialist would be on-site during the earth-moving

activities (i.e., grading) to ensure compliance with all the conservation measures required per the proposed impacts to Quino checkerspot butterfly occupied habitat.

4.1.3 Restoration Contractor

The restoration contractor should have at least seven years of applicable restoration experience, i.e., vernal pool restoration, sensitive plant species restoration, and native and non-native plant identification. The contractor would be a firm holding a valid C-27 Landscape Contracting License from the State of California, a valid Pest Control Business License, and a Qualified Applicator Certificate or Qualified Applicator License, with Category B, that would allow them to perform the required work for this restoration effort. The contractor may be from the same firm as the restoration specialist.

During the installation, the contractor would be responsible for initial weed control/dethatching, fencing/barrier installation, irrigation installation (if applicable), topsoil salvage and translocation, planting and seeding, as well as maintenance of the restoration site during the 120-day plant establishment period (PEP) and five-year maintenance period.

Following installation, the contractor would submit marked up as-built plans for all implementation activities to the restoration specialist. The contractor would be held responsible for meeting all PEP success criteria until formal sign-off of the PEP has been obtained from the restoration specialist, City of San Diego Mitigation Monitoring Coordination (MMC) staff, City of San Diego Park and Recreation Open Space and Wildlife Agencies.

Following formal sign-off of the PEP, the contractor would be responsible for maintaining the mitigation sites for a minimum of five years. During this period, the contractor would service the entire mitigation site according to the maintenance schedule (Section 6.0, below). Service would include, but not be limited to, weed control, irrigation maintenance (if applicable), trash removal, watering, dead plant replacement, re-seeding, and pest and disease management. All activities conducted would be seasonally appropriate and approved by the restoration specialist. The contractor would meet with the restoration specialist at the site when requested and would perform all checklist items in a timely manner as directed.

4.1.4 Grading Contractor Qualifications

The vernal pool grading would be conducted by personnel that have a minimum of at least three years' experience grading vernal pools in southern California; all grading activities would be under the guidance of the restoration specialist. The grading contractor may be from the same firm as the restoration contractor.

4.1.5 Rationale for Expecting Success

Existing examples of vernal pool restoration projects in the San Diego region range in age from one to over 25 years. In the oldest example, which was a controlled study evaluating the effects of topographic restoration and seed dispersal facilitation (Scheidlinger et al. 1985), vegetation in the restored pools and disturbed areas of the site with persisting pool hydrology was equivalent to that

of natural pools after 14 years (Patterson 1995). In restoration programs conducted on California Terraces on Otay Mesa (RECON 2005), restoration success criteria, similar to those proposed herein, were met within the five-year maintenance and monitoring period. Other successful vernal pool restoration projects have been undertaken and completed within five years on Otay Mesa, Marine Corps Air Station Miramar, and Marine Corps Base Camp Pendleton.

The proposed mitigation sites are considered suitable for vernal pool and Quino checkerspot butterfly restoration; factors that support this assessment include the following:

1) located within the MHPA;
2) most of the surrounding areas are anticipated to be maintained as open space;
3) adequate site access;
4) existing vernal pools on-site;
5) Quino checkerspot butterfly host and nectar species present on-site;
6) Quino checkerspot butterfly observed on-site;
7) located on a mesa top with appropriate soils;
8) avoidance of utility easements; and
9) outside any brush management zone.

While the project would occur to the west of the mitigation sites, land uses to the north, east, and south are planned as open space per the Specific Plan and City's MHPA (see Figure 4). The location of the mitigation sites adjacent to the larger open space preserve within the lands to be conserved and managed by the City would reduce fragmentation of habitat and increase viability and longevity of the habitat quality. No utility easements are present within the mitigation sites (mitigation credit is not allowed within any easements) and potential future development in adjacent areas was taken into consideration when identifying the mitigation sites. Additionally, the upland area of the restoration site includes a design feature that incorporates an artificial berm to expand opportunities for burrowing owl nesting locations within the Otay Mesa area. The proposed location is suitable for burrowing owl due to the creation of the berm, appropriate upland vegetation communities, such as maritime succulent scrub, and would be maintained to provide open foraging habitat within a 30-foot radius around the berm. Additionally, the restoration area is suitable as Crotch's bumble bee mitigation due to the restoration plan incorporating new nectar sources that would expand suitable habitat for the species within an area where they are known to occur.

4.2 Mitigation Measures

Native habitat and mapped occurrences of all sensitive species observed within the proposed vernal pool mitigation sites have a potential to be impacted during vernal pool grading (see Figures 8 through 10). This section details mitigation measures designed to avoid and minimize those impacts Sensitive wildlife species observed include coastal California gnatcatcher (*Polioptila californica californica*), Quino checkerspot butterfly, San Diego fairy shrimp, western spadefoot, San Diego black-tailed jackrabbit (*Lepus californicus bennettii*), and white-tailed kite (*Elanus leucurus*) (see Figure 10). Although not observed within the vernal pool mitigation sites, Crotch's bumble bee has been observed within the surrounding mitigation lands and has the potential to occur. Sensitive plant species found at the proposed mitigation sites that would be avoided during all restoration implementation and maintenance activities include San Diego button-celery, ashy spike moss

(*Selaginella cinerascens*), bobtail barley (*Hordeum intercedens*), Palmer's grapplinghook (*Harpagonella palmeri*), and San Diego bursage (*Ambrosia chenopodifolia*) (see Figure 9). The dot-seed plantain (*Plantago erecta*) patches previously mapped in the proposed mitigation sites as part of the Quino checkerspot butterfly surveys would be avoided (see Figure 11).

The overall mitigation design provides measures to ensure that the existing hydrology (rainwater runoff and subsurface flows) of the preserved vernal pools is maintained during grading, construction, and implementation. These measures include the following: (1) avoidance of the preserved vernal pool watersheds; (2) maintaining buffers between the mitigation project footprints and preserved and newly re-established vernal pools; (3) adjacent project drainage features to direct runoff away from the vernal pool mitigation sites; and (4) buffers between the vernal pools within the mitigation sites and the adjacent development.

4.2.1 General Project Measures

General measures designed to avoid and minimize impacts to sensitive species consistent with VPHCP Section 5.2.1 are as follows:

<u>During Project Construction</u>

1. Any development adjacent to the MHPA would be constructed to slope away from the extant pools to be avoided or newly re-established pools, to ensure that runoff from the project does not flow into the pools.

2. Temporary fencing (with silt barriers) would be required at the limits of project impacts (including construction staging areas and access routes) to prevent additional vernal pool impacts and prevent the spread of silt from the construction zone into adjacent vernal pools. Fencing would be installed in a manner that does not impact habitats to be avoided. Final construction plans would include photographs that show the fenced limits of work and all areas of vernal pools to be impacted or avoided. If disturbance associated with project development inadvertently occurs beyond the fenced or demarcated limits of impact, all work would cease until the problem has been remedied to the satisfaction of the City and Wildlife Agencies. Temporary construction fencing shall be removed upon project completion.

3. Impacts from fugitive dust that may occur during construction grading would be avoided and minimized through watering and other appropriate measures.

4. A qualified monitoring biologist that has been approved by the City would be on-site as needed during project construction activities to ensure compliance with all mitigation measures identified in the project permits. The biologist would be knowledgeable of vernal pool species biology and ecology. The biologist would perform the following duties:

    a. Oversee installation of and inspect the fencing and erosion control measures within or upslope of vernal pool restoration and/or preservation areas as needed. Daily supervision during all rain events to ensure that any breaks in the fence or erosion control measures are repaired immediately.

b. Periodically monitor the work area to ensure that work activities do not generate excessive amounts of dust.

c. Train all contractors and construction personnel on the biological resources associated with this project and ensure that training is implemented by the biological monitor. At a minimum, training would include (1) the purpose for resource protection; (2) a description of the vernal pool species and their habitat(s); (3) the conservation measures that must be implemented during project construction to conserve the vernal pool species, including strictly limiting activities, and vehicles, equipment, and construction materials to the fenced project footprint to avoid sensitive resource areas in the field (i.e., avoided areas delineated on maps or within the mitigation sites by fencing); (4) environmentally responsible construction practices as outlined in Measures 5, 6 and 7 below; (5) the protocol to resolve conflicts that may arise at any time during the construction process; and (6) the general provisions of the project's mitigation monitoring and reporting program, the need to adhere to the provisions of the Federal Endangered Species Act, and the penalties associated with violating the Federal Endangered Species Act.

d. Halt work, if necessary, and confer with the City to ensure the proper implementation of species and habitat protection measures. The biologist shall report any violation to the City within 24 hours of its occurrence.

e. Submit regular (e.g., monthly) letter reports to the City during project construction and a final report following completion of construction. The final report shall include as-built construction drawings with an overlay of habitat that was impacted and avoided, photographs of habitat areas that were avoided, and other relevant summary information documenting that authorized impacts were not exceeded and that general compliance with all conservation measures was achieved.

5. The following conditions would be implemented during project construction:

   a. Employees would strictly limit their activities, vehicles, equipment, and construction materials to the fenced project footprint.

   b. The mitigation sites would be kept as clean of debris as possible. All food-related trash items shall be enclosed in sealed containers and regularly removed from the site.

   c. Disposal or temporary placement of excess fill, brush, or other debris would be limited to areas within the fenced project footprint.

6. All equipment maintenance, staging, and dispensing of fuel, oil, coolant, or any other related activities would occur in designated areas within the fenced project impact limits. These designated areas would be located in previously compacted and disturbed areas to the maximum extent practicable in such a manner as to prevent any runoff from entering the vernal pools or their watersheds, and should be shown on the construction plans. Fueling of equipment would take place in areas greater than 100 feet from the vernal pools or their watersheds. Contractor equipment would be checked for leaks prior to operation and repaired as necessary. A spill kit for each piece of construction equipment should be on-site and must be used in the event of a spill. "No-fueling zones" would be designated on construction plans.

7. Grading activities immediately adjacent to mitigation sites would be timed to avoid wet weather to minimize potential impacts (e.g., siltation) to the vernal pools unless the area to be graded is at an elevation below the pools. To achieve this goal, grading adjacent to avoided pools would comply with the following:

    a. Grading would occur only when the soil is dry to the touch, both at the surface and 1 inch below. A visual check for color differences (i.e., darker soil indicating moisture) in the soil between the surface and 1 inch below indicates whether the soil is dry.

    b. After a rain of greater than 0.2 inch, grading would occur only after the soil surface has dried sufficiently as described above, and no sooner than 2 days (48 hours) after the rain event ends.

    c. To prevent erosion and siltation from stormwater runoff due to unexpected rains, best management practices (i.e., silt fences) would be implemented as needed during grading.

    d. If rain occurs during grading, work would stop and resume only after soils are dry, as described above.

    e. Grading would be done in a manner to prevent runoff from entering preserved vernal pools.

    f. If necessary, water spraying would be conducted at a level sufficient to control fugitive dust, but not to cause runoff into vernal pools.

    g. If mechanized grading is necessary, grading would be performed in a manner to minimize soil compaction (i.e., use the smallest type of equipment needed to feasibly accomplish the work).

8. Permanent protective fencing (and/or other measures approved by the City) would be installed along any interface with developed areas to deter human and pet entrance into on- or off-site habitat. Fencing shall be shown on the development plans and should have no gates (except to allow access for maintenance and monitoring of the biological conservation easement areas) and be designed to prevent intrusion by pets. Signage for the mitigation sites shall be posted and maintained at conspicuous locations.

Post-construction Monitoring

To ensure that the construction and operation of the project do not adversely affect the vernal pools on-site, post-construction monitoring shall be conducted throughout the rainy season of an adequate rainfall year (i.e., 70 percent of average rainfall) to verify that the measures were successful and to determine whether the project is changing the hydrology of, or causing erosion and sediment delivery to, these vernal pools (based on pre-construction conditions).

- A monitoring report shall be submitted to the USFWS, CDFW, and the City by December 1 following each monitoring season. If monitoring detects impacts to the adjacent vernal pools from construction and/or operation of the proposed project (e.g., from changes in hydrology) within the monitoring period, remediation shall be required.

4.2.2 Species-specific Mitigation Measures

In order to mitigate for potential impacts to sensitive plant and wildlife species as a result of restoration activities, the following measures will be implemented.

4.2.2.1 Thread-leaved Brodiaea

- Conduct a focused rare plant survey in the spring prior to the start of construction to determine the presence of thread-leaved brodiaea not previously detected. If no thread-leaved brodiaea are detected, no additional measures would be required.

- If detected, a qualified biologist will flag or fence any thread-leaved brodiaea that occur within the temporary impact areas prior to initiation of construction activities. Thread-leaved brodiaea shall be avoided to the maximum extent feasible within the temporary impact and restoration areas.

- Any individuals that cannot be avoided within temporary impact or restoration areas shall be salvaged for transplant and incorporated into the Vernal Pool/Quino Checkerspot Mitigation Plan area.

4.2.2.2 Coastal California Gnatcatcher

- To avoid indirect impacts to coastal California gnatcatcher nesting within the adjacent MHPA, any work that may cause noise in excess of 60 A-weighted decibels hourly average, or the ambient if it is greater, shall be avoided during the breeding season for these species, March 1 to August 15.

- If removal of habitat in the mitigation area must occur during the breeding season, a qualified biologist shall conduct a pre-implementation survey to determine the presence or absence of nesting birds in the proposed area of disturbance. The pre-implementation survey shall be conducted within 3 calendar days prior to the start of mitigation activities (including removal of vegetation).

- The applicant shall submit the results of the pre-implementation survey to the City for review and approval prior to initiating any mitigation activities. If none are detected, no additional monitoring beyond general biological monitoring will be required.

- If nesting birds are detected, a letter report in conformance with the City's Biology Guidelines (i.e., appropriate follow-up surveys, monitoring schedules, work and noise barriers/buffers, etc.) shall be prepared and include proposed measures to be implemented to ensure that take of birds or eggs or disturbance of breeding activities is avoided.

- The report shall be submitted to the City for review and approval and implemented to the City's satisfaction. The City's MMC shall verify and approve that all measures identified in the report are in place prior to and/or during implementation.

4.2.2.3 Other Nesting Avian Species

- To avoid any direct impacts to avian species identified as a listed, candidate, sensitive, or special status species in the MSCP, removal of habitat that supports active nests in the mitigation area should occur outside the breeding season for these species (February 1 to September 15).

- If removal of habitat in the mitigation area must occur during the breeding season, a qualified biologist shall conduct a pre-implementation survey to determine the presence or absence of nesting birds in the proposed area of disturbance. The pre-implementation survey shall be conducted within 3 calendar days prior to the start of mitigation activities (including removal of vegetation).

- The applicant shall submit the results of the pre-implementation survey to the City, CDFW, USFWS, and RWQCB for review and approval prior to initiating any mitigation activities. If no nesting birds are detected, no additional monitoring beyond general biological monitoring will be required.

- If nesting birds are detected, a letter report in conformance with the City's Biology Guidelines (i.e., appropriate follow-up surveys, monitoring schedules, work and noise barriers/buffers, etc.) shall be prepared and include proposed measures to be implemented to ensure that take of birds or eggs or disturbance of breeding activities is avoided.

- The report shall be submitted to the City, CDFW, USFWS, and RWQCB for review and approval and implemented to the City's satisfaction. The City's Mitigation Monitoring Coordinator and CDFW, RWQCB, and USFWS shall verify and approve that all measures identified in the report are in place prior to and/or during implementation.

4.2.2.4 Quino Checkerspot Butterfly

- Prior to restoration implementation, locations of Quino checkerspot butterfly host and nectar plants would be mapped.

- During restoration activities, Quino checkerspot butterfly nectar plants shall be avoided.

- Herbicide application would not occur within the 10-foot buffers of the Quino checkerspot butterfly host plant patches, nectar plant patches, and Quino restoration areas. Buffers would be used to prohibit restoration activities from occurring or personnel from entering areas where Quino checkerspot butterfly larvae have potential to traverse between host plant patches, and to ensure only target species are treated with herbicide. The field crew would not enter occupied Quino checkerspot butterfly areas or areas where host plants are present.

- Only locations with dense non-native plant cover and no Quino checkerspot butterfly host or nectar plants would be sprayed with a glyphosate-based herbicide. A field crew trained in habitat restoration would spray weeds in areas where Quino checkerspot butterfly and its host plants have not been documented.

- Herbicide would not be applied when wind speed and direction may cause herbicide drift to areas with host plants, nectar plants or Quino restoration areas. Marker dye would be added to the herbicide mixture so the restoration field crew can see any drift.

- The California Invasive Plant Council Best Management Practices for wildland stewardship, including covering host plant patches and nectar plant patches with tarps during herbicide applications.

4.2.2.5 Crotch's Bumble Bee

- Additional coordination and an Incidental Take Permit are anticipated to be conducted with CDFW. The results of this additional coordination may adjust the required mitigation. The results of this additional coordination may adjust the required mitigation. If Crotch's bumble bee is no longer a candidate or listed species at the time of implementation, this measure would not apply.

- To avoid impacts to Crotch's bumble bee, removal of habitat in the proposed area of disturbance must occur outside of the Colony Active Period between April 1 through August 31. If removal of habitat in the proposed area of disturbance must occur during the Colony Active Period, a Qualified Biologist shall conduct a pre-construction survey to determine the presence or absence of Crotch's bumble bee within the proposed area of disturbance.

- The Qualified Biologist must be approved by CDFW and hold a Memorandum of Understanding to catch and release Crotch's bumble bees in accordance with the CDFW guidance (i.e., Survey Considerations for California Endangered Species Act Candidate Bumble Bee Species, dated June 6, 2023). Survey methods that involve lethal take of species are not acceptable.

- The pre-construction survey shall be conducted during the colony active period between April 1 through August 31 by the Qualified Biologist prior to the issuance of Grading Permit, Demolition Plans/Permits and Building Plans/Permits and within one year prior to the initiation of project activities (including removal of vegetation). The pre-construction survey shall consist of photographic surveys following CDFW guidance (i.e., Survey Considerations for California Endangered Species Act Candidate Bumble Bee Species, dated June 6, 2023). The surveys shall consist of three separate visits spaced two to four weeks apart. Survey results will be considered valid until the start of the next colony active period.

- The Qualified Biologist/owner/permittee shall submit the results (including positive or negative survey results) of the pre-construction survey to City DSD (Mitigation Monitoring and Coordination) City Planning Department (MSCP) staff and CDFW for review and written approval prior to the issuance of Grading Permit, Demolition Plans/Permits and Building Plans/Permits.

- If pre-construction surveys identify Crotch's bumble bee individuals on-site, the Qualified Biologist shall notify CDFW, and the measures identified in the Incidental Take Permit will be implemented.

- Survey data shall be submitted by the Qualified Biologist to the California Natural Diversity Database in accordance with the Memorandum of Understanding with CDFW, or Scientific Collecting Permit requirements, as applicable.

- Herbicide application should consider proximity to known Crotch's bumble bee (*Bombus crotchii*) occurrences or nests (i.e., known occurrences within 1 kilometer of the mitigation site) during the nesting season (February 15 to September 15), and to the extent feasible herbicide shall be avoided during the peak blooming season for potential foraging resources of Crotch's bumble bee.

4.2.2.6 San Diego Fairy Shrimp and Western Spadefoot

- Direct impacts will be avoided by conducting work when all soil is dry, as noted in general project measures above.

- To ensure that indirect impacts do not occur to any fairy shrimp or western spadefoot, a scouting survey shall be conducted to map any new ponding areas within the restoration area and along the access trails surrounding the restoration area.

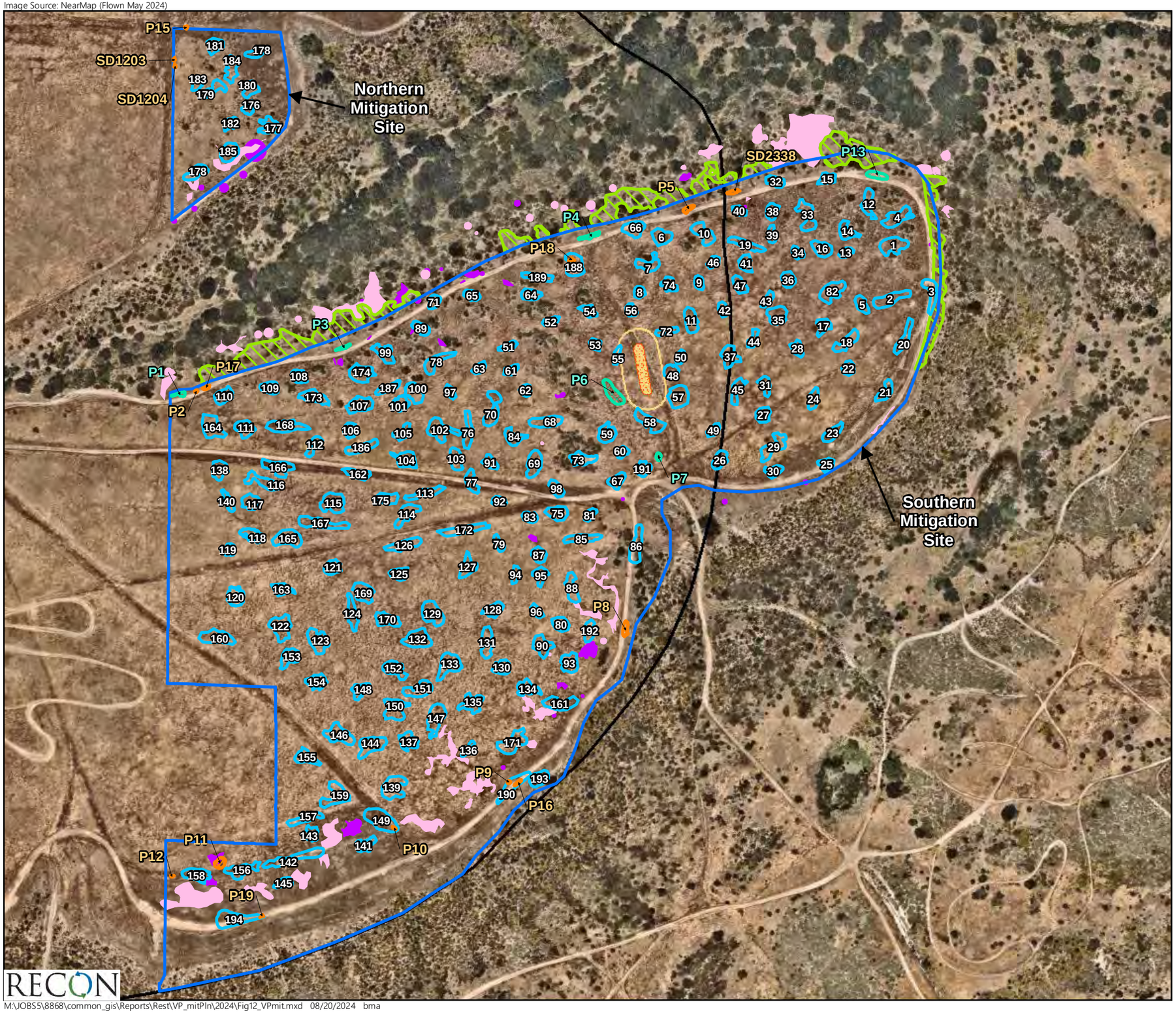
- Any ponding areas identified as supporting either of these species will be marked and/or fenced as needed to ensure restoration activities will not impact these basins.

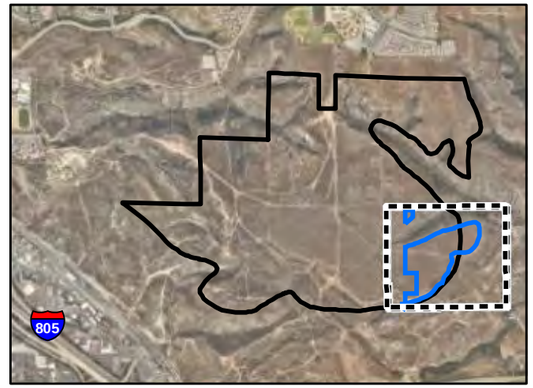
4.3 Preliminary Design and Engineering

The proposed mitigation sites are comprised of the northern mitigation site and the southern mitigation site (Figure 12). This mitigation plan proposes re-establishment of 195 vernal pools and enhancement of 6 existing pools, creation of a berm for western burrowing owl nesting and open space for owl foraging, and areas of Quino preservation/enhancement and restoration. Existing vernal pools are those that were identified in the VPHCP and RECON vegetation surveys and confirmed through the wetland delineation conducted in support of the biological resources report (RECON 2024).

Existing pools (P1, P3, P4, P6, P7, and P13) would not be graded but would be enhanced through weeding, remedial seeding, and possible fairy shrimp inoculation. Existing pools are shown as enhancement pools in Figures 12 and 13 and their watersheds are shown in green on Figure 13. Non-jurisdictional road rut pools would be expanded and/or combined with other road rut pools through minor grading (see Figure 12 and Attachment 3). After grading, these pools would be further improved through seed introduction, weeding, and possible fairy shrimp inoculation.

Image Source: NearMap (Flown May 2024)





- Enhancement Pools (0.05 acre)
- Re-establishment Pools (VPHCP/RWQCB/CDFW) (0.03 acre)
- Re-establishment Pools (Historical) (3.83 acres)
- Vernal Pool Mitigation Sites (33.71 acres)
- QCB Habitat Restoration (0.93 acres)
- Host Plant (0.13 acres)
- Nectar Plant (0.83 acres)
- Western Burrowing Owl Berm
- Western Burrowing Owl Buffer
- Specific Plan Boundary

0 Feet 200

RECON

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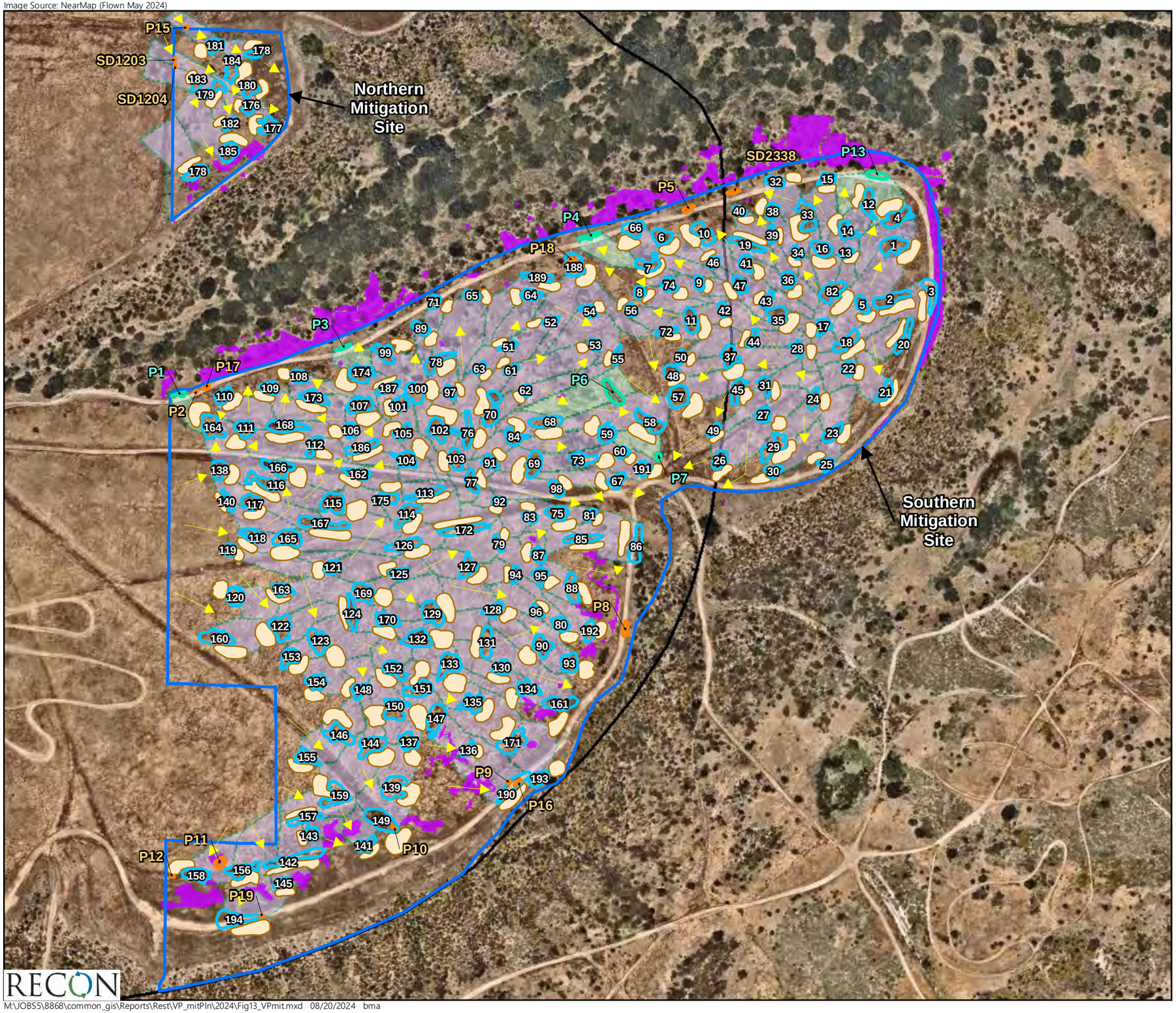
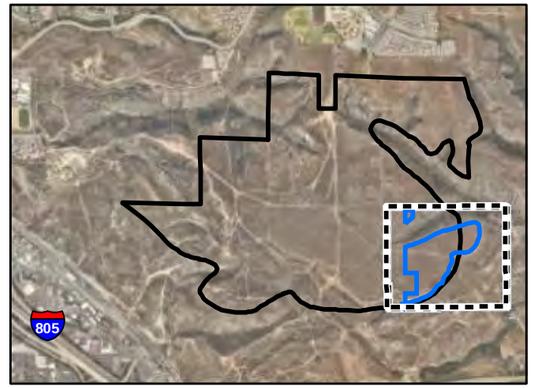
FIGURE 12
Proposed Vernal Pool Mitigation Design

Image Source: NearMap (Flown May 2024)





- Enhancement Pools (0.05 acre)
- Re-establishment Pools (VPHCP/RWQCB/CDFW) (0.03 acre)
- Re-establishment Pools (Historical) (3.83 acres)
- Proposed Mima Mounds
- Enhancement Pool Watershed
- Re-establishment Pool Watershed
- Flow Direction
- Vernal Pool Mitigation Sites (33.71 acres)
- QCB Habitat Restoration & Preservation (1.90 acres)
- Specific Plan Boundary

0 Feet 200

RECON

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FIGURE 13
Restored Vernal Pool Watersheds and Flow Patterns

A minimum of 3.86 acre (167,991 square feet) of new vernal pool surface area would be restored through topographic re-contouring/grading, soil translocation, seed collection and dispersal, and continued maintenance and monitoring. An additional 0.05 acre (2,066 square feet) of existing vernal pools (pools identified by the City's VPHCP or by vegetation surveys and confirmed by wetland delineations conducted by RECON) would be enhanced through hand weeding, soil translocation, seed collection and dispersal, and continued maintenance and monitoring. The restoration of 3.86 acres (167,991 square feet) of vernal pool surface area is in excess of the 2.51 acres of required mitigation.

To develop this design, historic aerial imagery from 1966 was evaluated to determine past locations of vernal pool and mima mound topography (see Figure 7). A topographic survey was then performed on the site to determine 0.5-foot (6-inch) contours. The basis for this fine-scale resolution is the micro-depth (i.e., several inches) of the vernal pools that shall be restored. The combination of the historic imagery and 0.5-foot contours, as well as locations of existing resources (see Figures 8 through 11), was used to determine the placement of the proposed vernal pools and mima mounds. Existing low points would be further enhanced to re-establish vernal pool basins and excess soil generated from grading would be used to create new mima mounds or enhance existing mima mound topography. All proposed vernal pools and mima mounds have been placed in a manner to improve the existing site hydrology and encourage ponding of re-established and enhanced vernal pools (see Figure 13). Per the requirements of the VPHCP, the restored pools and their watersheds shall not impact the watersheds of any existing pools except where needed to establish hydrologic connections as demonstrated in Figure 13. All final specifications and topographic-based grading, planting, and watering plans shall have 0.5-foot contours for the vernal pools, watersheds, and surrounding uplands (including adjacent mima mounds) at the mitigation sites. Grading plans would be developed during the permit application process. Figure 13 depicts the watersheds of the re-establishment and enhancement vernal pools, where grading of the re-establishment pools would not impact the watershed of any of the enhancement pools. A hydraulic analysis (i.e., surface and/or subsurface flow, where applicable) that shows each vernal pool, its watershed, and the hydrologic connection between the pools is required and included as Attachment 4. The hydraulic analysis demonstrates that after a typical one-year storm event resulting in 1.25 inches of rainfall, each re-established pool would remain ponded for 14 days and 193 of the 195 re-establishment pools would remain ponded after 21-days. This demonstrates that, as designed, the re-establishment pools would pond at a depth and duration to support San Diego fairy shrimp, Riverside fairy shrimp, San Diego button-celery, vernal pool endemic plant species, and develop hydric soils. In addition to Attachment 4, Figure 13 shows the watersheds of existing vernal pools, overflow pathways that hydrologically connect the re-established and enhanced pools in a way that mimics natural vernal pool complex topography and hydrology, and provides assurance that impacts to the watersheds of existing pools would be avoided (except where needs to establish hydrologic connections).Data from Attachment 4 including depth of ponding anticipated 14 days and 21 days following a one-year storm event has been also incorporated into Attachment 3.

In addition to grading of vernal pool basins and mima mounds, a berm for western burrowing owl would be installed within the center of the site. The berm would be approximately 150 feet long by 40 feet wide and 5 feet tall, as depicted on Figure 12. Starter holes measuring 4 inches in diameter and 3 feet deep would be installed throughout the berm at approximately 15 degrees from parallel of the ground. Approximately 10 starter holes would be installed within the berm. The berm and

surrounding 30 feet would be revegetated with low growing vegetation and maintained as appropriate to support burrowing owl nesting and breeding.

Finally, 0.96 acre of existing patches of Quino host and nectar species would be preserved and enhanced through weeding and seed introduction and 0.93 acre of new Quino habitat would be restored through weed removal, seed introduction, and regular weed maintenance.

4.4 Implementation

Implementation activities include weed dethatching, topographic re-contouring (i.e., grading), barrier/fence installation, soil salvage and translocation, and planting and seeding. The implementation schedule is shown in Table 3. Site preparation would commence prior to or concurrently with the start of construction of the project. As discussed in the biological resources report, the project would be constructed in three phases. Accordingly, the restoration would be implemented also in three phases, corresponding to the timing of development.

Table 3
Implementation Schedule

Task	Time of Year
Seed Collection and Bulking	Spring/Summer for vernal pool seed and annual upland seed, Summer/Fall for perennial upland seed
Vegetative Dethatching	Summer/Fall (prior to grading)
Vernal Pool Soil Salvage	Summer/Fall (prior to start of wet season)
Topographic Re-contouring/Grading	Summer/Fall (prior to start of wet season)
Barrier/Signage Installation	Fall (after grading)
Vernal Pool Soil Translocation	Winter[1]
Upland Plant and Seed Installation	Winter
Vernal Pool Plant Introduction	Winter[1]
[1]After vernal pool hydrology accepted by the Wildlife Agencies.	

4.4.1 Seed Collection and Bulking

Seed collection and bulking should begin as soon as possible by a qualified native plant nursery. Vernal pool plant seed collection would be conducted at the mitigation sites from within pools to be impacted. If adequate amounts of seed cannot be obtained on-site, then an alternate site located on Otay Mesa would be used only upon approval by the City. Care would be taken to avoid collection of soil during seed collection as fairy shrimp eggs may be mixed with the seed and soil. The sources and proof of local origin of all plant material and seed would be provided to the City.

Seed bulking includes propagating container plants specifically for the purposes of seed production. Container plants would be sown and grown under ideal conditions, allowed to germinate and flower, and all resulting seed would be harvested, rough cleaned, and stored for hand-seeding.

The vernal pool plant indicator species listed in Table 4 should be considered for introduction to the vernal pools. The hand-collected or bulked vernal pool seeds would be distributed in the newly established vernal pools at the discretion of the restoration specialist. In addition to the vernal pool plant indicator species listed in Table 4, sensitive species identified in the Species-Specific Objectives

of the VPMMP (City of San Diego 2020) would also be introduced as appropriate into the newly established vernal pools, including Otay Mesa mint, San Diego button-celery, and California Orcutt grass. Spreading navarretia would also be introduced to re-establish critical habitat for this species. Additional vernal pool species that are historically or currently known to occur in the Otay Mesa vernal pools, such as annual hairgrass (*Dechampsia danthonoides*), smooth boisduvalia (*Epilobium campestre*), Texas bergia (*Bergia texana*), and toothed downingia (*Downingia cuspidata*) would also be considered for introduction.

Table 4
Vernal Pool Plant Indicator Species Occurring on the Southwest Village Vernal Pool Mitigation Sites

Plant Species	Common Name
Callitriche marginata	water-starwort
Crassula aguatica	stone-crop
Eleocharis macrostachya	pale spikerush
Eryngium aristulatum var. *parishii*	San Diego button-celery
Isoetes orcuttii	Orcutt's quillwort
Juncus bufonius	toad rush
Lepidium latipes	dwarf peppergrass
Plagiobothrys acanthocarpus	adobe popcornflower
Plantago elongata	plantain
Psilocarphus brevissimus	dwarf woolly-heads
Triglochin scilloides	flowering quillwort

4.4.2 Vegetative Dethatching

Prior to topographic re-contouring, field crews would cut all non-native vegetation using low-impact mechanical equipment, such as line trimmers. Cut material, which includes the accumulated vegetative thatch that currently covers the mitigation sites, would be raked into piles and removed from the site. Removal of the thatch would enable the project restoration specialist and grading operator to see the soil surface so that the proper vernal pool elevations can be excavated. Removal of the thatch would also help reduce future weed growth. The thatch would be collected and put into a green waste dumpster for disposal or composted on-site outside of the vernal pool mitigation sites.

4.4.3 Salvage and Translocation of Vernal Pool Plant Material, Soils, and Fairy Shrimp Cysts

Necessary criteria for this mitigation plan include establishment of populations of San Diego and Riverside fairy shrimp and vernal pool indicator plant species. Soil from the impacted vernal pools and seasonal basins containing San Diego or Riverside fairy shrimp cysts or vernal pool plants would be collected prior to any construction impacts, stored at an appropriate facility, and used to inoculate the newly established vernal pools where fairy shrimp and plants are to be reintroduced.

In addition, San Diego and Riverside fairy shrimp and vernal pool plants are known to occupy some of the vernal pools on the mitigation sites which would be used to introduce cysts and seed to the

newly established basins. Following topographic re-contouring, the newly established vernal pools would be inoculated with the collected soil after the newly established vernal pools have demonstrated suitable hydrologic conditions (i.e., ponding for at least 14 to 21 days). San Diego or Riverside fairy shrimp cysts would be introduced into these vernal pools following the guidelines listed below.

Soil collection for fairy shrimp translocation would be performed per the following:

- Cyst bearing soil (inoculum) would be collected by an individual holding a valid USFWS 10(a) permit for the collection of vernal pool invertebrates and approved by the Wildlife Agencies.
- Cyst bearing soil (inoculum) would be collected when it is dry to avoid damaging or destroying fairy shrimp cysts, which are fragile when wet.
- A hand trowel or similar instrument shall be used to collect the top two inches of soil from the pools. Whenever possible, soil shall be collected in chunks. The trowel shall be used to pry up intact chunks of sediment, rather than loosening the soil by raking and shoveling which can damage the cysts. The soil from donor features would be stored individually in labeled boxes with adequate ventilation and away from direct sunlight. Salvaged soil would be kept at an approved seed storage facility that provides the appropriate conditions of light and temperature.
- Prior to placing any salvaged cyst-bearing soil into the newly established and enhanced existing pools, the preserved pools would have been surveyed for versatile fairy shrimp (*Branchinecta lindahli*) to the satisfaction of the City and Wildlife Agencies, which would include soil testing for the presence of the versatile fairy shrimp. If the soil contains versatile fairy shrimp cysts, then inoculum would not be introduced until measures, approved by the Wildlife Agencies, are implemented in an attempt to remove the versatile fairy shrimp from the pools. To date, wet season fairy shrimp surveys have only detected San Diego and Riverside fairy shrimp in the preserved and impact pools.
- Salvaged soil would be spread out into the deepest portions of the newly established and enhanced existing vernal pools to give the greatest chance for the material to be inundated during the rainy season. Inoculum would be placed in a manner that preserves, to the maximum extent possible, the orientation of the fairy shrimp cysts within the surface layer of soil (e.g., collected inoculum would be shallowly distributed within the pond so that cysts have the potential to be brought into solution upon inundation).
- Inoculum (both vernal pool plant seeds and fairy shrimp cysts) would not be introduced until the Wildlife Agencies approve the hydrology of the newly established and recontoured vernal pool basins; i.e., until newly created pools have demonstrated water retainage for the appropriate amount of time to support San Diego (14 to 21 days) or Riverside fairy shrimp (i.e., at least 21 to 28 days).
- Inoculum from different source pools would not be mixed prior to translocation for any of the newly established vernal pools.

- As a last resort, and after approval by the Wildlife Agencies additional inoculum from donor vernal pools as close to the mitigation sites as possible may be used to supplement the inoculum collected at the project impact site. If inoculum is used for restoration and enhancement, the plan shall identify any proposed donor pools and include documentation that they are free of versatile fairy shrimp.

4.4.4 Topographic Re-contouring

Topographic re-contouring at the mitigation sites would be implemented to create a mound and basin topography typical of vernal pool habitats on Otay Mesa. The result would be the establishment of a more natural watershed with the ability to capture and retain precipitation for both the existing and new vernal pools.

The primary physical change accomplished by grading would be the redistribution of part of the soil surface to establish (i.e., excavate) new vernal pool basins and allow ponding and water retention. Excess material displaced by the excavation process would be used to construct low mounds. Mounds would be placed in a manner that enhances the local watershed of the complex by encouraging ponding of new/existing pools and improving hydrologic connectivity between pools. After grading, cobbles uncovered during the grading process would be placed within the pools to provide topographic complexity and enhance biotic zonation within the pool basins.

Topographic re-contouring activities would be timed to avoid wet weather to minimize potential impacts (e.g., siltation) to the existing vernal pools unless the area to be recontoured is at an elevation below the pools. To ensure that potential impacts to the existing vernal pools are avoided, topographic re-contouring activities would be performed consistent with the following:

- Would occur only when the soil is dry to the touch at the surface and 1 inch below. A visual check for color differences (i.e., darker soil indicating moisture) in the soil between the surface and 1 inch below indicates the soil is dry.

- After a rain of greater than 0.2 inch, topographic re-contouring would occur only after the soil surface has dried sufficiently as described above, and no sooner than 2 days (48 hours) after the rain event ends.

- Topographic re-contouring would commence only when no rain is forecasted during the anticipated grading period. If rain occurs during grading, work would stop and resume only after soils are dry.

- Topographic re-contouring would be done in a manner to prevent runoff from entering the existing vernal pools. To prevent erosion and siltation from storm water runoff due to unexpected rains, best management practices (e.g., silt fences or other means) would be implemented as needed.

- Topographic re-contouring would be conducted under the direction of a qualified restoration specialist with a minimum of five years of vernal pool restoration experience. Areas that are to remain unaffected by topographic re-contouring activities would be marked prior to implementation. Topographic re-contouring would be implemented using earth

moving devices applicable for fine grading. The grading operator would also be experienced in vernal pool restoration work.

- After topographic re-contouring, cobble generated by grading activities would be placed within the vernal pool basins to provide topographic complexity to the basin bottoms.
- After topographic re-contouring and prior to container plant installation, the maximum potential ponding area and watersheds of the newly established vernal pools would be surveyed. Potential ponding areas and watersheds would be mapped to ensure that the boundary for each pool does not differ by more than 10 percent from the target areas and that the watershed of each vernal pool is at least four to eight times the size of the potential ponding area, depending on the pools location within the site. High resolution aerial photography would be captured using a professional small unmanned aerial vehicle. Using industry standard photogrammetry software and procedures, a digital surface model (DSM) would be generated using the data collected by the small unmanned aerial vehicles.
- The as-built grading plans and report figures would include vernal pool boundaries and 0.5-foot contours, both of which would be derived from the DSM, and would be replotted at a 1 inch equals 40 feet scale.
- A final implementation schedule would be included that indicates when all vernal pool impacts, as well as vernal pool restoration/enhancement grading and planting, shall begin and end. Vernal pools restoration is anticipated to begin concurrent with impacts and after all wetland permits are received from wetland regulatory agencies. This would minimize the length of time inoculum is kept in storage and ensure that there is appropriate habitat to translocate it to.

Attachment 3 lists the existing and planned conditions of the existing and restored pools at the mitigation sites.

4.4.5 Barriers

Concurrent with topographic re-contouring, a temporary fence would be erected and maintained around the perimeter of the mitigation sites to prohibit unauthorized vehicle access. Once the topographic re-contouring is complete, signs would notify that the area is an ecological preserve, trespassing is prohibited, and cite penalties for trespassing violations, including liability for repair of any damage to soil or biological resources within the barrier. Signs in both Spanish and English would be mounted at approximately 200-foot intervals around the mitigation sites. If necessary, the mitigation sites would be permanently fenced to prevent unauthorized entry and to minimize vandalism. Protection of the mitigation sites from human disturbance is essential for success. Any permanent fencing would be installed in consultation with the project owner and the City.

4.4.6 Plant and Seed Introduction

The vernal pools would be seeded once it has been determined that the hydrology of the pools is adequate to support these species. Planting of the upland watersheds would occur immediately following site preparation. Table 3 outlines the timing of native plant introduction.

4.4.6.1 Establishment of Vernal Pool Target Species

Establishment and enhancement of vernal pool habitat within the mitigation sites require the reintroduction of plants and animals in addition to the physical topographic re-contouring described above. The restoration of vernal pool habitat can be greatly accelerated by the active transport of propagules from donor sites into the new vernal pools and associated watershed (Scheidlinger et al. 1985). This would be accomplished by one or a combination of the following:

- The redistribution of topsoil containing seeds, spores, bulbs, invertebrate eggs, fairy shrimp cysts, and other propagules salvaged from on-site vernal pools to be impacted;
- The distribution of vernal pool plant seed collected from an off-site source approved by the City;
- If necessary, the use of vernal pool inoculum from an off-site source approved by the City.

Re-introduction of vernal pool biota into the newly established vernal pools and the existing preserved vernal pools to be enhanced would not be conducted until the City and Wildlife Agencies have approved the site preparation. Inoculum would not be introduced into the newly established vernal pools until after they demonstrate water retention for an appropriate amount of time to support targeted vernal pool species (i.e., at least 14 to 21 days for San Diego fairy shrimp or 21 to 28 days for Riverside fairy shrimp), and have been surveyed for versatile fairy shrimp to the satisfaction of the City. If versatile fairy shrimp are detected in the restored or enhanced pools, inoculum shall not be introduced until appropriate measures on how to address versatile fairy shrimp are approved by the City and Wildlife Agencies.

If natural rain is inadequate to support plant establishment during the initial re-introduction of vernal pool biota, artificial watering of the established/enhanced pools and their watersheds may be done upon approval by the City and Wildlife Agencies and in order to establish plants but not hydrate shrimp. Any artificial watering shall be done in a manner that prevents ponding in the pools. Any water to be used shall be identified and documented to be free of contaminants that could harm the pools.

Inoculum shall be spread evenly over the surface, no more than 0.25-inch deep. If any ponding water is present at the time of soil inoculation, the inoculum shall only be placed on the wet soil adjacent to the ponded areas. Inoculum shall be placed into the bottoms of the restored/enhanced pools in a manner that preserves, to the maximum extent possible, the orientation of the fairy shrimp cysts and plant seeds within the surface layer of soil (e.g., collected inoculum shall be shallowly distributed within the pools so that cysts have the potential to be inundated when the pool ponds).

4.4.6.2 Upland Planting

The upland watershed of the mitigation sites would be restored to maritime succulent scrub. The upland areas currently support disturbed non-native grassland and remnant Diegan coastal sage scrub. The non-native grassland would be restored to maritime succulent scrub and the Diegan coastal sage scrub would be enhanced. The restoration of native plant communities at the mitigation sites would be based on a principle of re-establishing suitable soil conditions (i.e., mycorrhizal fungi), re-introduction of native shrub and herbaceous species, and native seed banks. The timing of the

introduction of the native maritime succulent scrub container stock and seed shall coincide with the seasonal rain period.

The maritime succulent scrub restoration techniques would include installing container stock and hand-broadcasting native seed. All seed used for plant propagation and hand-broadcasting would be collected from the vicinity of the project where feasible and, if necessary, from commercially available seed sources. All planting would be installed in a way that mimics natural plant distribution.

The reestablishment of a fully diverse native maritime succulent scrub community would rely on appropriate initial conditions and intensive weed control efforts. The container plant palette and seed mix for the maritime succulent scrub restoration are listed in Tables 5 and 6.

Table 5
Container Stock for the Maritime Succulent Scrub Restoration

Scientific Name	Common Name	Size	Number per Acre
Adolphia californica	California adolphia	1-gallon	10
Ambrosia chenopodifolia	San Diego bur-sage	1-gallon	100
Artemisia californica	California sagebrush	1-gallon	200
Bahiopsis laciniata	San Diego sunflower (viguiera)	1-gallon	150
Bergerocactus emoryi	golden spined cereus	cuttings	10
Cylindropuntia prolifera	coast cholla	cuttings	50
Dudleya pulverulenta	chalk dudleya	1-gallon	20
Encelia Californica	bush sunflower	1-gallon	75
Eriogonum fasciculatum	California buckwheat	1-gallon	150
Euphorbia misera	cliff spurge	1-gallon	50
Opuntia littoralis	coast prickly pear cactus	cuttings	25
Simmondsia chinensis	jojoba	1-gallon	150
Sisyrhinchium bellum	blue-eyed grass	rose pots	100
Stipa lepida	foothill needlegrass	rose pots	100
Stipa pulchra	purple needlegrass	rose pots	100
Yucca schidigera	Mojave yucca	1-gallon	25
		TOTAL	1,315

Table 6
Seed Mix for the Uplands and Quino Checkerspot Butterfly Restoration

Scientific Name	Common Name	Pounds per Acre
Acmispon glaber	deerweed	1.0
Castilleja exserta	purple owl's clover	1.0
Cryptantha intermedia	nievitas cryptantha	1.0
Lasthenia gracilis	goldfields	2.0
Lupinus bicolor	miniature lupine	1.0
Plantago erecta	dot-seed plantain	5.0
Stipa pulchra	purple needlegrass	2.0
	TOTAL	13.0

4.4.6.3 Upland Plant Salvage and Translocation

San Diego barrel cactus (*Ferocactus viridescens)* within the impact area would be salvaged prior to construction activities. Cactus would be salvaged by hand and with heavy equipment, with root ball attached, and immediately translocated to the mitigation sites.

4.4.6.4 Seed Introduction – Quino Checkerspot Butterfly

Introduction of seed would occur within the upland areas of the mitigation sites to support habitat for Quino checkerspot butterfly. In addition, existing patches of dot-seed plantain (Quino checkerspot butterfly host plants) and nectar species (Quino checkerspot butterfly nectar plants; see Figure 12) would be protected and enhanced during mitigation implementation. These patches would be expanded and enhanced through hand seeding and weed maintenance (see Table 6). Additional Quino checkerspot butterfly restoration would occur along the northern boundary of the southern mitigation site where Quino checkerspot butterfly host and nectar species would be hand seeded and the area would be maintained specifically as Quino checkerspot butterfly habitat. Seed would be mixed with an inert biodegradable material, such as straw or rice hulls, and hand dispersed within the mitigation sites. No raking would occur to prevent disturbing soil crusts that occur within existing patches of Quino checkerspot butterfly host and nectar species.

4.4.6.5 Seed Introduction – Western Burrowing Owl

Introduction of seed would occur within 30 feet of the berm (see Figure 12) in support of western burrowing use and foraging. Seed would be mixed with an inert biodegradable material, such as straw or rice hulls, and hand dispersed. Seed would be lightly raked to ensure good seed to soil contract and to support seed germination. The seed mix is shown in Table 7.

Table 7
Seed Mix for the Western Burrowing Owl Restoration

Scientific Name	Common Name	Pounds per Acre
Acmispon glaber	deerweed	1.0
Croton setigerus	doveweed	3.0
Cryptantha intermedia	nievitas cryptantha	1.0
Eriophyllum confertiflorum	golden yarrow	2.0
Grindelia camporum	gumplant	2.0
Isocoma menziesii	coastal goldenbush	1.0
Lasthenia gracilis	goldfields	2.0
Lupinus bicolor	miniature lupine	1.0
Malvella leprosa	alkali mallow	2.0
Plantago erecta	dot-seed plantain	5.0
Stipa pulchra	purple needlegrass	2.0
	TOTAL	22.0

4.4.7 Irrigation

If a point of connection to a reliable water source is available at the time of mitigation implementation, a temporary aboveground irrigation system would be installed within areas planned to receive container plants in the upland habitat. The irrigation system would be field fit to ensure adequate irrigation coverage to all installed container plants to the extent practicable with avoidance of overspray into the vernal pool basins. At no point would irrigation water that results in pooling of water be allowed to enter the vernal pool basins. The system would also be installed with hose bibs to allow for hand watering of container plants that cannot be watered by the system due to their proximity to vernal pools.

If a reliable point of connection is not available at the time of container plant installation, all container plants and germinating upland seed would be watered by water truck and hoses. The water truck would fill up at the closest fire hydrant using the appropriate water meter.

4.5 As-Built Reporting

At the completion of implementation, the installation would be approved by the City of San Diego's DSD/MMC, Park and Recreation Open Space Division, and MSCP staff. The restoration contractor would submit an as-built report within 90 days of completion of implementation that documents implementation activities and the dates they were completed. The report would include, but not be limited to, dates of on-site work, location and size of vernal pool basins, Quino habitat location, western burrowing owl berm location, final plant and seed lists and quantities, and modifications to the mitigation sites design that occurred through consultation with the restoration specialist. Figures would include the results of the DSM created after vernal pool grading.

4.6 120-day PEP

The 120-day PEP is the initial period of maintenance after plants have been installed. This maintenance period would begin once the implementation activities are approved by the City, likely once all container plants and native seed have been installed. The PEP would last for 120 calendar days and would consist of all maintenance activities and methods discussed in Section 5.0. Regular (at least once per week) qualitative monitoring would be conducted to assess vernal pool ponding, native container plant establishment, native seed germination, and non-native weed presence and make recommendations for maintenance activities, as needed (Table 8). At the end of the PEP, any dead container plants would be replaced in kind and the site would be free of non-native weed species. Year 1 would begin after successful completion of the PEP and any required remedial container plant installation has been completed. At the completion of the PEP, the restoration specialist would prepare a letter report for submittal to the City MMC, DSD, and MSCP staff (Open Space, vernal pool biologist, and botanist), and resource agencies to document activities conducted during the PEP and the site progress towards final success criteria.

Table 8 Maintenance Schedule						
Task	120-day PEP	Year 1	Year 2	Year 3	Year 4	Year 5
Weed Control (Herbicide Treatment)	As needed	Monthly[1]	Monthly[1]	5 to 6 times per year[1]	4 to 5 times per year[1]	4 times per year[1]
Weed Control (Hand pulling – Vernal Pools)	As needed	3 times per year[1]	3 times per year[1]	2 times per year[1]	2 times per year[1]	2 times per year[1]
Watering	As needed	As needed	As needed	As needed	--	--
Supplemental Planting/Seeding	At end of PEP	Fall/Winter	Fall/Winter	Fall/Winter	--	--
Trash Removal	As needed	As needed	As needed	As needed	As needed	As needed
[1]Minimum frequency						

5.0 Maintenance Plan

Regular maintenance of the mitigation sites would be required during the five-year maintenance and monitoring period to establish native container plants and control aggressive non-native weeds in the vernal pools and adjacent upland watershed habitats. Maintenance activities would occur concurrent with project construction. The need for weeding is expected to decrease substantially by the end of the monitoring period provided successful habitat restoration has been achieved. Weeding activities would include herbicide application, line trimming, and hand pulling. Herbicide would not be applied within the vernal pool basins or near Quino checkerspot butterfly host plants. Maintenance activities would also include watering of planted container stock, hand weeding of the vernal pool basins, replanting and reseeding of native species, repair of fencing and signage, and trash removal. Maintenance activities would be performed per the schedule in Table 8.

5.1 Weed Control

Weed control would be performed consistent with the following:

- All weeding shall be done by hand within the vernal pools and by line-trimmers in areas immediately adjacent to the preserved and newly established vernal pools. Use of herbicides within and immediately adjacent to restored pools would only be used under conditions approved by the resource agencies and City MSCP staff (Open Space, vernal pool biologist and botanist).

- All herbicide use would be under the direction of a licensed qualified applicator and would be applied by personnel trained to apply herbicide, under the supervision of the vernal pool restoration specialist or team. All weeding personnel would be educated to distinguish between native and non-native species to ensure that local native plants are not inadvertently killed.

- Herbicides would be applied on all areas that have been dethatched and at least three feet from the edge of the pools. Herbicide would only be applied when wind speed is less than five miles per hour, and spray nozzles would be of a design to maximize the size of droplets,

to reduce the potential for drift of herbicide to non-target plants. Application of herbicide would not occur if rain is projected within 24 hours of the scheduled application.

- Weeding of the uplands would be done at a frequency and duration to ensure that weeds are not allowed to flower and set seed within the site. During the growing season this may be as frequently as weekly, depending on weather patterns. Any weeds that have set seed would be removed by hand and disposed of off-site.

- When vernal pools are ponding or close to saturation, weeds germinating along the basin edge would be cut using line trimmers by specially trained field personnel to ensure that germinating native species are not harmed. Cut material would be lightly raked away from the pools and care would be taken to not disturb the soil with raking activities.

- Herbicide treatment would be avoided within a 10-foot buffer from any concentrations of sensitive plant species.

To mitigate for potential direct impacts to Quino checkerspot butterfly and the occupied habitat within the vernal pool restoration areas during weed control, the following measures, but not limited to, would occur:

- Only locations with dense non-native plant cover and no Quino checkerspot butterfly host plants would be sprayed with a glyphosate-based herbicide. A field crew trained in habitat restoration would spray weeds in areas where Quino checkerspot butterfly and its host plants have not been documented.

- Herbicide application would not occur within the 10-foot buffers of the Quino checkerspot butterfly host plant patches. Buffers would be used to prohibit restoration activities from occurring or personnel from entering areas where Quino checkerspot butterfly larvae have potential to traverse between host plant patches, and to ensure only target species are treated with herbicide. The field crew would not enter occupied Quino checkerspot butterfly areas or areas where host plants are present.

- Herbicide would not be applied when wind speed and direction may cause herbicide drift to areas with host plants. Marker dye would be added to the herbicide mixture so the restoration field crew can see any drift.

- The California Invasive Plant Council Best Management Practices for wildland stewardship, including covering host plant patches with tarps during herbicide applications, would be adhered to (California Invasive Plant Council 2015).

5.2 Watering

Watering would be performed consistent with the following:

- Hand-watering of container plants would be done in a manner to mimic natural rainfall, at a frequency and duration to encourage deep root establishment, but not enough to create runoff into the vernal pool basins.
- Hand-watering would be carefully tapered off during the summer months to allow plants to experience their typical summer dormancy and avoid root rot or excessive soil shrinking and swelling that can damage plant roots.

5.3 Supplemental Planting and Seeding

Remedial planting and seeding of the maritime succulent scrub upland habitat and remedial seeding of the vernal pool basins would be performed consistent with the following:

- Container plants would be replaced, as needed, within the upland watersheds. All dead plants would be replaced during years 1 and 2 after initial plant installation unless their function has been replaced by natural recruitment.
- Areas of the site where native plants and seed struggle to recruit would be remedially seeded during years 1 and 2.
- Remedial seeding would be conducted to increase vegetative cover and native species richness.
- Vernal pool basins that do not support their target vegetation (see Table 4), are not demonstrating the desired vernal pool endemic coverage, or are not meeting native richness performance standards would be remedially seeded.
- Hand seeding of the vernal pool basins would be conducted in the winter, after the pools begin to pond and after the start of the wet season.

5.4 Trash Removal and Barrier/Sign Maintenance

Trash removal and barrier/sign maintenance would be performed consistent with the following:

- Trash in the mitigation areas would be removed as necessary.
- All fencing and signs would be checked and repaired as necessary.
- Other site problems, such as vehicle damage and erosion, would be reported to the City or other adjacent landowners with recommendations for remedial measures.

5.5 Maintenance Road Decompaction and Seeding

Maintenance road decompaction and hydroseeding would be performed consistent with the following:

- At the completion of the five-year maintenance and monitoring period and prior to final sign-off, any maintenance roads that were utilized within the site would be lightly decompacted by hand tools and seeded with the species and quantities shown in Tables 5 through 7. Any areas that have developed soil crusts would not be decompacted.

5.6 Maintenance Monitoring

Qualitative monitoring of the mitigation sites to guide maintenance activities would be performed consistent with the following:

- After completion of the PEP, mitigation areas would be qualitatively monitored once a week by the vernal pool restoration specialist for the first two months, once every other week for the next four months, and monthly thereafter during the growing season. Monitoring would include, but not be limited to, assessment of container plant health, native seed germination, weed presence, and unauthorized trespassing. Monitoring results would be used to determine the timing and frequency of maintenance activities.

6.0 Ecological Performance Standards

The performance standards used to determine successful vernal pool mitigation would include the achievement of standards for the vernal pool basins and the surrounding maritime succulent scrub. Vernal pool basin standards have been developed similar to those included as part of the VPHCP and include targets for California Rapid Assessment Method (CRAM), hydrologic regime, vernal pool vegetation, composition, and San Diego and Riverside fairy shrimp presence compared to a selected reference site.

For the vernal pool mitigation, reference vernal pools would be chosen from undisturbed vernal pools located in a complex on Otay Mesa. The most functional pools at the reference site would be chosen to include the ranges of both physical and biotic characteristics that meet the performance standard goals. All reference vernal pools should support vernal pool vegetation, as defined in Section 7.3.1. Any vernal pools to be used as reference pools for this mitigation project must be approved by the City.

The maritime succulent scrub standards include targets for native and non-native vegetation coverage and species richness. The reference site for the upland habitat would be selected from maritime succulent scrub habitat located adjacent to the mitigation sites on Otay Mesa.

Each performance standard would be monitored and evaluated following the completion of seasonal field monitoring to determine if the final performance standards have been met (taking into account

the seasonal conditions). The final assessment of success shall be based on the combined performance over the monitoring period and an analysis of the trends established.

6.1 Location of Reference Site

The VPHCP requires that vernal pool mitigation projects utilize reference pools from each of the three VPHCP subareas; however, due to the unique nature of Otay Mesa pools (endemic vernal pool plant species, clay pan substrate), one reference site, the City-owned Cal Terraces vernal pool complex on Otay Mesa, would be used for this project (see Figure 4). The Cal Terraces complex is located two miles northwest of the mitigation site and supports high-quality vernal pools surrounded by established upland maritime succulent scrub habitat. Multiple vernal pools from the Cal Terrace reference site would be used to provide a variety of conditions for comparison to the restored pools. Representative, high-quality reference vernal pools would be chosen from within Cal Terraces. The most functional vernal pools would be chosen at the time of the analysis to include the ranges of both physical and biotic characteristics that meet the performance standards. All reference vernal pools would support vernal pool vegetation, as defined below in the target vegetation and cover criteria. Any vernal pools to be used as reference pools for this mitigation project must be approved by the City. Cal Terraces would also serve as the reference site for the maritime succulent scrub habitat for the watershed restoration, with the exception of the area adjacent to the western burrowing owl berm which would have its own set of success criteria appropriate for burrowing owl use, as described in Section 6.5. Most vernal pool complexes on Otay Mesa are either restored vernal pools or severely degraded and while Cal Terraces is a restoration site itself, the site achieved all success criteria and was signed off by regulatory agencies in 2003. The site has remained high-quality vernal pool and maritime succulent scrub habitat for 17 years. Cal Terraces represents one of the older restoration sites and provides a high-quality example of what restoration sites should look like upon completion.

The City performs annual monitoring of Cal Terraces per the requirements of the VPHCP (City of San Diego 2019). The complex supports 377 vernal pools, a subset of which are surveyed each year per the methods described in the VPMMP (City of San Diego 2020). In 2020, of the 36 sampled pools, 100 percent contained Otay Mesa mint and San Diego button-celery, 36 percent contained spreading navarretia, and 31 percent contained California Orcutt's grass, with 61 percent containing Riverside fairy shrimp and 92 percent containing San Diego fairy shrimp (AECOM 2021). The vegetative cover of the focal species observed in each sampled pool ranged from 1 to 25 percent. Due to the random selection of the sample pools, it is assumed that these percentages can be applied through the complex which represents one of the healthiest and most diverse vernal pool complexes in San Diego County. Non-native species cover for the monitored vernal pools was observed to be less than 1 percent for most pools, with some pools containing up to 5 percent non-native cover. Based on these monitoring results, it is anticipated these reference pools would provide a high-quality target for the vernal pool restoration effort.

6.2 California Rapid Assessment Method–Vernal Pools

CRAM is a quick wetland assessment method that combines biological, landscape, hydrological, and physical structure attributes into an index value. These indexed values are repeatable, scientifically

defensible, and offer a window into overall wetland functionality (California Wetlands Monitoring Workgroup 2019).

CRAM would be used as an additional monitoring method to demonstrate vernal pool mitigation sites improvement and provide an overall view of the mitigation sites as a whole. CRAM would not be used in lieu of quantitative monitoring efforts, but in combination, to demonstrate the functionality of the vernal pool systems within the vernal pool mitigation sites.

Although no official success standards would be applied to this project, CRAM scores would be used to evaluate form and function of the vernal pool mitigation sites and therefore general achievement of non-wetland waters mitigation requirements for the project. When compared to the as-built condition, the results of the Year 5 CRAM surveys should show, at a minimum, the following:

- Physical form and structure suitable for ponding and hydrologic connectivity.
- Development of hydrologic features within the system that provide evidence of expected function.
- Continued improvement in biotic structure.
- Overall trajectory toward improved rather than degraded condition.

CRAM attribute scores on representative assessment areas should generally increase, but increases would mostly be observed within the physical and biotic structure attribute scores. CRAM assessments would use the Vernal Pool Module (version 6.2 or most recent) and shall be conducted a total of four times, one after site grading but prior to planting, and three assessments throughout the five-year mitigation and monitoring period to inform adaptive management: pre-construction, post-implementation (Year 0), Year 3, and Year 5. CRAM metrics goals for the proposed mitigation sites are displayed in Table 9.

Table 9
CRAM Metric Goals for Five Years Post-establishment of Vernal Pools

CRAM Attribute	CRAM Metric and Submetrics	Target CRAM Metric Goal
Buffer and Landscape Context	Aquatic Area Abundance	B
	Percent of AA with Buffer	B
	Average Buffer Width	B
	Buffer condition	B
Hydrology	Water Source	A
	Hydroperiod	A
	Hydrologic Connectivity	A
Physical Structure	Structural Patch Richness	B
	Pool and Swale Density	B
	Topographic Complexity	B
Biotic Structure	Horizontal Interspersion and Zonation	B
	A. Number of Co-dominant Species	B
	B. Percent Non-native	A
	C. Endemic Species Richness	C
	Plant Community Composition Metric (average of A–C)	B

6.3 Vernal Pool Hydrological Regime Performance Standard

The depth and duration of ponded water in newly re-established vernal pools is highly dependent upon the magnitude and number of storm events, the time interval between each event, and the climactic conditions of the season. Annual occurrences of winter rains in the region are remarkably variable. Therefore, the performance standards for hydrological characteristics depend on a comparison with comparable reference habitats during each monitoring year. In general, newly re-established vernal pools pond earlier and longer than older, more established pools, and this variation should be taken into consideration when discussing the success of the vernal pools. The reference site would be located at a vernal pool complex on Otay Mesa. The vernal pool hydrological regime performance standards include:

- The duration, periodicity, and depth of inundation for the re-established vernal pools would be considered successful if, prior to the end of the monitoring period, the vernal pools demonstrate hydrological patterns of duration, periodicity, and depth of inundation that fall within the range of the highest-functioning reference vernal pool.

- Total area of inundation of the mitigation vernal pools must be equal to the area proposed in the mitigation plan during an average of above average rainfall year.

- Each re-established vernal pool must be inundated for a duration and depth that is within the range inundation observed for the reference vernal pools. Each re-established vernal pool must be inundated, during an average or above rainfall year, for a duration and depth that supports vernal pool flora and fauna.

- The average depth and duration of inundation of the re-established pools must be consistent with the average depth and duration of the reference pools.

6.4 Biological Vernal Pool Performance Standards

The re-established vernal pools would be subject to the biological performance standards listed below. The upland areas of the mitigation sites would be restored to maritime succulent scrub and would be subject to the performance standards listed in Section 6.5. The existing vernal pools in the mitigation sites would only be subject to the target weed species success criteria outlined in Section 7.3.3.

Desired absolute vernal pool vegetation goals are shown in Table 10 and serve as a guide for monitoring annual changes and determining needs for adaptive management; however, the performance standards included in 6.4.1 through 6.4.3 would be utilized to determine ultimate project success and whether the site meets the objectives identified in the Site Specific Objectives of the VPMMP (City of San Diego 2020).

Table 10 Vernal Pool Vegetation Performance Standards as a Relative Percentage of Reference Site Values			
Year	Native Species Richness[1]	Endemic Vernal Pool Species Cover (percent)	Non-native Cover (percent)
1	2	5	• <10 • 0 Cal-IPC high or perennial species
2	3	10	• <10 • 0 Cal-IPC high or perennial species
3	4	20	• <10 • 0 Cal-IPC high or perennial species
4	5	30	• <10 • 0 Cal-IPC high or perennial species
5	6	40	• <10 • 0 Cal-IPC high or perennial species
Cal-IPC = California Invasive Plant Council [1]Of species listed in Table 4.			

6.4.1 Endemic Vernal Pool Plant Species Richness

The restored vernal pools would support reproducing populations of a minimum number of endemic vernal pool plant species (see CRAM Vernal Pool modules) equivalent to that supported by the reference vernal pools (see Table 10). Equivalence is met when (1) the endemic vernal pool species richness (i.e., number of native vernal pool species) value for each of the restored vernal pools is equal to or greater than the minimum value found in the reference vernal pools and (2) the average value of vernal pool species richness for all of the restored vernal pools is equal to or greater than the minimum value found in the reference vernal pools.

6.4.2 Endemic Vernal Pool Vegetation Cover

For the re-established vernal pools, the performance standards for project success are as follows:

- The vernal pool endemic plant species cover of all re-established pools on average must be at least 40 percent of the average for the reference pools.
- Vernal pool endemic species cover for each restored vernal pool must increase in each successive year based on initial quantitative monitoring, except in years of extreme drought.
- A total of 0.03 acre of re-established vernal pool basins shall support San Diego button-celery (see Table 1).

6.4.3 Vernal Pool Non-native Cover

The non-native cover performance standards are as follows:

- Within all the vernal pools in the mitigation sites, California Invasive Plant Council List High or perennial weed species would not be present, and the relative cover of all other non-native species would not exceed ten percent.

- The average absolute cover of non-native species in the restored/enhanced vernal pools must be less than the average absolute cover of non-native species of the reference pools.

6.4.4 San Diego and Riverside Fairy Shrimp

A total of 2.18 acre of re-established vernal pools shall support reproducing populations of San Diego fairy shrimp (i.e., gravid females) and a total of 0.06 acre of vernal pools shall support reproducing populations of Riverside fairy shrimp (see Table 1). An additional 0.24 acre of pools shall support San Diego fairy shrimp to meet the Alta Del Mar mitigation requirements needs (see Table 1) for a total of 2.42 acres. Success for fairy shrimp re-introduction shall be determined by measuring the ponding of water, presence of viable cysts, hatched fairy shrimp, and gravid females, as outlined below:

- Water measurements shall be taken annually in the re-established vernal pools to determine the depth, duration, and quality (e.g., pH, temperature, total dissolved solids, and salinity) of ponding. The re-established vernal pools shall pond for a period of time and at an appropriate depth and quality to support fairy shrimp.

- Wet samples shall be taken annually in the re-established pools to determine the presence of hatched fairy shrimp and gravid females. Hatched fairy shrimp and gravid females shall be present in the re-established vernal pools for at least three wet seasons before a determination of success can be made.

- Dry samples shall be taken in the re-established vernal pools to determine the presence of viable cysts in the soils. Dry sampling shall occur in the last year to verify the viable cyst presence.

6.5 Upland Southern Maritime Succulent Scrub Performance Standards

Performance standards for the restoration of maritime succulent scrub upland habitat within the watershed portion of the vernal pool mitigation sites would be conducted over a five-year period. The performance standards for the maritime succulent scrub upland habitat would be based on a reference site that supports the target vegetation and would be used to establish target values for vegetation cover, species richness, and weed abundance. The reference site would be in adjacent open space that supports maritime succulent scrub habitat so that, upon completion, the mitigation site would naturally blend in with the adjacent high-quality habitat while providing a healthy watershed for the vernal pool basins. Performance standards for the area around the burrowing owl berm would be appropriate for burrowing owl use and, therefore, vary compared to the performance

standards for the maritime succulent scrub upland habitat. Ultimately, areas within a radius of 30 feet around the owl berm should not exceed 50 percent cover and would consist of low-growing vegetation to ensure proper foraging habitat is present. Yearly target values for the performance standards cover and plant diversity of maritime succulent scrub are presented in Table 11.

Table 11
Southern Maritime Succulent Scrub Performance Standards as a Relative Percentage of Reference Site Values

Year	Container Plant Survival	Percent Cover–Native Shrub Species[1]	Percent Cover–Native Herbaceous Species	Species Richness	Percent Cover – Non-native Species[3]
1	80[2]	10	5	N/A	• <10 • 0 Cal-IPC high or perennial species
2	--	20	10	40	• <10 • 0 Cal-IPC high or perennial species
3	--	30	20	50	• <10 • 0 Cal-IPC high or perennial species
4	--	50	40	60	• <10 • 0 Cal-IPC high or perennial species
5	--	60	50	75	• <10 • 0 Cal-IPC high or perennial species

[1]Vegetative coverage within 30 feet of berm shall be less than 50 percent and comprised of low growing species.
[2]Of initial plantings.
[3]Absolute coverage, not relative to reference site values.

6.5.1 Plant Survivorship, Vegetation Cover, and Species Richness Performance Standards

The plant survivorship, vegetation cover, and species richness performance standards are as follows:

- Container plant survival shall be 80 percent of the initial plantings for year 1. For year 1 after initial plant installation, all dead plants would be replaced unless their function has been replaced by natural recruitment.
- At the end of the five-year monitoring program, required upland maritime succulent scrub relative percent cover values shall be 60 percent of the reference site for shrub cover and 50 percent of the reference site for herbaceous cover.
- Overall species richness by taxon shall be evaluated for the reference and restoration sites. The maritime succulent scrub portion of the vernal pool mitigation sites shall be considered to meet the species richness performance standard if 75 percent of its upland plant taxa are shared relative to the reference site after the five-year monitoring period.

- Areas within a radius of 10-12 feet around each burrow should not exceed a 50 percent cover of low-growing vegetation and upland areas adjacent to the berm shall not exceed 75 percent vegetation cover of low-growing vegetation.

6.5.2 Non-native Cover

The relative cover of all non-native species within the upland restoration areas shall not exceed an absolute value of 10 percent and no California Invasive Plant Council List High or perennial species shall be present for any of the years of the five-year monitoring period.

6.6 Quino Checkerspot Butterfly Performance Standards

At the end of the maintenance and monitoring period, the patches of Quino checkerspot butterfly habitat would demonstrate expansion from pre-mitigation conditions and general improvement with a greater diversity and density of Quino checkerspot butterfly host and nectar species (Table 12). The habitat present within the project area consist primarily of non-native grasses, with scattered patches of host and nectar plants. The mitigation would support the same acreage (0.93 acre) of Quino checkerspot butterfly habitat as was impacted during construction of the project and also include 0.96 acre of preservation/enhancement.

Table 12
Quino Checkerspot Butterfly Performance Standards (absolute)

Year	Native Species Richness	Non-native Cover (percent)
1	3	• <10 • 0 Cal-IPC high or perennial species
2	4	• <10 • 0 Cal-IPC high or perennial species
3	5	• <10 • 0 Cal-IPC high or perennial species
4	6	• <10 • 0 Cal-IPC high or perennial species
5	7	• <10 • 0 Cal-IPC high or perennial species
Cal-IPC = California Invasive Plant Council		

6.7 Photographic Documentation

Permanent photograph location points would be in areas that provide an overview of the restored vernal pool mitigation sites including the watershed restoration areas. Representative photographs would be taken at each photograph location point to visually document the progress of vegetation development over the monitoring period.

7.0 Monitoring Requirements

A minimum commitment of five years of monitoring of vernal pool and upland watershed habitat restoration/establishment/enhancement areas would be completed. Monitoring methods are outlined in sections 7.1 and 7.2.

7.1 Monitoring Methods

Biological monitoring for performance standard goals would include quantitative hydrology monitoring, vegetation monitoring, USFWS Protocol Fairy Shrimp Surveys (dry and wet season), Quino checkerspot butterfly habitat mapping, and photographic documentation. The monitoring schedule is presented in Table 13 and would be followed in each phase of mitigation implementation.

Table 13
Vernal Pool and Watershed Monitoring Schedule

Task	120-day PEP	Year 1	Year 2	Year 3	Year 4	Year 5
Qualitative Monitoring	Weekly	Once weekly for first 2 months; Once every other week for months 2–6; Monthly thereafter	Monthly during the growing season	Monthly during the growing season	Monthly during the growing season	Monthly during the growing season
Hydrology Monitoring	Every 48 hours after initial ponding	Winter/ Spring[1]	Winter/ Spring[1]	Winter/ Spring[1]	Winter/ Spring[1]	Winter/ Spring[1]
Vernal Pool Vegetation (Quantitative)	None[2]	March (aquatic phase) and May (dry phase)[1]	March (aquatic phase) and May (dry phase)[1]	March (aquatic phase) and May (dry phase)[1]	March (aquatic phase) and May (dry phase)[1]	March (aquatic phase) and May (dry phase)[1]
Fairy Shrimp (Wet Season)	--	Protocol Survey[1]	Protocol Survey[1]	Protocol Survey[1]	Protocol Survey[1]	Protocol Survey[1]
Fairy Shrimp (Dry Season)	--	--	--	--	--	Viable Cyst Density Sampling
Photograph Documentation	Monthly	Spring	Spring	Spring	Spring	Spring
Upland Maritime Succulent Scrub Monitoring (Quantitative)	None[2]	None[2]	Spring[1]	Spring[1]	Spring[1]	Spring[1]
Quino Checkerspot Butterfly Habitat Mapping	--	Spring[1]	Spring[1]	Spring[1]	Spring[1]	Spring[1]

[1]Timing dependent on rainfall.
[2]Quantitative monitoring to begin in Year 2 to avoid impacts to plant and seed establishment.

7.1.1 Vernal Pool Hydrology and Watershed

The success criteria for hydrological characteristics for the newly re-established vernal pools depend on a comparison with reference vernal pools representing the target performance goals during each monitoring year. The reference site would be located at a vernal pool complex on Otay Mesa. Hydrological characteristics of the vernal pool mitigation sites to be monitored include assessment of the depth, periodicity, and duration of inundation in the newly re-established and reference pools. Precipitation is recorded at the nearest reporting weather station (Brown Field). Field methods for quantitative hydrological monitoring are described below.

- The newly re-established vernal pools and reference pools would be measured annually for water depth after every rainfall event during the period of November 1 through May 15 or until the standing water is gone. Water depth would be measured using a ruler placed in the low point of each pool.

- Approximately 30 percent of the re-established vernal pools (sample pools) and reference pools shall be monitored each year to collect hydrological data. All re-established pools shall be sampled in Year 5 to measure success.

- A water-depth versus time chart shall be prepared illustrating water depth and ponding periodicity over the low point for a subsample of re-established vernal pools and reference pools.

- Water samples would be taken annually in the newly re-established pools and reference pools to determine water quality (e.g., pH, temperature, total dissolved solids, salinity).

7.1.2 Vernal Pool Vegetation Monitoring

Vegetation parameters of the re-established vernal pools and reference vernal pools to be monitored include species presence and vegetative cover. In addition, photographic documentation would provide an overview of the vegetative community of each vernal pool. Biological observations shall be made by a field biologist trained in the methods described below and familiar with the plant taxa listed in Table 4. Monitoring tasks for vernal pool vegetation are as follows:

- The monitored vernal pools shall be sampled for plant species presence and estimated cover using a meander survey of at least a 15-minute duration per basin during the aquatic phase (approximately March) and after the pools have dried (approximately May, or within 30 days of the disappearance of standing water).

- The monitored vernal pools shall be photographed from an established photo point during the vegetation sampling period.

- Approximately 30 percent of the re-established vernal pools (sample pools) and reference pools shall be monitored each year to collect vegetation data. All re-established pools shall be sampled in Year 5 to measure success.

7.1.3 Target Weed Species

Non-native weed species expected to be present within or adjacent to the vernal pools include wild oat (*Avena* spp.), brome grasses (*Bromus* spp.), rabbitfoot grass (*Polypogon monspeliensis*), brass buttons (*Cotula coronopifolia*), loose-strife (*Lythrum hyssopifolia*), filaree (*Erodium* spp.), sand-spurrey (*Spergularia bocconii*), curly dock (*Rumex crispus*), common knotweed (*Polygonum arenastrum*), wall barley (*hordeum murinum*), and Italian ryegrass (*Festuca perennis*). Of these, the *Festuca, Lythrum, Spergularia* and *Hordeum* species are some of the most significant competitors in this area with native vernal pool vegetation as it becomes established. The mitigation sites would be monitored annually for the presence of invasive non-native species to coordinate the control of these weed species by the maintenance crews.

7.1.4 Fairy Shrimp Monitoring

Monitoring tasks for vernal pool wildlife are as follows:

- During the aquatic phase of the monitored vernal pools, all animal taxa observed shall be recorded (including monitoring for spadefoot toad eggs, tadpoles, and adults).

- Annually during the aquatic phase, the monitored vernal pools shall be dip-net sampled for aquatic invertebrates using pole-mounted dip-nets in appropriate mesh size to capture cladocerans, ostracods, branchiopods, and tadpoles following USFWS protocol survey methods (2015). The density of hatched San Diego or Riverside fairy shrimp and gravid females would be recorded.

- Approximately 30 percent of the sample pools and reference pools shall be monitored each year to collect fairy shrimp and spadefoot data. All re-established pools shall be sampled in Year 5 to measure success.

- Dry samples would be taken in the newly re-established vernal pools and reference pools to determine the presence of viable cysts in the soils. Dry sampling shall occur in the last year to identify changes to viable cyst presence.

7.2 Upland Watershed Monitoring

It is anticipated that the maritime succulent scrub would become established within the five-year monitoring period, although full maturation of the community may take longer. Overall native cover (i.e., shrubs, herbaceous species) and species richness shall be evaluated for the watershed restoration areas and the reference site.

The vegetation cover would be measured quantitatively using line-intercept sampling method in the spring, beginning in Year 2 (see Table 13). This method involves the establishment of randomly placed transects, usually 10 meters long, to gather data to estimate native vegetation cover (i.e., shrub and herbaceous). Approximately two 10-meter transects would be sampled per acre. Species richness would be determined by lists of all plant species present within the restoration areas.

7.2.1 Quino Checkerspot Butterfly Habitat

In the spring of each year, patches of Quino checkerspot butterfly habitat (host and nectar species) would be mapped with a global positioning system (GPS) unit. This mapping would be included in the figures with the annual reports and would demonstrate that the Quino checkerspot butterfly habitat impacted by development has been replaced at a 1:1 ratio and diversity in host and nectar plants has increased.

7.2.2 Invasive Non-native Plants

The presence of invasive non-native plant species would be monitored in the restored upland maritime succulent scrub habitat areas. Information collected during monitoring visits would be used to schedule the maintenance crews to conduct weed control measures.

7.2.3 Wildlife and Western Burrowing Owl Usage

A list of wildlife species observed using the vernal pool mitigation sites would be prepared and included in the annual reports. Species lists for both vernal pools and upland watershed areas would be compiled annually.

Additionally, while the mitigation sites would be restored and maintained to support western burrowing owl use and foraging, burrowing owl use or occupancy is not a requirement of this plan and not a condition of project completion.

7.3 Annual Reporting

An annual report shall be submitted to the City through the vernal pool reporting website and Wildlife Agencies by December 1 of each year that assess both the attainment of yearly interim and progress toward the final performance standards for the newly established vernal pools and restored watershed areas. The report shall also summarize the project's compliance with all applicable mitigation measures and permit conditions. A final monitoring report for each implementation phase would be prepared and submitted to the City DSD/MMC, Park and Recreation Open Space, MSCP, and Wildlife Agencies for use in the notification of completion and final acceptance of the mitigation effort.

8.0 Adaptive Management Plan

While the restoration and maintenance measures proposed by this plan are intended to improve the quality of the vernal pool mitigation sites, unforeseen changes may occur because of unpredictable weather patterns, ecological processes, or other natural or anthropogenic stressors. The contractor would respond to any unexpected events that have a detrimental impact on the mitigation sites using an adaptive management approach. Adaptive management is defined, for the purposes of this mitigation project, as a flexible, iterative approach to the long-term management of biological resources that is directed by the results of ongoing monitoring activities and direct observation of

adverse environmental stressors. Effects of any catastrophic events that affect the mitigation would receive prompt and appropriate corrective actions.

Adaptive management measures to be implemented would include the utilization of qualitative and quantitative data gathered in the field prior to and/or throughout the five-year monitoring period to assess the health and vigor of newly established vernal pools and restored upland watershed habitat within the mitigation sites. Following an event that causes damage to all or part of the mitigation sites, this data would be used to drive management considerations for the repair of the damaged areas. Achieving the key goals of the mitigation program and establishing self-sustaining native habitats would be the focus of all adaptive management decisions.

9.0 Notification of Completion

Verification that restoration/enhancement of vernal pools is complete shall require written sign-off by the City and Wildlife Agencies. If the final success criteria have been met at the end of the five-year monitoring program for each phase, notification of these events shall be provided with the fifth-year report. If the final success criteria have not been met by the end of the five-year monitoring program, the fifth-year report would discuss the possible reasons and recommendations for remedial measures to aid the site in meeting the criteria. If any of the re-established/enhanced vernal pools or upland watershed habitats have not met the performance standards, the project proponent's maintenance and monitoring obligations would continue, until the City and Wildlife Agencies and deem the mitigation program as successful.

Following receipt of the final annual report(s), the City and Wildlife Agencies shall conduct a site visit to the mitigation sites in order to approve completion of the mitigation effort. The vernal pool mitigation requirements shall be deemed complete once the final success criteria are met and after written approval by the City DSD/MMC, Park and Recreation Open Space, MSCP and Wildlife Agencies has been received.

10.0 References Cited

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ATTACHMENTS

ATTACHMENT 1

Re-initiation of Biological Opinion on the Shaw Lorenz Project (Corps File No. 2004009966-KJC), City of San Diego, San Diego County, California
(Formerly known as 1-6-06-F-4005R1)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92011

In Reply Refer To:
FWS-SD-08B0023/08F0016R001

NOV 5 2007

Colonel Thomas Magness IV
District Engineer
Los Angeles District
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

Attention: Kari Coler, San Diego Field Office, Regulatory Branch

Subject: Re-initiation of Biological Opinion on the Shaw Lorenz Project (Corps File No. 200400996-KJC), City of San Diego, San Diego County, California (Formerly known as 1-6-06-F-4005R1)

Dear Colonel Magness:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion on the proposed Shaw Lorenz project, which is located in the City of San Diego in San Diego County, California. The original opinion, dated May 3, 2006, addressed the effects of the project on the federally endangered San Diego fairy shrimp (*Branchinecta sandiegonenis*), coastal California gnatcatcher (*Polioptila californica californica*), and Del Mar manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia*) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). It was subsequently modified in a letter dated August 25, 2006. On October 13, 2006, the District Court in *Southwest Center for Biological Diversity v. Bartel,* No. CV-98-CV-2234 (S.D. Cal.. 2006), enjoined the City of San Diego's (City) Incidental Take Permit as applied to the San Diego fairy shrimp and six other vernal pool species issued by us in July 1997. The District Court's decision constitutes new information that reveals effects of the action that may affect listed species in a manner or to an extent not previously considered, thus triggering the need for re-inititation.

Your request for re-initiation of formal consultation dated March 28, 2007, was received on March 29, 2007. This biological opinion is based on information provided in the following: (1) your request for re-initiation dated March 28, 2007; (2) a revised Biological Assessment prepared by Natural Resource Consultants dated March 12, 2007; (3) a revised project description dated July 14, 2007; (4) the administrative record for the original biological opinion; (5) the Recovery Plan for Vernal Pools of Southern California; and (6) documents identified in the *Literature Cited* section of this document and/or in our files. A complete administrative record of this consultation is on file at the Carlsbad Fish and Wildlife Office.

The Applicant is not relying on coverage for the San Diego fairy shrimp or other vernal pool species provided under the City of San Diego's incidental take permit and related MSCP subarea plan. The impacts of this project on the San Diego fairy shrimp is reviewed by the Service independently and without regard to the provisions of the City's MSCP subarea plan or the Service's biological opinion under Section 7 regarding the City's MSCP subarea plan and associated incidental take permit. Nothing herein shall be considered a modification of the terms and conditions of approval by the City or any other governmental agency.

CONSULTATION HISTORY

The Consultation History from the original biological opinion is incorporated by reference. Since issuance of that opinion, the following events have occurred.

May 3, 2006
The Service issued the original Biological Opinion to the Corps.

August 25, 2006
The Service issued a letter to the Corps clarifying the Service's Biological Opinion.

September 1, 2006
Final Shaw-Lorenz Vernal Pool Restoration and Enhancement Plan provided to the Service.

September 5, 2006
Letter from the Service to RECON approving the Final Shaw-Lorenz Vernal Pool Restoration and Enhancement Plan.

October 13, 2006
Decision and Injunction Order issued by Judge Brewster in *Southwest Center for Biological Diversity v. Bartel.*

December 18, 2006
The Service issued a letter to the City regarding our interpretation of the Brewster decision and how it relates to biological opinions, including Shaw Lorenz.

March 29, 2007
The Service received a request for re-initiation from both the applicant and the Corps. Included in the request was an updated Biological Assessment.

May 1, 2007
The Service (California Nevada Operations Office and Carlsbad Field office staff), participated in a meeting with representatives from Pardee, the Conservation Fund, and Harvey Whittemore to discuss the re-initiation.

May 17, 2007
Ms. Susan Wynn of the Service and Ms. Amy Glad and Mr. Allen Kashani, of Pardee, walked the project site. Pardee provided a copy of an updated restoration plan.

May 18, 2007
Ms. Therese O'Rourke and Ms. Susan Wynn, of the Service, met with Ms. Amy Glad and Mr. Harvey Whittemore to discuss potential changes to the project description that would increase the level of conservation on-site.

June 20, 2007
Ms. Susan Wynn of the Service and Mr. David Hogan of Center for Biological Diversity, met with Harvey Whittemore to discuss potential changes to the project description.

July 25, 2007
The Service received an email transmitting a new project description that reflects the discussions of the previous two meetings.

September 17, 2007
The Service met with Ms. Amy Glad and Mr. Harvey Whittemore regarding the Project description, likely terms and conditions and the timeline for issuing the draft biological opinion.

September 21, 2007
The Service issued a draft re-initiated Biological Opinion.

October 5, 2007
The Service received comments from the Corps and the applicant on our draft Biological Opinion.

BIOLOGICAL OPINION

1.0 DESCRIPTION OF THE PROPOSED ACTION

The proposed action is the issuance of a permit by the Corps to the project proponent (Pardee Homes, its successors or assigns) under section 404 of the Clean Water Act to impact 0.248 acre of waters of the United States, including impacts to 0.012 acre of wetlands, associated with six unnamed drainage courses for the Shaw Lorenz project. The Shaw Lorenz project is located within the Del Mar Mesa Subarea (Subarea V) of the Future Urbanizing Area (FUA) in the City of San Diego. The 278-acre property is located at the southern terminus of Shaw Ridge Road in a developing residential area (Figure 1). The proposed project will impact approximately 125.3 acres for approximately 139 single-family homes, associated public and private interior streets and drives, landscaping, and a network of internal trails leading to multi-use trails along public rights-of-way. Approximately 118.3 acres will be dedicated into the City's Multiple Habitat Planning Area (MHPA). The remaining approximate 30 acres consists of natural open space that will be provided within an Urban Amenity[1] and lots (totaling 11.21 acres) that preserve existing vernal pools.

The project area is comprised of a variety of topographic features that include well-defined drainages, valleys, mesa top, canyons and steep slopes. Vegetation on the property consists of the following: native grassland (0.28 acre); scrub oak chaparral (9.78 acres); coastal sage scrub (150.79 acres); chaparral (104.22 acres); non-native annual grassland (3.28 acres); ruderal/disturbed/eucalyptus (8.81 acres); and, mulefat scrub/marsh/pond/depressional features (1.00 acre).

Fifty-six depressional features [totaling 8482 square foot (0.19 acre) basin] have been mapped on the property based on one or more following factors: the presence of ponding; presence of vernal pool indicator plants; occurrence within historic vernal pool complex; and, the presence of or potential to support the listed San Diego fairy shrimp. Table 1 lists the 56 depressional features. Twenty-three of the 52 depressional features identified in Glenn Lukos Associates (2005b) contain at least one vernal pool indicator plant species.

Dry season sampling in 18 depressional features affected by the project identified *Branchinecta* cysts in 15 of the 18 depressional features sampled (Glen Lukos Associates 2005a). Cysts from 13 of these depressional features (hydration of the cysts from the other two depressional features with cysts were not conducted because these two depressional features each had only cyst fragments or one cyst) were hydrated, hatched and the resulting fairy shrimp were reared so they could be identified to species. Although Tony Bomkamp opportunistically observed common

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[1] Urban amenity, as defined by the *Del Mar Mesa Specific Plan* (City 2000), is open space intended to provide alternative habitats and movement corridors for wildlife and visual relief from adjacent development.

Figure 1. Project Location

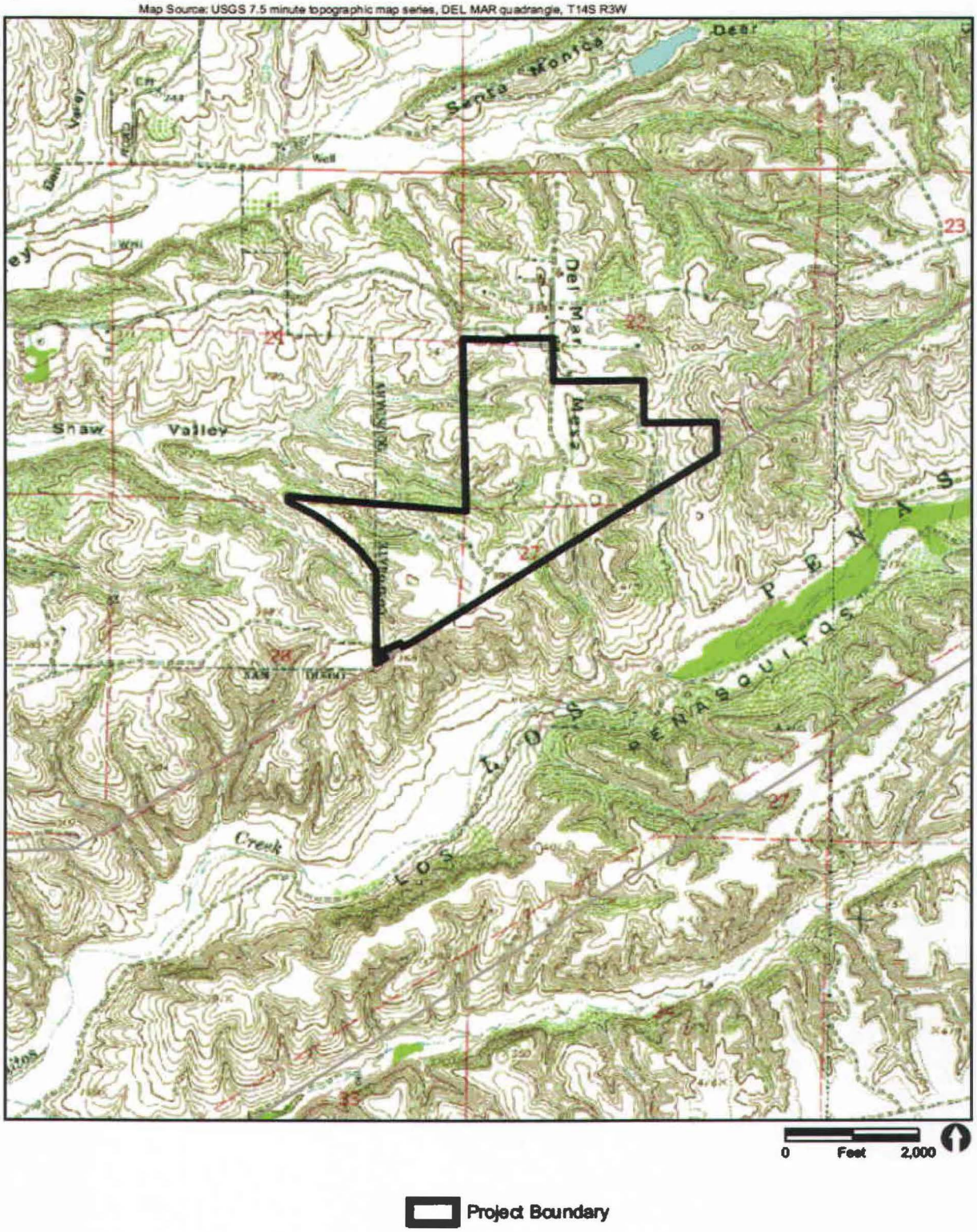


Table 1. Depression Feature Summary Table

Feature	Description	Basin Area All Depressions (Square Feet)	Basin to be Impacted	Area of Basins to be Impacted (Square Feet)	Area of Basins to be Conserved (Square Feet)
A	Ditch	195	No	Avoided	195
B	Road Rut	120	No	Avoided	120
C	Road Rut	195	No	Avoided	195
D	Ditch	195	No	Avoided	195
E	Road Rut	360	No	Avoided	360
F	Ditch	160	No	Avoided	160
G	Road Rut	50	No	Avoided	50
H	Road Rut	50	No	Avoided	50
I	Road Rut	50	No	Avoided	50
J	Road Rut	50	No	Avoided	50
K	Road Rut	600	No	Avoided	600
L	Disturbed Depression	180	No	Avoided	180
M	Disturbed Depression	100	No	Avoided	100
N	Disturbed Depression	100	No	Avoided	100
O	Road Rut	150	No	Avoided	150
P	Depression	300	No	Avoided	300
Q	Depression	160	No	Avoided	160
R	Depression	100	No	Avoided	100
S	Road Rut	60	No	Avoided	60
T	Ditch	50	No	Avoided	50
U	Road Rut	45	No	Avoided	45
V	Road Rut	560	No	Avoided	560
W	Road Rut	90	No	Avoided	90
X	Road Rut	96	No	Avoided	96
Y	Road Rut	225	No	Avoided	225
Z	Road Rut	400	No	Avoided	400
AA	Road Rut	240	No	Avoided	240
BB	Road Rut	120	No	Avoided	120
CC	Road Rut	72	No	Avoided	72
DD	Road Rut	54	No	Avoided	54
EE	Road Rut	180	No	Avoided	180
FF	Road Rut	48	No	Avoided	48
GG	Road Rut	72	No	Avoided	72
HH	Road Rut	40	No	Avoided	40

Feature	Description	Basin Area All Depressions (Square Feet)	Basin to be Impacted	Area of Basins to be Impacted (Square Feet)	Area of Basins to be Conserved (Square Feet)
II[2]	Disturbed Depression	460	No	Avoided	460
JJ	Road Rut	80	**Yes**	80	Impacted
KK	Ditch	45	**Yes**	45	Impacted
LL	Trail Rut	15	No	Avoided	15
MM	Road Rut	25	No	Avoided	25
NN	Road Rut	70	**Yes**	70	Impacted
OO	Road Rut	40	**Yes**	40	Impacted
PP	Ditch	115	**Yes**	115	Impacted
QQ	Road Rut	615	**Yes**	615	Impacted
RR	Road Rut	185	**Yes**	185	Impacted
SS	Road Rut	40	**Yes**	40	Impacted
TT	Road Rut	165	**Yes**	165	Impacted
UU	Road Rut	30	**Yes**	30	Impacted
VV	Road Rut	40	**Yes**	40	Impacted
WW	Road Rut	60	**Yes**	60	Impacted
XX	Road Rut	30	**Yes**	30	Impacted
YY	Road Rut	410	**Yes**	410	Impacted
ZZ	Road Rut	165	**Yes**	165	Impacted
Corps 1	Ditch	100	**Yes**	100	Impacted
Corps 2	Ag Road Depression	200	**Yes**	200	Impacted
Corps 3	Ag Road Depression	100	**Yes**	100	Impacted
Corps 4	Ag Road Depression	25	**Yes**	25	Impacted

Total area of depression features (56) = 8,482 square feet (0.194 acre)
Area of features to be impacted (19) = 2,515 square feet (0.057 acre)
Area of features to be conserved (37) = 5,967 square feet (0.137 acre)

[2] The project will avoid the basin of Feature II, but will impact approximately 18 percent of the watershed for Feature II.

fairy shrimp (*Branchinecta lindahli*) in two depressional features during the 2003 wet-season (Wegscheider 2003), the hydration study did not detect *B. lindahli* in 13 of the depressional features tested (Glen Lukos Associates 2005a). However, the hydration study found San Diego fairy shrimp in all 13 of the depressional features tested. Therefore, we conclude that San Diego fairy shrimp are likely to occur in all 56 depressional features on site.

The action area is defined as the entire project site, including all areas subject to direct and indirect effects of the project. Areas subject to direct effects include all areas within the construction footprint such as construction vehicle access routes, staging areas, grading areas, building pads, trails, roadways, and other constructed project features. Indirect effects include physical impacts to the watersheds of vernal pools, degradation of adjoining habitat through edge effects, habitat isolation, and fragmentation. The proposed project will directly impact the following vegetation communities: native grassland (0.24 acre); scrub oak chaparral (0.59 acre); coastal sage scrub (86.78 acres); chaparral (31.98 acres); annual non-native grassland (1.63 acres); and, ruderal/disturbed/eucalyptus (4.1 acres). In addition, fill will be placed in the following: six Corps jurisdictional drainages (Drainages A, B, C, E, F, and G totaling 0.25 acre of waters of the United States that contain 0.012 acre of jurisdictional wetlands); 19 depressional features (totaling 2515 square feet of basin area, 0.06 acre), and the watershed of 1 depressional feature. Though the project proposes to avoid direct impacts to the remaining 37 depressional features (the "Conserved Areas") (totaling 5967 square feet; 0.14 acre) and their watersheds on site, it is expected to cause indirect impacts, often referred to as "edge effects," to these depressional features because it will surround all or a major portion of each depressional features.

1.1 CONSERVATION MEASURES

The following conservation measures are proposed to be implemented as part of the proposed action to avoid, minimize, and compensate for direct and indirect impacts to depressional features.

1. The project will preserve the Conserved Areas, their watersheds, and the species they currently support, including all vernal pools on site. These 36 depressional features total 5507 square feet (0.13 acre) of basin area and are located in lots 127, 128, J, P, 0, X, WW, XX, YY, and ZZ (Figure 2). The project also will preserve the basin area, but not the entire watershed, of depressional feature II (460 square feet; 0.01 acre) located in lot N.

2. In addition to lot WW, the project will also preserve Lots 126, 127 and 128 (collectively referred to as the "Mitigation Site") (Figure 3) to minimize edge effects to the depressional features in Lot WW and allow for potential restoration and/or enhancement of additional depressional features. The Project Proponent shall construct the road section adjacent to the Mitigation Site in the manner as described on Figure 4 to minimize the amount of grade change and construction that will occur on lots 126, 127 and 128 in order to favor the natural hydrological regime for the Mitigation Site.

Figure 2. Conserved Areas

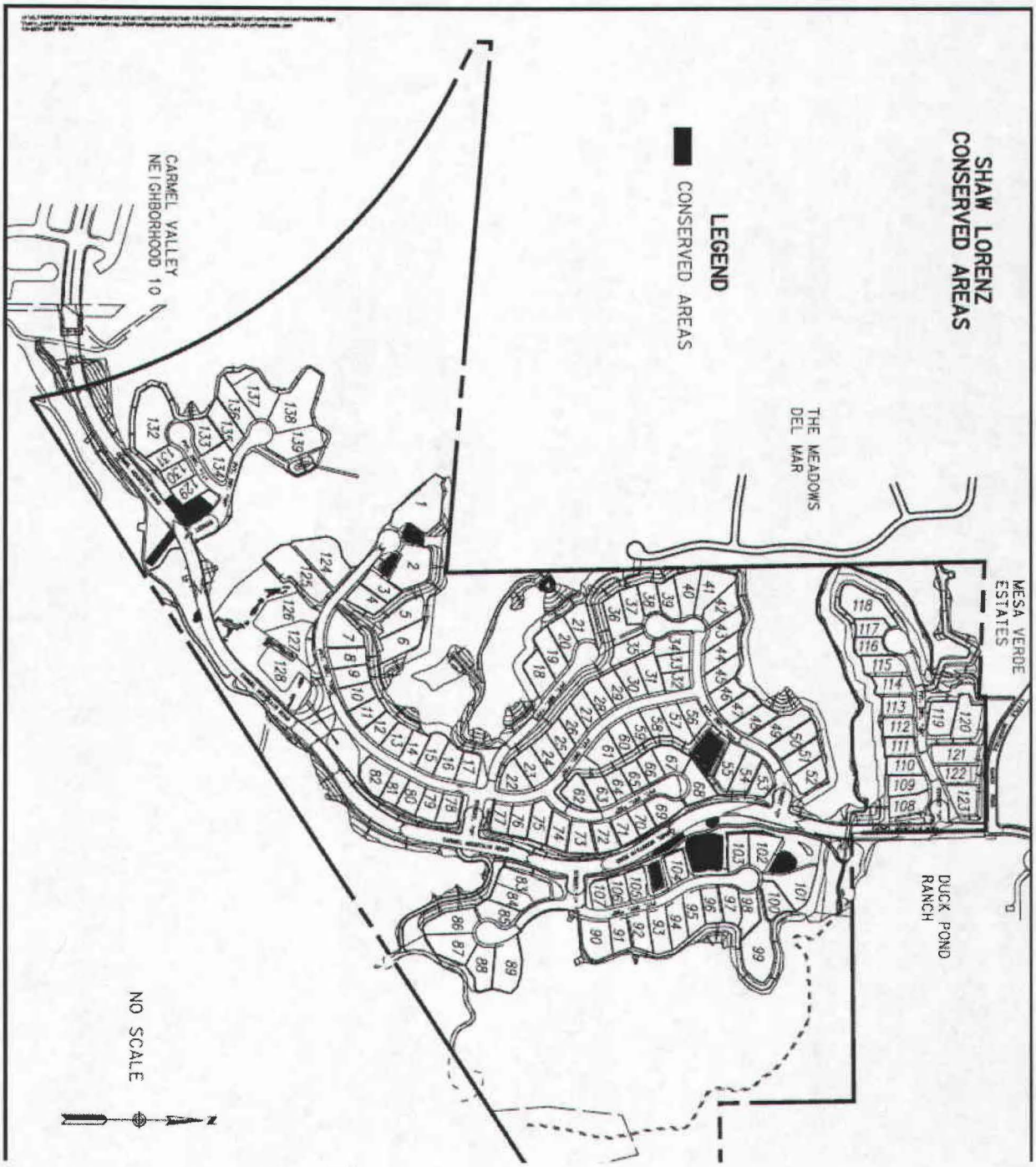
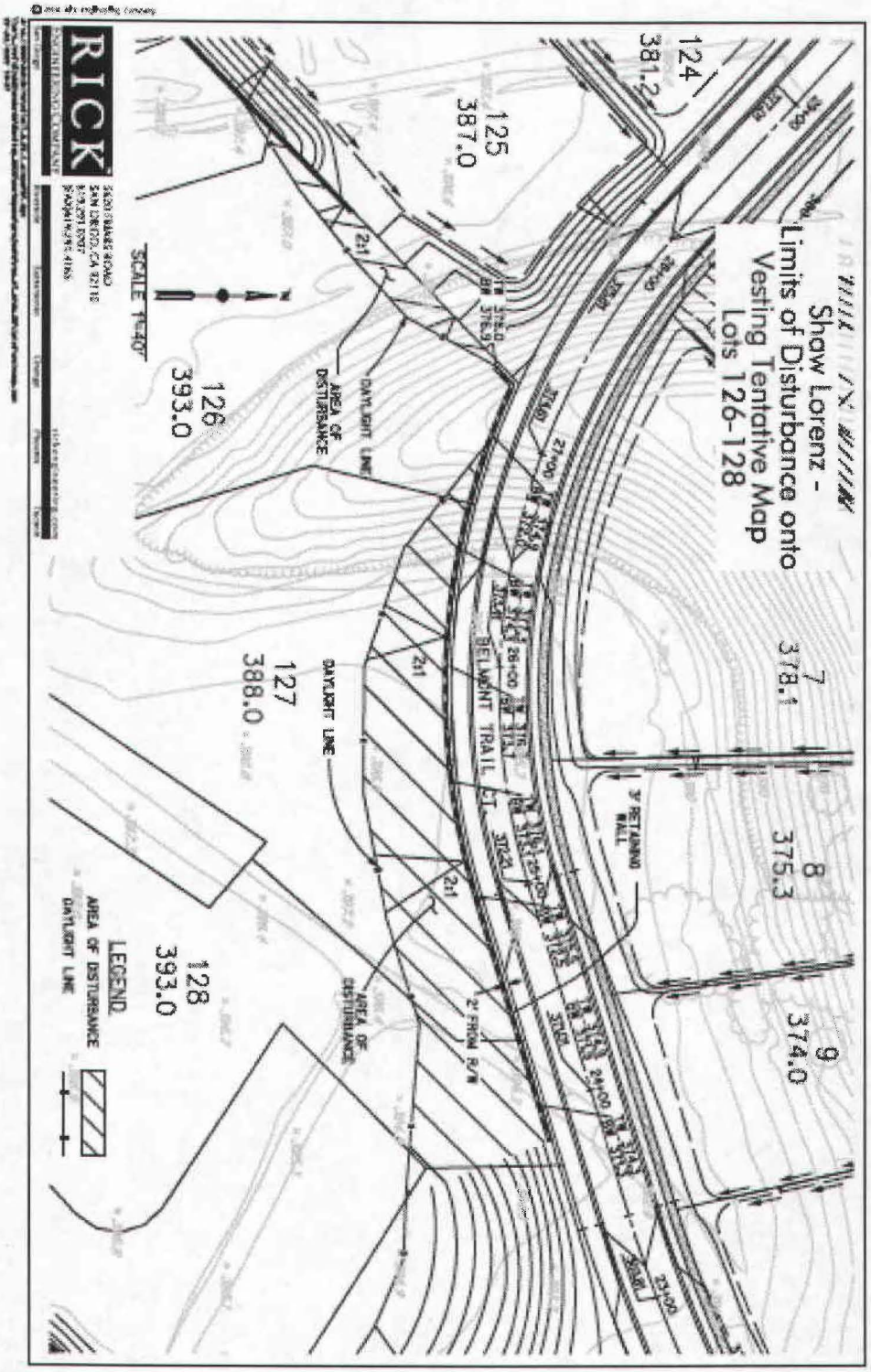


Figure 3. Mitigation Site

Figure 4. Road Adjacent to Mitigation Site



a. The project proponent agrees, subject to consent or approval by the Service and the City of San Diego (City), to transfer by appropriate conveyance Lots 126 and 127 (the Lots) as shown on the Vesting Tentative Map and Grading Plan within the Del Mar Mesa (Subarea V) Number 25674 (the Project) to The Conservation Fund (TCF).

b. If the City or other relevant governmental authority objects to, fails to consent to such transfer, or finds that such transfer of the Lots is a modification of the permits allowing the construction of approximately 139 single family structures, such that the project proponent would be required to submit or resubmit for approval of a new or different vesting tentative map for the Project, then the project proponent agrees to burden the Lots with a conservation easement in favor of TCF, prohibiting the construction of single family structures on the Lots (the Conservation Easement).

c. If the modifications outlined in Paragraphs 2a or 2b (and therefore the funding mechanism set forth herein) are not accepted by the City, the project proponent agrees to sell or donate to TCF Lots 126 and 127 subject to the Conservation Easement at no cost. TCF shall agree as part of the purchase agreement to cause the restoration and management of the Lots pursuant to the terms of the Plan.

3. The project proponent agrees to create, with TCF, an enforceable funding mechanism (EFM) in a form acceptable to the Service to restore and enhance the Mitigation Site. Such EFM will be separate from and in addition to any funding mechanism created by the project proponent as part of the Covenants, Codes, Restrictions, and Easements (CC&Rs) for the project. The amount of the initial funding of the EFM shall be approved by the Service as part of the Vernal Pool Restoration and Enhancement Plan, and long-term maintenance for such Mitigation Site shall be established through the use of a Property Analysis Record (PAR) (Center for Natural Lands Management ©1998), equivalent cost analysis, or such other mechanism acceptable to the Service. The project proponent shall be obligated to fully fund the costs as established by such mechanism, not less than annually. The project proponent shall make such payments to a restricted account controlled by TCF. It is the intent of the project proponent to restore and enhance two distinct areas: the Mitigation Site through the funding mechanism described herein without HOA involvement and the Conserved Areas with minimal involvement of the HOA.

a. In addition to the cost of the restoration and the long-term maintenance, the project proponent agrees to provide $500,000 (the Fund) over a period of years acceptable to the Service, to TCF for use in a manner directed by the Service for vernal pool restoration and enhancement of the Property pursuant to the Plan. This money will be available to fund remediation measures that may be necessary on-site. To the extent that the Service determines that such efforts on the Property are unsuccessful or fail to achieve the goals of the Plan, the Service may direct the remainder of the Fund to be used on locations not on the Property, or as may be provided by separate agreement

between the project proponent and the Service. In all events, the Fund must be used to support the San Diego fairy shrimp and vernal flora characteristic of San Diego fairy shrimp in the San Diego area.

b. The project proponent agrees to cause the HOA while it is under the control of Pardee Homes to require that the company selected to provide the long-term maintenance and management of the Conserved Areas and Mitigation Site be the company that provides similar services for the HOA throughout the project.

4. The project proponent will engage a qualified biological consulting firm (qualified biologist that holds a recovery permit for SDFS through the Service), to begin the process of planning a vernal pool preserve restoration and enhancement area within Lots 126, 127, 128 and WW. The project proponent will submit the Vernal Pool Restoration and Enhancement Plan (Plan) to the Service, for approval, at least 60 days prior to initiating project impacts. A minimum of 2 square feet will be enhanced/restored for every 1 square foot lost for a minimum restoration of 0.12 acre of surface ponding area of vernal pool habitat suitable for, and occupied by, the San Diego fairy shrimp. Additional surface area may be restored, as appropriate in Lots WW and 126, 127, and 128 to ensure that the minimum acreage requirement is met. The Plan will include the following measures:

a. Implementation of the final plan will be conducted under the direction of a qualified biologist (vernal pool restoration specialist), to be approved by the Service. The biologist will have at least three years of vernal pool restoration experience and hold a valid Service ESA Section 10(a)(1)(A) permit for identifying fairy shrimp.

b. All pools to be avoided and their watersheds will be enhanced as appropriate to achieve the same success criteria as the restored pools and surrounding uplands at the levels set forth herein. Enhancement activities will include addition of vernal pool plant species, inoculation of unoccupied pools with San Diego fairy shrimp as appropriate, and addition of coastal sage scrub plant species in the surrounding uplands. Any vernal pool inoculum or plant material from an off-site source must be approved by the Service.

c. All restoration/enhancement activities will commence in the first summer-fall season possible, preferably prior to the first grading period, or concurrently.

d. All final specifications and topographic-based grading, planting and watering plans will have 0.5-foot contours and show typical cross-sections for the vernal pools, watersheds and surrounding uplands (including adjacent mima mounds) at the restoration/enhancement sites. The grading plans will also show overflow pathways that hydrologically connect the restored pools in a way that mimics natural vernal pool complex topography/hydrology, as possible.

e. Additional inoculum from Service approved off-site donor vernal pools in the Del Mar Mesa area may be use to supplement the inoculum collected on site. The final plan will identify any proposed off-site donor pools and include documentation acceptable to the Service that they are free of versatile fairy shrimp (*Branchinecta lindahli*). No more than 10 percent of the basin area of any donor pool will be used for collection of inoculum.

f. Inoculum and planting will not be installed until the Service has approved the habitat restoration site grading. All planting will be installed in a way that mimics natural plant distribution, and not in rows. Inoculum will not be introduced into the restored pools until after they have been demonstrated to retain water for the appropriate amount of time to support San Diego fairy shrimp as determined by the project biologist (as defined below) [See for example (Hathaway and Simovich 1996, Ripley et. al. 2004)]. Surveys shall be completed as soon as possible after appropriate rain events for versatile fairy shrimp (*Branchinecta lindahli*) to the satisfaction of the Service. If versatile fairy shrimp are detected in the restored pools, inoculum will not be introduced until measures approved by the Service are implemented to attempt to remove the versatile fairy shrimp from the pools, but such removal and introduction shall not preclude other project activity on site. Inoculum will be placed in a manner that preserves, to the maximum extent possible, the orientation of the fairy shrimp cysts within the surface layer of soil (e.g., collected inoculum will be shallowly distributed within the pond so that cysts have the potential to be brought into solution upon inundation);

g. Plant palettes (species, size and number/acre) and seed mix (species and pounds/acre) will be included in the restoration/enhancement plan. The plant palette will include native species specifically associated with the on-site habitat type(s). If native plant species (no cultivars) cannot be obtained within Del Mar Mesa, the Service must approve the donor site. The source and proof of local origin of all plant material and seed will be provided;

h. Native plants and animals will be established within the restored/enhanced pools, their watersheds and surrounding uplands. This can be accomplished by redistributing topsoil containing seeds, spores, bulbs, eggs, and other propagules from affected pools and adjacent vernal pool and upland habitats; by the translocation of propagules of individual species from off-site habitats; and by the use of commercially available native plant species; any vernal pool inoculum or plant material from an off-site source must be approved by the Service. Topsoil and plant materials from the native habitats to be affected on-site will be applied to the watersheds of the enhanced and restored pools to the maximum extent practicable. Exotic weed control will be implemented within the restoration areas to protect and enhance habitat remaining on-site;

i. Any artificial watering of the restored/enhanced pool watersheds will be done in a manner that prevents water from entering into the pools. Any water to be used will be identified and documented to be free of contaminants that could harm the pools;

j. All weeding within and immediately adjacent to the restored/enhanced pools will be performed by hand. No herbicide will be used within or adjacent to the restored and preserved vernal pools. Herbicide may be used in the uplands adjacent to pools only as approved by the Service. All workers conducting weed removal activities will be educated to distinguish between native and non-native species so that local native plants are not inadvertently killed by weed removal activities;

k. A final implementation schedule that indicates when all vernal/road pool impacts, as well as vernal pool restoration/enhancement grading and planting will begin and end. Any temporal loss of vernal and/or road pools or upland habitat caused by delays in restoration will be mitigated through habitat preservation and/or restoration at a 0.5:1 ratio for every 6 months of delay (i.e., 1:1 for 12 months delay, 1.5:1 for 18 months delay, etc.). In the event that the project proponent is wholly or partly prevented from performing obligations under the final plans (causing temporal losses as a result of delays) because of unforeseeable circumstances or causes beyond reasonable control, and without the fault or negligence of the project proponent, the project proponent will be excused by such unforeseeable cause(s).

l. At least 0.12 acre of the restored vernal pools will support San Diego fairy shrimp. Restoration success for San Diego fairy shrimp will be determined by measuring the ponding of water, and density of viable cysts, hatched fairy shrimp, and gravid females within the restored pools. Water measurements shall be taken in the restored pools to determine the depth, duration and quality (e.g., pH, temperature, total dissolved solids, and salinity) of ponding. Dry samples shall be taken in the restored pools to determine the density of viable cysts in the soils. Wet samples shall also be taken in the restored pools to determine the density of hatched fairy shrimp and gravid females. The pools must pond for a period of time similarly to reference vernal pools during an average rainfall year and at an appropriate depth and quality to support fairy shrimp. The average viable cyst, hatched fairy shrimp, and gravid female density of the restored pools must not differ significantly ($p < 0.05$) from reference pools for, at least, three wet seasons before a determination of success can be made. Vernal pools selected as reference or control pools for evaluating restoration success shall be identified and described in the restoration plan. Alternate methods of determining success may be used upon approval by the Service.

m. Five years of success criteria for upland restoration/enhancement areas will include: the appropriate[3] species richness and cover criteria for all five years of monitoring; 0

[3] Appropriate vegetation may include maritime succulent scrub or coastal sage scrub. It should match the adjacent

percent cover for weed species categorized as High or Moderate in the Cal-IPC Invasive Plant Inventory and relative cover of all other weed species is no more than 5 percent coverage for other exotic/weed species for all five years of the five-year monitoring period. Container plant survival will be 80 percent of the initial plantings for the first five years. At the first and second anniversary of plant installation, all dead plants will be replaced unless their function has been replaced by natural recruitment.

n. The five-year monitoring program for coastal sage scrub restoration will include yearly quantitative monitoring of species richness and vegetative cover. The method used for monitoring will be described and a map of proposed sampling locations will be included. Stratified-random sampling will be used for all quantitative surveys.

o. Verification that restoration/enhancement of San Diego fairy shrimp habitat is complete will require written sign-off by the Service. If a performance criterion is not met for any of the restored/enhanced vernal pools or upland habitat in any year, or if the final success criteria are not met, the project proponent will prepare an analysis of the cause(s) of failure and, if deemed necessary by the Service, propose remedial actions for approval. If any of the restored/enhanced vernal pools or upland habitat have not met a performance criterion during the initial five-year period, the project proponent's maintenance and monitoring obligations will continue until the Service deems the restoration/enhancement successful, or contingency measures must be implemented. Restoration/enhancement will not be deemed successful until at least two years after any significant contingency measures are implemented, as determined by the Service.

p. If success criteria are not met within the eight years following implementation of the Plan, the project proponent will pursue restoration offsite at a location within the H series [e.g., Del Mar Mesa/Carmel Mountain, on Carmel Mountain where the project proponent has vernal pool mitigation opportunities per their development agreement with the City of San Diego for Pacific Highlands Ranch Subarea III, North City Future Urbanizing Area (dated September 8, 1998)] approved by the City and the Service or elsewhere, if approved by the Service. Appropriate upland habitat, topography, vernal pools, and their watersheds in the vernal pool restoration and enhancement areas shall be restored/enhanced to a species composition and size compared to other vernal pools within the H series. The size and shape of the depressional features shall be suggested by the restoration biologist and approved by Service.

q. Annual reports will be submitted to the Service by September 1 of each year of the 5 year monitoring program. Those reports will assess both the attainment of yearly

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habitat types .

success criteria and progress toward the final success criteria. The reports will also summarize the project's compliance with all Service biological opinion conservation measures and terms and conditions.

5. The project proponent will hire a qualified biologist (project biologist) with a minimum 3 years of vernal pool experience who will be responsible for overseeing compliance with protective measures for the fairy shrimp and will be approved by the Service. The biologist will monitor construction daily to ensure damage to preserved depressional features, their watersheds and surrounding uplands is avoided. The biologist shall be onsite during installation of protective fencing for fairy shrimp habitat and work adjacent to depressional features (within at least 100 feet of the lots to be preserved) to ensure compliance with all conservation measures and terms and conditions of this Biological Opinion and to produce reports that document compliance with these measures. The project proponent will submit the biologist's name, address, telephone number, and work schedule on the project to the Service at least 7 days prior to the planned date of initiating impacts to fairy shrimp habitat. The project biologist shall perform the following duties:

   a. Train all supervisors, (sub) contractors, construction personnel, and employees on the biological resources associated with this project and ensure that training is implemented by all construction personnel prior to working on the proposed project. At a minimum, training will include: 1) the purpose for resource protection; 2) a description of the San Diego fairy shrimp, its habitat(s) and general ecology, and sensitivity to human activities; 3) the conservation measures and terms and conditions given in the biological opinion that should be implemented during project construction to conserve their habitat and promote their persistence/survival within the project area, including strictly limiting activities, vehicles, equipment, and construction materials to the fenced project footprint (i.e., avoided areas delineated on maps or on the project site by fencing); 4) environmentally responsible construction practices as outlined in above; 5) the protocol to resolve conflicts that may arise at any time during the construction process; 6) the general provisions of the Act, the need to adhere to the provisions of the Act, and the penalties associated with violating the Act. Included in this program will be a fact sheet that includes color photographs of the listed species, which will be shown to the employees. Following the education program, the fact sheet will be posted in the contractor and Resident Engineer's office, where they will remain through the duration of the Project.

   b. Allow and direct salvage and transplant of live plants to the revegetation areas as practicable.

   c. Inspect the fencing and erosion control measures within or up-slope of lots with preserved depressional features and other preservation areas a minimum of once per week and after all rain events to ensure that any breaks in the fence or erosion control measures are repaired immediately.

d. Periodically monitor the work area to ensure that work activities do not generate excessive amounts of dust.

e. Halt work, if necessary, and confer with the Service and Corps to ensure the proper implementation of species and habitat protection measures. The biologist will report any violation to the Service and the Corps within 24 hours of its occurrence.

f. Submit a final report to the Service and the Corps within 60 days of project completion that includes: as-built construction drawings with an overlay of fairy shrimp pools that were impacted or preserved; photographs of the preserved San Diego fairy shrimp pools; and, other relevant information documenting that authorized impacts to habitat for fairy shrimp were not exceeded and that general compliance with all conditions of this Opinion was achieved.

6. The project proponent shall ensure that development landscaping does not include exotic plant species that may be invasive to native habitats. Exotic plant species not to be used include those species listed on Lists A & B of the California Invasive Plant Council's (Cal-IPC) list of "Exotic Pest Plants of Greatest Ecological Concern in California as of October 1999." This list includes such species as pepper trees, pampas grass, fountain grass, ice plant, myoporum, black locust, capeweed, tree of heaven, periwinkle, sweet alyssum, English ivy, French broom, Scotch broom, and Spanish broom. A copy of the complete list can be obtained from Cal-IPC's web site at http://www.caleppc.org. In addition, landscaping should not use plants that require intensive irrigation, fertilizers, or pesticides adjacent to preserve areas. The project proponent shall submit a draft list of species to be included in the landscaping to the Service at least 60 days prior to installing any landscaping.

7. Before construction of the Shaw Lorenz project commences in those areas where topsoil collection will occur, topsoil will be salvaged from the impacted vernal/road pools on site. Vernal pool soil (inoculum) will be collected when dry to avoid damaging or destroying fairy shrimp cysts. Hand tools (i.e., shovels and trowels) will be used to remove the first two inches of soil from the pools. Whenever possible, the trowel will be used to pry up intact chunks of soil, rather than loosening the soil by raking and shoveling which can damage the cysts. The soil from each pool will be stored individually in labeled boxes that are adequately ventilated and kept out of direct sunlight in order to prevent the occurrence of fungus or excessive heating of the soil, and stored off-site at an appropriate facility for vernal pool inoculum. Inoculum from different source pools will not be mixed for seeding any restored pools. The collected soils will be spread out and raked into the bottoms of the restored pools. Topsoil and plant materials salvaged from the upland habitat areas to be impacted will be transplanted to, and/or used as a seed/cutting source for, the upland habitat restoration/creation areas to the maximum extent practicable as approved by the Service.

8. The project proponent will execute and record a biological conservation easement over the 11 vernal pool lots containing depressional features (i.e. Lots 126, 127, 128, B, J, N, O, P, X, WW, XX, YY, and ZZ) that will be avoided/preserved and restored/enhanced by the project. The easement shall be in favor of the City of San Diego or other grantee approved by the Agencies. The Service shall be named as a third party beneficiary. The easements on Lots J and X can acknowledge the option to be removed, with concurrence from the Service, provided a biologically superior alternative is developed consistent with City ordinances. If this were to occur, new development lots would be created between lots 55 and 56 (Lot 55A), between Lots 103 and 104 (Lot 103A) and between lots 104 and 105 (lot 104A). There should be no active trails in the easement areas except in Lots B and J if easement restrictions currently exist for those trails and as approved by the Service. The project proponent shall submit a draft easement to the Service, which includes exhibits of the proposed trail designs and locations, for review and approval at least 60 days prior to initiating project impacts, where depressional features exist. The project proponent shall receive prior written approval by the Service prior to execution and recordation of the conservation easement. The easement shall be approved by the Service prior to its execution. The project proponent shall submit the final easement and evidence of its recordation to the Agencies prior to the issuance of the first certificate of occupancy.

9. The project will conserve the Orcutt's brodiaea (*Brodiaea orcuttii*) which occurs within the proposed preserved areas.

10. Water runoff from landscaped areas will be directed away from the biological conservation easement areas (e.g., lots that contain preserved depressional features) and contained and/or treated within the development footprint. No permanent irrigation or water from irrigation systems will be permitted to enter lots that contain preserved depressional features (i.e., Lots 128, B, J, N, O, P, X, WW, XX, YY, and ZZ). Where depressional features to be preserved are located below graded slopes or walls, drainage swales and/or concrete ditches will be installed to prevent runoff from the slopes or walls from entering the depressional features and their watersheds. The project proponent will submit detailed figures to the Service depicting the proposed irrigation systems, slopes, drainage swales and/or concrete ditches utilized to avoid introduction of increased storm water run-off into the depressional features for review and approval prior to grading. The project proponent will conduct maintenance of the concrete ditch and graded swales annually prior to the rainy season (i.e., October 15), for the life-of-the-project and after each significant storm event to ensure that they are properly functioning in preventing runoff from entering the depressional features and their watersheds.

11. Grading activities adjacent to lots with preserved depressional features will be timed to avoid wet weather to minimize potential impacts (e.g., siltation) to the avoided pools unless the area to be graded is at an elevation below the lots. To achieve this goal,

grading within and adjacent to lots to be preserved shall comply with the following:

a. All depressional features to be preserved, and the lots within which they are located, will be flagged and surrounded with orange construction fencing prior to the beginning of grading. Fencing shall be installed in a manner that does not impact habitats to be avoided. All sensitive habitats to be avoided will be flagged and all construction personnel will be informed that they are "no-entry" areas for the duration of construction. If work occurs beyond the fenced limits of impact, all work shall cease until the problem has been remedied to the satisfaction of the Service. Any impacts to depressional features beyond the fenced limits will be offset at a minimum 5:1 ratio. Temporary construction fencing will be removed upon project completion.

b. Grading will occur only when the soil is dry to the touch both at the surface and one inch below. A visual check for color differences (i.e., darker soil indicating moisture) in the soil between the surface and one inch below indicates the soil is dry.

c. After a rain of greater than 0.2 inch, grading will occur only after the soil surface has dried sufficiently as described above, and no sooner than two days (48 hours) after the rain event ends.

d. To prevent erosion and siltation from storm water runoff due to unexpected rains, Best Management Practices (i.e., silt fences) will be implemented as needed during grading.

e. If rain occurs during grading, work will stop and resume only after soils are dry, as described above.

12. Grading will be done in a manner to prevent run-off from entering the preserved depressional features. Grading on the project site outside the MHPA is to be consistent with MSCP and thus not restricted on the basis of the gnatcatcher breeding season unless the grading negatively affects gnatcatchers located within the MHPA.

13. The project proponent shall install permanent protective fencing along any interface with developed areas (including trails) and/or use other measures approved by the Service to deter human and pet entrance into on-site habitat if feasible and within the approvals previously granted by the City. This fencing will be installed per phase as the development occurs. Entire development bubbles will be fenced, as phased, to ensure effectiveness of the fencing, prior to the occupancy of any homes in each phase. Different types of fencing will be used depending upon the location within the project. Post and rail will be used along public trails and walkways to guide people away from and around protected areas without calling undo attention to them. Post and rail fencing will be used on both sides of the public trail in Lot J to direct people away from the depressional features. Wrought iron or concrete block will be used along the backs of lots where

adjacent to open space to preserve views while protecting the depressions and other resources within the MHPA. Fencing should have no gates and be designed to prevent intrusion by pets. Signage for the biological conservation easement area shall be posted and maintained at conspicuous locations throughout the project site noting areas that are conserved to direct people away from such areas. The project proponent will ensure funding, above and beyond the funds dedicated to vernal pool management, restoration and enhancement to upgrade fencing to prevent human and pet encroachment in the habitat areas if the originally installed fencing is found to be ineffective at keeping people and pets out. Final plans for fencing and/or other preventative measures will be submitted to the Service within 60 days after initiating project impacts.

14. The project proponent shall ensure that the following conditions are implemented during project construction:

    a. Employees shall strictly limit their activities, vehicles, equipment, and construction materials to the fenced project footprint.

    b. The project site shall be kept as clean of debris as possible. All food related trash items shall be enclosed in sealed containers and regularly removed from the site.

    c. Pets of project personnel shall not be allowed on the project site.

    d. Disposal or temporary placement of excess fill, brush or other debris shall not be allowed in waters of the United States, their banks and/or any depression features or their watersheds.

    e. All equipment maintenance, staging, and dispensing of fuel, oil, coolant, or any other such activities shall occur in designated areas within the fenced project impact limits but outside of lots with preserved depressional features. These designated areas shall be located in previously compacted and disturbed areas to the maximum extent practicable in such a manner as to prevent any runoff from entering waters of the United States and depressional features, and shall be shown on the construction plans. Contractor equipment shall be checked for leaks prior to operation and repaired as necessary. "No-fueling zones" shall be designated on construction plans.

    f. Impacts from fugitive dust will be avoided and minimized through watering and other appropriate measures. However, no watering shall be permitted to enter watersheds of depressional features that are being conserved.

    g. There are a set of additional upland conservation measures required by the City and the MSCP which will be implemented.

15. The project proponent will ensure the long-term management of the Conserved Areas and

the Mitigation Site will occur in perpetuity. The project proponent will hire a qualified biological manager to prepare a long-term management and monitoring plan (Vernal Pool Management and Maintenance Program (VPMP)) and submit it to the Service for approval prior to impacts. The program shall include a PAR, or other similar cost estimation study, to determine the costs for long-term management of San Diego fairy shrimp habitat to identify the level of funding that is necessary to adequately preserve and manage the habitat in perpetuity. The project proponent shall provide adequate funding, as defined by the PAR or similar cost estimation study, to implement the VPMP. This could be through the establishment of a non-wasting endowment account (or other mechanism approved by the Agencies). Management activities will be funded by the project proponent. The expenditure of these funds will be at the direction of the Service. Any funds not expended in any given year will be set aside for use in future years for similar activities and will not diminish the annual obligation. Accounting for these carryover funds will be part of an annual report provided to the Service. These reports will also summarize the amount expended, carryover amount, and total amount in reserve for Conserved Areas. The HOA-obligated funds will be mandatory and the CC&Rs will not allow for the removal or the reduction of funds. The VPMP, will include, but is not limited to the following provisions:

a. No lighting will be installed within the lots with conserved depressional features. Any lighting adjacent to the conserved lots will be shielded and directed away from the lots.

b. Weeding in the lots with conserved depressional features will be conducted at least twice a year, generally in the spring, to remove new invasions of non-native species. Weeding will concentrate on bent grass and Italian ryegrass, although efforts will be made to remove new invasions of problematic species. Weeding will be done by hand or hoe using personnel trained to distinguish between native and week species. No herbicide will be permitted within these lots, unless prior approval is received from the Service.

c. A public information package will be given to all homebuyers, explaining the importance of the vernal pools and depressions and the need for avoidance. Information will be included to direct homeowners to avoid excessive irrigation, use native plants and shield lighting where they are adjacent to the Mitigation Site and Conserved Areas. These three requirements will also be included in the CC&R's for these particular lots.

d. Maintenance of the Mitigation Site and Conserved Areas will include removal of trash and repair of protective fencing, signage, and drainage ditches and swales intended to divert water away from certain depressional features.

e. No brush management will be conducted within the Mitigation Site and Conserved Areas that contain preserved depressional features with the exception of Lot O. However, brush management will not occur within the depressional feature (i.e., W) located within Lot O.

f. Monitoring will be conducted in perpetuity in accordance with a specific schedule. The monitoring schedule includes specific tasks to be done at specific intervals. The company performing the maintenance and monitoring must meet certain qualifications. The project proponent will insure that these qualifications are met when hiring the maintenance and monitoring company. An annual report to the City is required, with copies to the Service.

16. The project proponent will post a performance bond with CDFG or another qualified entity, with approval by the Service for grading, planting, and five years of maintenance and monitoring of the vernal pool and upland restoration/enhancement areas (including a 20 percent contingency to be added to the total cost). This bond is to guarantee the successful implementation of the vernal pool/upland restoration/enhancement. The project proponent will submit a draft bond with an itemized cost list to the Service and the holder of the bond for approval at least 60 days prior to initiating project impacts. The project proponent will submit the final bond for the amount approved by the Service and the holder of the bond within 30 days of receiving Service and the holder of the bond approval of the draft bond. .

17. To the extent that TCF is incapable in the judgment of the Service to perform the duties outlined herein, the Service may substitute another conservation entity similar in purpose to the TCF[4]. The Lots shall be restored and enhanced through implementation of the Vernal Pool Restoration and Enhancement Plan (Plan) (collectively the area to be restored and enhanced under the Plan is the Mitigation Site). If the Service determines that TCF, an alternative conservation entity, or the HOA is failing to perform any of the obligations imposed by these conditions or the Plan, the Service shall notify the project proponent and/or the HOA. The project proponent shall have sixty days to bring TCF, the alternative conservation entity, or the HOA's performance into compliance with these conditions and the Plan.

18. The project proponent shall use its best efforts to seek City approval of removing Lot WW/128 from control by the Homeowners Association (HOA) for management and restoration as described in Conservation Measure 3. In the event that the City declines this request, the HOA will be required to allow access by the project proponent or it agents to Lot WW/128 for restoration. Lots J, N, O, P, X, XX, YY, and ZZ shall be managed by the HOA pursuant to the terms of the Plan. The project proponent shall

[4] All references to TCF in this biological opinion include such other conservation organization as may be approved by the Service.

include in the Covenants, Codes, Restrictions and Easements for the Project that Lots J, N, O, P, X, XX, YY, and ZZ shall be managed. The request to the City for removal of Lot WW/128 from control of the HOA will be made after issuance of Section 404 permit and Section 401 certification for the Project.

19. The project proponent will phase the grading. Lots 1, 2, 3, 4, 5, 6, 7, 8, 9, 124, 125, and the associated access road shall be in the last phase of construction in order to allow the Service the opportunity to acquire funding for purchase of some of the more "desirable" lots.

2.0 STATUS OF THE SPECIES

2.1 San Diego Fairy Shrimp

2.1.1 *Listing Status*

The SD fairy shrimp was federally listed as endangered on February 3, 1997, (62 *Federal Register* 4925). The Recovery Plan for Vernal Pools of Southern California (Recovery Plan), which includes SD fairy shrimp, was published in September 1998 (Service 1998).

2.1.2 *Critical Habitat*

Critical habitat for the SD fairy shrimp was designated on October 23, 2000, (65 *Federal Register*: 63438). Critical habitat was remanded but not vacated by the Central District Court of California on June 12, 2002. Critical habitat was re-proposed on April 22, 2003, (68 *Federal Register* 19887). A new Final Critical Habitat designation is anticipated to be published by November 12, 2007. Primary constituent elements include: (1) small to large vernal pools with shallow to moderate depths that hold water for sufficient lengths of time necessary for SD fairy shrimp incubation and reproduction, but not necessarily every year; (2) associated watershed(s) and hydrology for vernal pool basins and their related vernal pool complexes; (3) ephemeral depressional wetlands; (4) flat or gently sloping topography; and (5) any soil type with a clay component and/or an impermeable surface or subsurface layer known to support vernal pool habitat. This projects falls outside the boundaries of the currently designated and proposed critical habitat, therefore, no analysis regarding the adverse modification of critical habitat will be done for this biological opinion.

2.1.3 *Species Description*

The SD fairy shrimp is a small freshwater crustacean in the family Branchinectidae of the Order Anostraca. The species was originally described by Fugate (1993) from samples collected on Del Mar Mesa, San Diego County. Male SD fairy shrimp are distinguished from males of other species of Branchinecta by differences found at the distal (located far from the point of attachment) tip of the second antennae. Females are distinguishable from females of other

species of Branchinecta by the shape and length of the brood sac, the length of the ovary, and by the presence of paired dorsolateral (located on the sides, toward the back) spines on five of the abdominal segments (Fugate 1993). Adult male SD fairy shrimp range in size form 0.35 to 0.63 in (9 to 16 mm) and adult females are 0.31 to 0.55 in (8 to 14 mm) long.

2.1.4 *Distribution*

The range of the SD fairy shrimp includes Orange and San Diego Counties in southern California, and northwestern Baja California, Mexico (Service 1998; Brown et al. 1993). In Baja California, SD fairy shrimp have been recorded at two localities: Valle de Palmas, south of Tecate and Baja Mar, north of Ensenada. A single isolated female was previously reported from vernal pools in Isla Vista, Santa Barbara County, California; however, directed surveys have not located any additional individuals (62 *Federal Register* 4925).

In Orange County, the SD fairy shrimp has been documented at Fairview Park (CNDDB occurrence #11, 1996), Newport Banning Ranch, North Ranch Policy Plan Area, and within the San Juan Creek watershed at Chiquita Ridge and Radio Tower Road (See Appendix A).

In San Diego County, the species occurs in vernal pools from Marine Corps Base Camp Pendleton, inland to Ramona and south through Del Mar Mesa, Proctor Valley, and Otay Mesa. A minimum of 246 pools on Marine Corps Base Camp Pendleton are known to be occupied by SD Fairy Shrimp (See Appendix A). Based on surveys of the 2,856 vernal pool basins currently mapped on Marine Corps Air Station Miramar, 1,303 are occupied by SD fairy shrimp (Miramar 2006). Of the 62 vernal pool complexes[5] mapped by The City of San Diego's Vernal Pool Inventory[6] (2002-2003), 29 were found to be occupied by SD fairy shrimp and occur at the following localities: Del Mar Mesa (1), Carmel Mountain (1), Mira Mesa (6), Nobel Drive (3), Kearny Mesa (3), Mission Trails Regional Park (1), and Otay Mesa (14).

Additional vernal pool complexes with occurrences of SD fairy shrimp located in San Diego County but not included in the City of San Diego's Inventory include: Carlsbad, San Marcos, Ramona, Poway, Santee, Rancho Santa Fe, Murphy Canyon, Otay Lakes, Imperial Beach, East Otay Mesa, Marron Valley, and Proctor Valley (CNDDB Occurrence # 27, 2001).

2.1.5 *Habitat Affinity*

San Diego fairy shrimp are restricted to vernal pools and vernal pool-like depressions (e.g., ruts

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[5] Vernal pool complexes are defined as a series of vernal pool groups that are hydrolocially connected with similar soil types and species compositions. They were first described and surveyed by Beauchamp and Cass 1979 and subsequently updated in 1986 (Bauder) and 1998 (Recovery Plan). The City of San Diego (2003) surveyed complexes within City boundaries and MCAS Miramar has surveys current through 2006 for approximately 70% of the Base.

[6] The City of San Diego conducted non-protocol surveys for San Diego fairy shrimp. Therefore this inventory may under-represent the true number of vernal pools with occurrences of San Diego fairy shrimp.

in dirt roads). Vernal pools are ephemeral wetlands that occur from southern Oregon through California into northern Baja California, Mexico (Service 1998). They require a unique combination of climatic, topographic, geologic, and evolutionary factors for their formation and persistence. They form in regions with Mediterranean climates where shallow depressions fill with water during fall and winter rains and then dry up when the water evaporates in the spring (Collie and Lathrop 1976; Holland 1976; Holland and Jain 1977, 1988).

Downward percolation of water within the pools is prevented by an impervious subsurface layer consisting of claypan, hardpan, or volcanic stratum (Holland 1976, Holland and Jain 1988). Seasonal inundation makes vernal pools too wet for adjacent upland plant species adapted to drier soil conditions, while rapid drying during late spring makes pool basins unsuitable for typical marsh or aquatic species that require a more persistent source of water. Local upland vegetation communities associated with vernal pools include needlegrass grassland, annual grassland, coastal sage scrub, maritime succulent scrub, and chaparral (USFWS 1998).

San Diego fairy shrimp tend to inhabit shallow, small vernal pools and vernal pool-like depressions that range in temperature from 10° to 26° Celsius. They are ecologically dependent on seasonal fluctuations in their habitat, such as absence or presence of water during specific times of the year, duration of inundation, and other environmental factors that likely include specific salinity, conductivity, dissolved solids, and pH levels (Gonzalez *et al.* 1996, Hathaway and Simovich 1996, and Holtz 2003)

2.1.6 *Life History*

San Diego fairy shrimp are non-selective particle feeding filter-feeders, or omnivores. Detritus, bacteria, algal cells, and other items between 0.3 to 100 microns may be filtered and ingested (Eriksen and Belk 1999). Adult fairy shrimp are usually observed from January to March; however, in years with early or late rainfall, the hatching period may be extended (65 *Federal Register* 63438). SD fairy shrimp, have a two-stage life cycle and spend the majority of their life cycle in the cyst stage (Templeton and Levin 1979, Schaal and Leverich 1981, Herzig 1985, Hairston and De Stasio 1988, Venable 1989). After hatching, SD fairy shrimp reach sexual maturity in about 7 to 17 days, depending on water temperature and persist for about 4 to 6 weeks (Hathaway and Simovich 1996). Fairy shrimp mate upon reaching maturity, and female SD fairy shrimp produce between 164 and 479 cysts (eggs) over their lifetime (Simovich and Hathaway 1997). The cysts are either dropped by the females to settle into the mud at the bottom of the pool, or they remain in the brood sac until the female dies and sinks to the bottom (Eriksen and Belk 1999). Fairy shrimp cysts may persist in the soil for several years until conditions are favorable for successful reproduction (Simovich and Hathaway 1997). The cysts will hatch in 3 to 5 days when water temperatures are between 10 and 20 degrees Celsius (Hathaway and Simovich 1996). Not all cysts are likely to hatch in a season, thus providing a mechanism for survival if water quality and ponding conditions are not favorable in a given year (Simovich and Hathaway 1997, Ripley et. al., 2004).

2.1.7 *Population Trend*

The loss of vernal pools that have the potential to support SD fairy shrimp has resulted in a range-wide reduction in diversity and abundance of SD fairy shrimp. Urban and water development, flood control, and highway and utility projects, as well as conversion of wild lands to agricultural use, have eliminated or degraded vernal pools and/or their watersheds in southern California (Jones and Stokes Associates 1987). Historically, vernal pools covered approximately 200 square miles of San Diego County (Bauder and McMillan 1998). Approximately 95 to 97 percent of vernal pools within San Diego County have been lost (Bauder 1986b, Bauder and McMillan 1998, Oberbauer 1990). Most of the remaining vernal pools in San Diego County occur on Redding soils, primarily on MCAS Miramar (Service 1998). It is assumed that an unknown quantity of vernal pools occupied with SD fairy shrimp has been lost in Mexico.

A listing, by Management Area[7], of the current conservation status of the known vernal pool complexes throughout the extant range of SD fairy shrimp is included in Appendix B[8]. Currently, there are 222[9] complexes identified; 131 of those are occupied by SD fairy shrimp. The Recovery Plan identified 111 of these complexes as necessary to stabilize (90) or reclassify (21) the species. Since completion of the Recovery Plan, there have been 37 new complexes identified, 25 of which have occurrences of SD fairy shrimp. Of the 131 complexes with SD fairy shrimp, 79 (or 60%) have been conserved, identified as a conservation priority (on military land), proposed for conservation, or partially conserved and restored; 50 (or 38%) are not conserved, have been developed, are partially developed, are proposed for development, or have been impacted. Of the 111 complexes listed in the Recovery Plan as necessary to stabilize or reclassify the population of SD fairy shrimp, 64 (or 58%) are currently conserved, identified as a conservation priority (on military land), proposed for conservation, or partially conserved and restored; 45 (or 41%) are not conserved, have been developed, are proposed for development, or are impacted. The status of the remaining complexes is unknown at this time. Projects reviewed by the Service within the Management Areas have been required to implement restoration and management/monitoring programs to achieve a no net loss of SD fairy shrimp habitat. Restoration techniques have included decompaction, sculpting/recontouring, reseeding, re-establishment, and invasive species removal to restore impacted or lost pools.

Overall, since the time of listing, the status of San Diego fairy shrimp has remained unchanged. The same threats that were identified in the final rule still remain. The biggest threats are loss and degradation of habitat due to fragmentation and direct impacts from development, as well as lack of management. For vernal pools that have been impacted by development, these impacts have been offset through the restoration, enhancement, and management of habitat. In some

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[7] Management Areas were defined in the Recovery Plan based on plant and animal species distributions, soil types and climatic variables. Eight distinct Management Areas, which comprise locally variable vernal pool complexes covered in Southern California, were defined (see Figure 9 in the Recovery Plan).

[8] This includes both verified and unverified vernal pool complexes.

[9] Three of these complexes, which were identified in the Recovery Plan, have been completely extirpated by development.

cases, due to security of the site and the active management of the vernal pools, the species status has improved. In addition, grants have been awarded to restore habitat in several areas including Otay Mesa, the San Diego National Wildlife Refuge, and Sweetwater Authority lands. Sites that have been restored benefit from fencing and management which further removes threats from the site that were occurring prior to the restoration efforts. Range-wide more information is known about the species than at the time of listing. New sites have been identified that support the species that were not known at the time of listing. The following is a status summary of the complexes by each Management Area (MA).

Los Angeles-Orange: Los Angeles Basin-Orange Management Area

This MA occurs within the coastal terraces, valleys, and foothills in Los Angeles and Orange Counties. Extensive vernal pool habitat once occurred on the coastal plain of Los Angeles and Orange Counties (Mattoni and Longcore 1997); however, there has been a near total loss of vernal pool habitat in these areas (Ferren and Pritchett 1988, Keeler-Wolf et al. 1998, Mattoni and Longcore 1997, Service 1998). No remaining vernal pools occupied by SD fairy shrimp are known from Los Angeles County. The Recovery Plan identifies 10 pool complexes in this MA, including one known to be occupied by SD fairy shrimp (i.e., Fairview Park); two are identified as needed to stabilize the species (i.e., Fairview Park and San Clemente). Since completion of the Recovery Plan, there have been six new complexes identified in Orange County, four of which have occurrences of SD fairy shrimp (Newport Banning Ranch, Radio Tower Road, Chiquita Ridge, and Irvine Ranch Land Reserve). Of the five total complexes in Orange County with SD fairy shrimp, four (or 80%) are conserved and/or restored. The Fairview complex assemblage has been partially restored and conserved as mitigation (Glenn Lukos Associates 2006b). Additional restoration at the site will occur once funding is secured. Long term management has been secured for three of the conserved complexes (Chiquita Ridge, Radio Tower Road, and Irvine Ranch Land Reserve). The long-term plans for Newport Banning Ranch are unknown at this time.

San Diego: North Coastal Management Area

The vernal pools within this MA are associated with the coastal terraces north of the San Dieguito River within San Diego County. It includes the vernal pool complexes at MCB Camp Pendleton and those within the City of Carlsbad. Currently, there are 17 complexes in this MA, 11 (or 65%) are known to be occupied by SD fairy shrimp. The Recovery Plan identified nine of these as needed to stabilize (8) or reclassify (1) the species; of these, eight (or 88%) are known to be occupied by SD fairy shrimp. Since the completion of the Recovery Plan, there has been one new complex identified in Carlsbad that is occupied by SD fairy shrimp. Of the three complexes in Carlsbad (all of which support SD fairy shrimp), two have been partially impacted (including the two complexes identified as needed for stabilization of SD fairy shrimp, and the one new complex occupied by SD fairy shrimp). Additional impacts are proposed for the other complex identified in the Recovery Plan as needed to stabilize the SD fairy shrimp (i.e., SD County Airport). We are working informally with the County to identify appropriate mitigation to offset this proposed loss.

Fourteen of the 17 complexes in the MA are on Marine Corps Base Camp Pendleton (MCBCP); nine of which are occupied by SD fairy shrimp. However, the fairy shrimp collected from Range 409, which is inland of the Y series complex, were identified as versatile fairy shrimp (*Branchinecta lindali*) (as determined by Jonathan Snapp-Cook, CFWO). In addition, potential hybrids of SD fairy shrimp and versatile fairy shrimp have been reported from the previously unknown Papa Three complex which is also inland from the Y series. Several projects have partially impacted/partially restored SD fairy shrimp habitat in the Las Pulgas complex on Camp Pendleton. To date, these efforts appear to have successfully established SD fairy shrimp in the restored pools. Monitoring is continuing to confirm the long-term viability of the San Diego fairy shrimp populations in the restored pools.

San Diego: Central Coastal Management Area

The vernal pools within this MA are associated with the coastal terraces and mesas of central San Diego County from the San Dieguito River south to San Diego Bay and north of the Sweetwater River. It includes the vernal pools at Del Mar Mesa and Mira Mesa, the Kearny Mesa vernal pool complexes (MCAS Miramar, Tierrasanta, Montgomery Field, Mission Trails Regional Park), and the San Diego Mesa Complex (Chollas Heights). SD fairy shrimp have been detected from all of these areas. Approximately 73 percent of all the pools destroyed in San Diego County during the 7-year period between 1979 and 1986 (Keeler-Wolf et. al. 1998) occurred in this MA. Currently, there are 99 complexes in this MA, 72 (or 73%) are known to be occupied by SD fairy shrimp. The Recovery Plan identified 53 of these complexes as needed to stabilize (45) or reclassify (8) the species. Since completion of the Recovery Plan, there have been nine new complexes identified in this MA, seven of which have occurrences of SD fairy shrimp. Of the 72 complexes in this MA with SD fairy shrimp, 50 (or 69%) are conserved and/or restored, partially conserved, identified as a conservation priority (on military land), or partially restored; 21 (or 29%) are not conserved, have been developed, are partially developed, are proposed for development, or have been impacted. Of the 53 complexes in this MA identified in the Recovery Plan as needed to stabilize or reclassify the species, 44 (or 83%) are conserved and/or restored, partially conserved, identified as a conservation priority (on military land), or partially restored; eight (or 15%) are not conserved, have been developed, are partially developed, are proposed for development, or have been impacted. Projects reviewed by the Service within this Management Area have been required to implement restoration and management/monitoring programs to achieve a no net loss of SD fairy shrimp habitat. Example of this is the extensive restoration the military has completed (as part of the base realignment (1-6-95-F-33) on MCAS Miramar:

- In 1997, 2.30 acres (79 pools) were restored within AA4-7, F (north), F16, U15, and U19 pool groups (Black 2000a, 2003a).
- In 1997, 2.3 acres (75 pools) were restored within Management Unit 2, X1-4, Z1-3, EE1, and HH3+ pool groups (Black 2000b, 2003b).
- In 1998-1999, 0.85 acre (69 pools) was restored within A4, AA8, AA9, and AA10 pool groups (KEA Environmental, Inc. 1999; EDAW, Inc. 2005).

- In 1999-2000 MCAS Miramar re-established/restored about 170,000 square feet of vernal pool surface in the Miramar Mounds National Natural Landmark Vernal Pool Group U (north) (Tomsovic and Macaller 2003, 2004a, and 2004b).

San Diego: South Coastal Management Area

The southern San Diego coastal mesa vernal pools include isolated pools and complexes from the Sweetwater River south to the Mexican border. Included within this management area are the National City and Chula Vista pools (mostly extirpated), Border Field pools, Western and Eastern Otay Mesa complexes, Sweetwater Reservoir pools, and the vernal pools in the vicinity of Otay Lake; SD fairy shrimp have been detected from all of these areas. Substantial losses have occurred in the Otay Mesa Area, where over 40 percent of the vernal pools were destroyed between 1979 and 1990. Currently, there are 65 complexes in this MA, 29 (or 45%) are known to be occupied by SD fairy shrimp. The Recovery Plan identified 27 of these complexes as needed to stabilize (23) or reclassify (4) the species. Since completion of the Recovery Plan, there have been 10 new complexes identified in this MA, nine of which have occurrences of SD fairy shrimp. Of the 29 complexes in this MA with SD fairy shrimp, 12 (or 41%) are conserved and/or restored, identified as a conservation priority (on military land), or partially conserved; 16 (or 55%) are not conserved, have been developed, are proposed for development, or have been impacted. Of the 27 complexes in this MA identified in the Recovery Plan as needed to stabilize or reclassify the species, nine (or 33%) are conserved and/or restored, identified as a conservation priority (on military land), or partially conserved; 17 (or 63%) are not conserved, have been developed, are proposed for development, or have been impacted. Projects reviewed by the Service within this Management Area have been required to implement restoration and management/monitoring programs to achieve a no net loss of SD fairy shrimp habitat. As an example, Pardee homes restored 45 acres of vernal pool habitat supporting 330 pools to offset impacts to 162 pools.

San Diego: Inland Valleys Management Area

The San Diego Inland Valley MA consists of pools situated in San Marcos, Ramona, San Dieguito Valley, Poway, Marron Valley, and Proctor Valley. The majorities of these pools are isolated to a degree from extreme maritime influence by topography and occur more than nine kilometers (6 miles) from the coast. SD fairy shrimp have been observed in all of these areas. These complexes are smaller and more isolated than the coastal complexes, and as a result are suffering from indirect effects such as fragmentation, off road vehicle use, and changes in hydrology. Currently, there are 25 complexes in this MA, 14 (or 56%) are known to be occupied by SD fairy shrimp. The Recovery Plan identified 20 of these complexes as needed to stabilize (12) or reclassify (8) the species. Since completion of the Recovery Plan, there have been four new complexes identified in this MA, three of which have occurrences of SD fairy shrimp. Of the 14 complexes in this MA with SD fairy shrimp, five (or 36%) are conserved, partially conserved, or proposed for conservation; nine (or 64%) are not conserved, have been developed, are proposed for development, or have been impacted. Of the 20 complexes in this MA identified in the Recovery Plan as needed to stabilize or reclassify the species, three (or 21%) are conserved, partially conserved, or proposed for conservation; 17 (or 85%) are not conserved,

have been developed, are proposed for development, or have been impacted. Efforts in this management area focus on conservation, restoration, and management of pools on privately owned lands to reduce further development of known pools.

The SD fairy shrimp faces threats throughout its range. These threats can be divided into three major categories: 1) direct destruction of vernal pools and vernal pool habitat as a result of construction, vehicle traffic, domestic animal grazing, dumping, and deep plowing; 2) indirect threats which degrade or destroy vernal pools and vernal pool habitat over time including altered hydrology (e.g., damming or draining), invasion of non-native species, habitat fragmentation, and associated deleterious effects resulting from adjoining urban land uses; and 3) long-term threats including the effect of isolation on genetic diversity and locally adapted genotypes, air and water pollution, climatic variations, and changes in nutrient availability (Bauder 1986, Service 1998, Bohonak 2005).

2.1.8 *Rangewide Conservation Needs*

Based on current population trends, threats analysis, and new genetic information, the SD fairy shrimp has the following needs to survive and recover:

1. Vernal pool habitat should be restored and enhanced; this includes expansion of existing populations and re-establishment of populations where habitat and historical conditions are appropriate.
2. Vernal pool management plans should be developed and implemented to maintain hydrologic regimes; watershed and habitat functions; and species viability.
3. Land protection strategies should be developed to prevent further loss and fragmentation of existing habitat.
4. Vernal pool complexes not identified in the Recovery Plan as necessary to stabilize or reclassify the population should be re-evaluated based on their genetic structure to ensure the genetic variation within the SD fairy shrimp population is maintained.

3.0 ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR §402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation, and the impacts of State and private actions which are contemporaneous with the consultation in progress.

3.1 *Action Area*

Under section 7(a)(2) of the Act, the action area is defined as the reach of direct and indirect

effects, as well as the analysis area for this opinion. The action area also includes the area in which baseline conditions and cumulative effects are analyzed. The action area for this opinion encompasses the entire project site which is approximately 278 acres.

3.2 *Site Characteristics and Surrounding Land Use*

The proposed project is located with the northern portion of the City of San Diego on Del Mar Mesa. This site lies approximately two miles east of Interstate 5 and one mile south of State Route 56. Topography on the Shaw Lorenz site consists of relatively flat mesas and ridge tops with several intervening canyons that either drain south toward Penasquitos Canyon or west and northwest toward Carmel Valley. Portions of the site have been disturbed by historical agricultural activities. The flatter mesa tops on site were cleared of the original vegetation and subsequently diced and plowed. Vegetation communities present on site include scrub oak chaparral, southern mixed chaparral, chamise chaparral, native and non-native grassland, and coastal sage scrub. Land uses in the vicinity of the site include single-family homes, an equestrian center, a golf course, and undeveloped preserve lands.
Depressional features (e.g., vernal pools) within the action area are defined as the part of the H Series (i.e., Penasquitos North) of vernal pools that are located a top Del Mar Mesa and Carmel Mountain, central coastal mesas which extend from I-805 to the west, I-15 to the east, McGonigle Canyon to the north, and Penasquitos Canyon to the south (Bauder 1986b, Service 1998). Vernal pools on Del Mar Mesa are associated with Redding soils, which consist of a well-drained gravelly loam underlain with gravelly clay subsoils and a hardpan composed of cobbles cemented by iron and silica (Bauder and McMillan 1998). Federally listed species known to occupy vernal pools on Del Mar Mesa include the endangered San Diego fairy shrimp, San Diego mesa mint (*Pogogyne abramsii*), San Diego button celery (*Eryngium aristulatum* var. *parishii*), and spreading navarretia (*Navarretia fossalis*) (Bauder 1986b, Recon 2002). Vernal pools on Del Mar Mesa often occur among openings of dense chaparral vegetation, making them difficult to detect away from existing trails. Prior to 1979, over 200 vernal pools were identified in this series. As of 1986, approximately 40 percent of these pools had been lost to either residential development or agricultural activities (Bauder 1986b). Although some of the remaining pools on Del Mar Mesa are relatively undisturbed, other pools, particularly near existing trails and roads, have been damaged or nearly eliminated by past road grading, off-road vehicle traffic, and creation of new trails by mountain bikes.

Vernal pools located on the Shaw Lorenz property have been classified as part of the H 17 and H36 groups. Prior to 1979, 18 vernal pools had been mapped in this area (they were referred to as H XII (Beauchamp 1979)). Bauder's (1986) efforts to provide a status of vernal pools that had been previously mapped speculated that the H 17 and H36 pools (she references 10 pools) had been lost to agriculture. The Recovery Plan also noted that these pools needed restoration. Though agricultural activities have ceased, the site continues to be affected by unauthorized dumping and utilization of SDGE access roads and trails by off-road vehicles.

With the cessation of agriculture, the area has naturally reverted to the existing vegetation types. Recent surveys on site found depressional features that display vernal pool characteristics [e.g., presence of vernal pool indicator plant species (Corps 1997), fairy shrimp, ponding and/or cracked soil]. Glen Lukos Associates mapped 20 depressional features on May 7, 2001, under dry conditions, and as such, the mapping was only sufficient to identify features with obvious remnant vegetation indicators. Glenn Lukos mapped an additional 14 and 18 depressional features in February 2003 and spring 2005, respectively, for total of 52 depressional features. Glen Lukos Associates has identified vernal pool plant indicator species in 23 of these 52 depressional features. The Corps identified 4 additional depressional features in winter 2006. *Branchinecta* species have been identified in depressional features throughout the site. Nearly all of the depressional features supporting vernal pool flora and/or fauna at Shaw Lorenz consist of tire ruts and ditches, with the majority of remaining areas (occurring off of the roads) having been heavily disturbed through agriculture. Many of the features on site (including preserved and impacted) do not support any vernal pool flora, although many support plants with wetland indicator status. However, many of these support a predominance of non-native vegetation (e.g. pools P, Q, and R). The features range from 15 to 615 square feet, with an average of 150 square feet. Another 10 (Pools D, F, J, K, T, Z, AA, BB, EE, HH) of the depression features do not support any vernal pool flora, but do contain some plant species with wetland indicator status. However, many of these consist of non-native plant species. For example, Feature T consists of a low corner where two man-made ditches intersect. The portion that becomes inundated (approximately 50 square feet) is vegetated entirely with the non-native grass poly (*Lythrum hyssopifolium*).

Over the last ten years, the Service has consulted on a number of projects impacting San Diego fairy shrimp. Recently built projects within the immediate vicinity of Del Mar Mesa include Greystone Homes (1-6-00-F-36) and State Route 56 (1-6-99-F-60). Another project at the eastern end of Del Mar Mesa that has been approved by the City, but has not built, is Rhodes Crossings. All of these projects included the preservation and restoration of vernal pool habitat supporting San Diego fairy shrimp, consistent with the City of San Diego's Environmentally Sensitive Land (ESL) ordinance which requires impacts to vernal pools to be mitigated at a 2-4:1 ratio, depending on the quality of pools being impacted.

3.3 *Status of the Species in the Action Area*

Surveys following Service guidelines for listed fairy shrimp species (Service 1996) have not been conducted in all potential habitats for fairy shrimp. However, based on the following information, the Service concludes that San Diego fairy shrimp likely occur in all depressional features throughout the subject property. A dry season survey for fairy shrimp in 2003 identified *Branchinecta* cysts in 6 out of the 6 vernal pools (Pools U, A, and B in Lot ZZ and Pools V, D, C in Lot YY) surveyed for fairy shrimp (Wegscheider 2003). The City's *Vernal Pool Inventory, 2002-2003*, observed live *Branchinecta* species in 10 (Pools C and V in Lot YY; Pools A and B in Lot ZZ; and Pools K, J, H, E, F, and AA in Lot WW) out of twenty-six vernal pools observed as ponding during their surveys. In addition, the Service observed fairy shrimp during two

different field visits with either the City or the Corps and Pardee's representatives. Hatching and rearing of fairy shrimp cysts from 13 depressional features (Pool II in proximity to Lot ZZ; Pools JJ, KK, LL, and MM in proximity to Lot WW; Pools NN, OO, PP, and QQ in proximity to the proposed Carmel Mountain Road; Pools TT, UU, VV, and YY within and in proximity to Lot J) confirmed that San Diego fairy shrimp occupy the site (Glen Lukos Associates 2005a). Though no other species of *Branchinecta* were identified among the reared fairy shrimp species, Tony Bomkamp of Glenn Lukos Associates did identify individuals of *Branchinecta lindahli* during the 2003 wet-season in two depressional features (Pool C in Lot YY and Pool Z in Lot WW) (Wegscheider 2003, Glenn Lukos Associates, 2005a). The presence of *B. lindahli* on site is of concern because this species has been observed to hybridize with San Diego fairy shrimp in the lab, though it is not known if they can hybridize in the field (Simovich, 2005 *pers. comm.*). *B. lindahli* is rare within the H Series. It was previously only known to occur within 4 vernal pools within Group H 38, which is located on a different mesa top (i.e., Carmel Mountain) approximately 2 miles west of the Shaw Lorenz site (Simovich, 2005 electronic mail message to the Service). In all of these pools, *B. lindahli* co-occurs with San Diego fairy shrimp, so the presence of either species does not appear to preclude occurrences of the other. However, based on the results of the cysts hatching study, which is the most comprehensive and reliable survey to date, it appears that San Diego fairy shrimp is the dominant fairy shrimp species on the Shaw Lorenz site. Although it cannot be ruled out, it does not appear that the *B. lindahli* is widely distributed on site.

4.0 EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat that will be added to the environmental baseline, along with the effects of other activities that are interrelated and interdependent with that action. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

4.1 *Scientific Basis for Effects*

Activities that alter hydrology, increase vernal pool habitat fragmentation, or decrease land types suitable for vernal pool formation have the potential to limit the survivability and recovery of SD fairy shrimp (Service 1998). Changes in the natural micro-topography surrounding vernal pools will alter natural hydrological regimes and may result in increased runoff, erosion, sedimentation, and contamination into the vernal pools. The complex hydrology of vernal pools is supported by both surface flows within a pool's topographic watershed (e.g., the surface area in which water drains into a vernal pool) and subsurface flows that may extend beyond the surface watershed. Surface and subsurface lateral flows between vernal pools and the surrounding uplands influence the onset and level of inundation, and the seasonal drying of vernal pools (Hanes and Stromberg 1998). Therefore, modifications to the uplands surrounding a vernal pool can negatively affect

the pool's hydrology, even if such modifications occur outside the pool's surface watershed. For example, grading cuts near pools can accelerate the flow of water out of the subsoil (Bauder 1987). As such, graded slope cuts adjacent to the watersheds of vernal pools may result in 'leakage' of water out of the watersheds (City of San Diego 2003). Conversely, trapping all subsurface flows of water within the surface watershed of the vernal pools via putting in retaining walls may alter the hydrology of the pools by changing the onset or duration of ponding. Modifications to the hydrology of vernal pools can also alter the distribution of other vernal pool flora and fauna that are influenced by the length and frequency of water inundation (Bauder 1987, 2000). For instance, exotic plant species can become more prevalent in disturbed vernal pools when the periods of water inundation are reduced, while freshwater marsh species can expand into disturbed vernal pools when the periods of inundation are increased.

Modifications of landscapes from native to artificial adjacent to exiting vernal pools can alter natural hydrologic regimes, biogeochemical processes, and limit gene flow between pool complexes. Irrigation of artificial landscapes adjacent to vernal pools can saturate the soils and alter the timing and duration of inundation in fairy shrimp habitat. Additionally, water from the irrigation system may enter the fairy shrimp habitat, causing hatching of cysts at inappropriate times for their phenology. Altering the timing and duration of ponding also could negatively affect the ability of SD fairy shrimp to grow and reproduce because their phenology is dependent on such factors (Hathaway and Simovich 1996).

SD fairy shrimp are "osmoregulators" that maintain constant internal chemical concentrations, but cannot tolerate wide extremes in sodium or bicarbonate concentrations so they are vulnerable to contaminants in runoff waters and watershed quality that alter levels of salts and alkalinity (Service 1998). Therefore, runoff laden with fertilizers and pesticides from adjacent artificial landscapes could alter the specific water chemistry (Gonzalez et al. 1996) and temperature (Hathaway and Simovich 1996) required by SD fairy shrimp, thus negatively affecting their ability to mature and reproduce (Gonzalez et al. 1996, Holtz 2003).

Fragmentation and isolation of vernal pools can threaten the important ecological and mutualistic processes that link vernal pools to each other and the surrounding uplands (Service 1998). Such ecological and mutualistic processes involve insects that pollinate the vernal pools plants; mammals and birds that disperse flora and fauna between vernal pools; and amphibians that reproduce in vernal pools. Specialized plant-pollinator relationships can be threatened by fragmentation of vernal pools from the surrounding uplands. For example, some solitary bees from the Andrenidae family focus on vernal pool annuals (e.g., *Blennosperma*, *Downingia*, *Lasthenia*, *Limnanthes*) for collecting pollen (Thorp 1990). Except during the blooming period of their host plants, these bees spend most of their lives nesting underground in the adjacent uplands. These bees have a limited range of foraging, which is not surprising since they are small, have limited flight ability, and tend to remain near their natal site (Thorp 1990, Leong et. al. 1995, Thorp and Leong 1995).

General fragmentation of plant-pollinator systems can have detrimental effects on the visitation rates by pollinators and, ultimately, the seed set produced by the plants (Jennersten 1988). Although few empirical studies exist for southern California, similar plant-insect specialization is likely and may be essential to successful reproduction of certain species (Service 1998). Therefore, plants in vernal pools that are isolated from other natural ecosystems may experience reduced pollination and thus produce less offspring. Habitat fragmentation further threatens pollination systems by reducing population sizes and thus potentially increasing occurrences of genetic drift, inbreeding depression, and extinction due to demographic stochasticity (Kearns et. al. 1998). Watershed contiguity augments gene flow in populations already naturally low in variability (Davies 1996) by allowing flooding between pools. Vernal pool organisms are typically defined by the complex in which they occur, in part because gene flow between complexes appears to be extremely low (Fugate 1993; Davies 1996). Isolation of pools or modification of the natural watershed potentially compromises gene flow, resulting in a loss of genetic variability and an increased susceptibility to extinction and reduced fitness (Bohonak 2005, Soule 1986).

Similarly, the proximity of vernal pools to upland habitats influences the dispersal of seeds between vernal pools by herbivores, such as rabbits that can be important vectors of seed dispersal (Zedler and Black 1992). As they become fragmented and isolated, vernal pools can become unsuitable for avian species that consume and disperse vernal pool fairy shrimp species, which could in turn negatively affect the genetic stability of vernal pool fairy shrimp (Proctor 1964, Krapu 1974, Swanson *et al.* 1974, Driver 1981, Ahl 1991). Vernal pool preserves should provide adequate upland habitat and/or habitat linkages adjacent to vernal pools to support pollinators, herbivores and their predators, to prevent overgrazing of vernal pool flora, and avian species.

Preserving small, isolated, fragmented preserves may not sustain the multi-scale ecological processes associated with vernal pools (Leidy and White 1998). As such, the scientific community repeatedly recommends that conservation of vernal pools include the surrounding upland habitats (Bauder 1987, Thorp and Leong 1995 and 1998, California Department of Fish and Game 1998, Hanes and Stromberg 1998, Leidy and White 1998, Service 1998). These surrounding upland habitats influence vernal pool hydrology, species composition, and essential interactions between the species that inhabit them (California Department of Fish and Game 1998). Fragmenting vernal pools from each other can disrupt dispersal and gene flow between populations of vernal pool flora and fauna, increase their vulnerability to stochastic events (Service 2004), and hinder their ability to reestablish after local extinctions (Fugate 1998). Elimination of predators, which could lead to population increases of herbivores such as burrowing rodents, rabbits, and quail, is an indirect effect resulting from the fragmentation and isolation of vernal pools (Service 1998).

Other indirect effects to SD fairy shrimp and its habitat, often referred to as "edge effects," include unauthorized dumping; human and pet intrusion; trampling; vandalism; plant and animal collection; runoff; erosion and siltation; spills and contamination; invasion of nonnative species;

and increased off-road vehicle and bicycle activity. Multiple examples exist demonstrating the edge effects can result in direct impacts to vernal pool preserves. Direct impacts have been observed at two vernal pool preserves (i.e., the 14-acre Phoenix Park Vernal Pool Preserve and the 8-acre Phoenix Field Ecological Reserve) in Sacramento County, California (Clark et. al. 1998). These preserves have a large perimeter relative to their size (i.e., large edge-to-area ratio), and have little or no buffer from surrounding residential and recreational areas. Indirect impacts associated with urban development observed at one or both of these preserves resulted from: use of herbicides in nearby areas; changes in hydrology; dumping of landscape litter; introduction and invasion of exotic plants; brush management for fire; encroachment from feral and domestic animals; vandalism of the protective fencing; foot, horse and bicycle traffic; and plant and animal collection.

Similar to the Sacramento pools, vernal pools in San Diego have suffered from dumping, vehicle and foot traffic, irrigation and redirected surface water (both damming and culverts), and invasions of exotic plants (Bauder 1987). Most vernal pool mitigation and/or preserve monitoring reports the Service receives document some form of human disturbance related to urban development that must be corrected. For example, the City's *Carroll Canyon Vernal Pool Preserve Monitoring Report* for the September 27, 2004, site visit documented that trash, illegally planted non-natives, and dirt discarded by an adjacent landowner had to be removed from the preserve. As another example, vandals removed the protective fencing surrounding vernal pool complexes and constructed moguls (bumps probably used for jumping bicycles) within the vernal pool watersheds located in the West Otay Mesa Environmental Preserve (The Environmental Trust 2003). Although not its primary purpose, the *City of San Diego Vernal Pool Inventory* (City 2004b) also provides documentation of indirect impacts to preserved vernal pools adjacent to urban development. For example, the inventory notes that trash has been observed in the only remaining pool of the C 27 series at the Mira Mesa Market Center (a.k.a., Cousins Market Center), which is surrounded by housing and Interstate 15.

Habitat favorable for vernal pool formation consists of coastal terraces with an underlying iron-silica impervious soil layer or layers with undulating landscapes, where soil mounds are interspersed with basins, swales, and drainages (Service 1998). As stated under section 2.1.7, approximately 95 to 97 percent of vernal pool habitat within San Diego County has been lost, any loss of remaining habitat that facilitates vernal pool formation will reduce the amount of suitable land available for restoration and re-introduction opportunities of vernal pools, potentially limiting the recovery of listed vernal pool species. Further, there is a high degree of endemicity in vernal pool complex assemblages due to local adaptations to climate and environmental variables, this leads to a high degree of genetic differentiation among complex assemblages (Bohonak 2005). Destruction of entire complex assemblages may result in the loss of the considerable genetic variation that currently exists within the SD fairy shrimp population.

Vernal pool restoration can reestablish the physical and biotic characteristics of vernal pool habitat such that critical functions are restored. The restored habitat should resemble reference habitat in regard to the following attributes: soil properties, water quality, topography,

hydrology, nutrient cycling, species diversity and species interactions. Based on positive data from ongoing mitigation monitoring programs it appears that restoration can provide self-sustaining vernal pool ecosystems with clear and significant benefits to San Diego fairy shrimp; especially when cyst translocation occurs from existing (conserved) occupied pools (RECON 2007; GLA 2005c, 2006c; Black 2000a, 2000b; Edaw 2005). Benefits of restoration to the San Diego fairy shrimp include increasing the amount of available vernal pool habitat, increasing the quality of existing vernal pool habitat, and providing long-term management for this species. These benefits, when supplemented by long-term monitoring, provides the potential for reducing threats to the shrimp and maintaining and improving the habitat quality and regional distribution of San Diego fairy shrimp. Restoration of vernal pool ecosystems has not only benefited San Diego fairy shrimp, but has also provided additional and improved habitat for a number of other vernal pool plant and animal species that coexist with this species in the San Diego region. Since 1997, projects have documented success in the translocation of San Diego fairy shrimp. These include California Terraces on Otay Mesa (RECON 2007), San Diego Spectrum at Kearny Mesa (GLA 2005c), and other vernal pool restoration projects on Otay Mesa, Marine Corps Air Station Miramar, and Camp Pendleton.

4.2 *Direct Impacts*

Clearing and grading activities will directly affect 19 depressional features[10] (totaling 2515 square feet or 0.06 acre). These impacts would be a result of grading and filling of the basins. Though all 19 of these depressional features likely contain San Diego fairy shrimp, it has only been confirmed that San Diego fairy shrimp occupy 13 of these depressional features. The depressions to be directly impacted by the project consist of road ruts and ditches that do not support any vernal pool flora. Of the depressions to be impacted and that have been documented with San Diego fairy shrimp (by cyst), the majority have very low cysts densities. Destruction of habitat for San Diego fairy shrimp, including features which are suitable but presently unoccupied, precludes potential recovery efforts for this and other listed species dependent upon vernal pools at those locations. Prior to their filling, soil containing fairy shrimp cysts will be salvaged from the affected depressional features for use as inoculum in the vernal pools to be restored onsite, provided that such salvage does not interfere with the project's grading and construction schedule. However, it is not anticipated that 100 percent of the cysts will be salvaged and/or survive the salvage process.

Grading for the proposed project could result in unintentional fill entering into the avoided pools. To avoid these direct impacts, all depressional features, and the lots within which they are located, will be flagged and surrounded with orange construction fencing prior to the beginning of grading. Grading will be done in such a manner to ensure that no runoff enters the depressional features. Additionally, a qualified biologist will monitor construction to ensure damage to the depressional features is avoided.

[10] Includes JJ, KK, NN, OO, PP, QQ, RR, SS, TT, UU, VV, WW, XX, YY, ZZ, and Corps 1, 2, 3, and 4

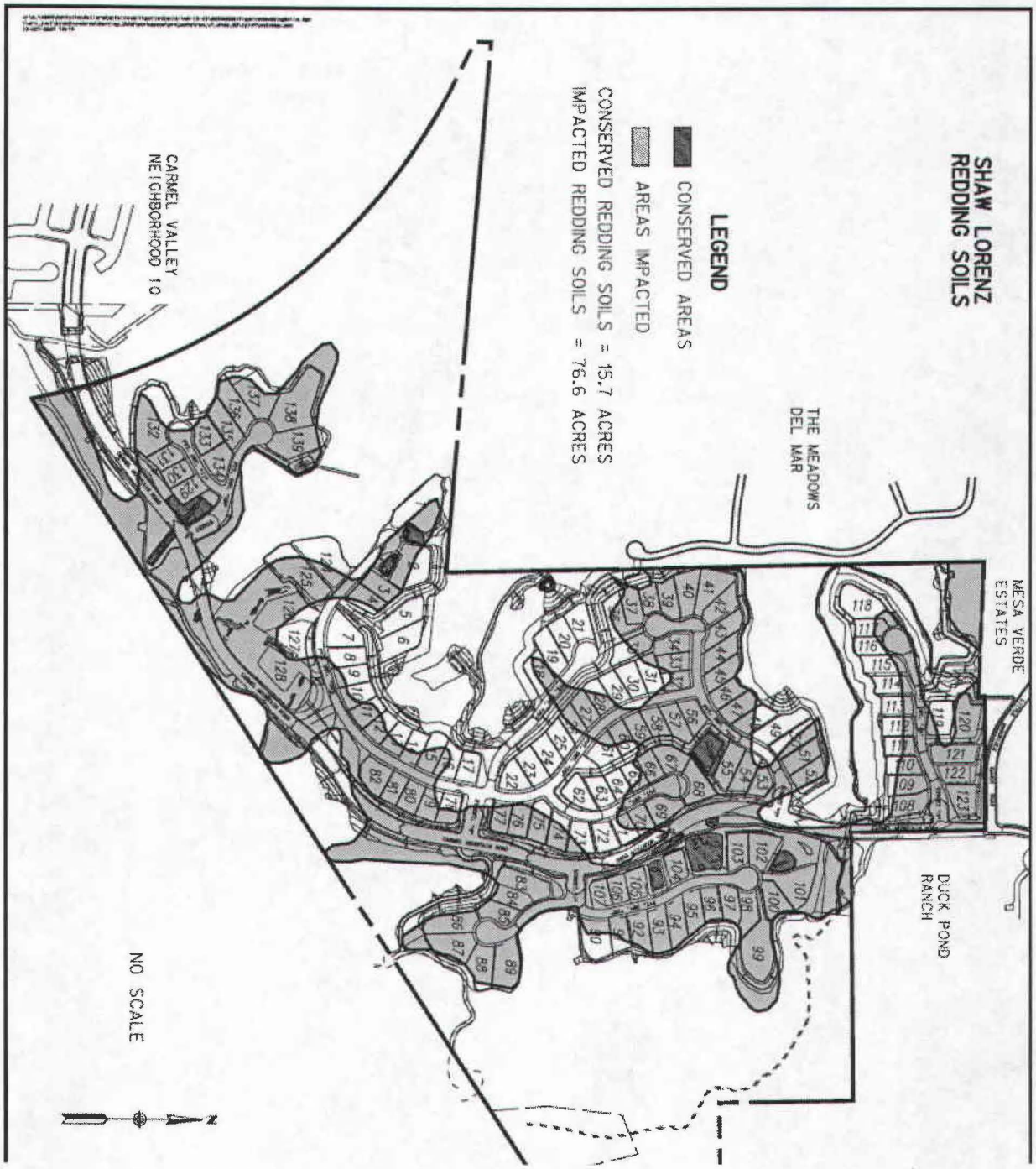
Despite the best intentions, inadvertent impacts to depressional features may occur during project construction resulting from excess runoff and contaminants and/or fill entering the features. Pardee Homes proposes to utilize erosion control measures around the depressional features; however, if grading and construction are conducted adjacent to depressional features during the rainy season, overland flows from rain events may overwhelm the erosion control measures and enter the depressional features. Such events could introduce excess dirt or fill and contaminants into the depressional features, potentially harming the San Diego fairy shrimp. The introduction of fill dirt or polluted runoff to adjacent landscapes can alter the specific water chemistry (Gonzalez et al. 1996) and temperature (Hathaway and Simovich 1996) required by San Diego fairy shrimp, thus negatively affecting their ability to mature and reproduce (Gonzalez et al. 1996, Holtz 2003). To minimize the potential for construction related run-off or siltation to enter the depressional features, Pardee Homes proposes to conduct grading adjacent to lots with preserved depressional features outside the rainy season unless the area to be graded is at an elevation below the lots, thus eliminating this threat.

Development of the project will eliminate the potential to restore ~77 acres (Figure 5) of potential vernal pool habitat on Del Mar Mesa that support Redding soils. Although the loss of the remaining Redding soils on the mesa top due to construction of the proposed project will reduce the amount of suitable land available for restoration and reintroduction of vernal pools and listed vernal pool species, the recovery plan does not identify the H17 and H36 complexes as necessary for the stabilization and/or downlisting of San Diego fairy shrimp. Nor are these pools identified as necessary for any of the other five listed vernal pool species that could occur in the area. Redding soils are the most common soil series remaining that support vernal pools within San Diego County, therefore loss of a portion of this site is not as significant as loss of rarer soil types elsewhere in the County (e.g. Stockpen in Otay Mesa). In addition, because Pardee Homes is proposing to avoid the Conserved areas and restore the Mitigation Site, there should be a net gain 16 acres of vernal pool habitat that was not anticipated in the Recovery Plan if the restoration is successful.

The project proposes on site avoidance and preservation of 37 depressional features[11] and the species they currently support. These depressional features total 5,967 square feet (0.14 acre) of basin area and are located in lots 127, 128, J, N, O, P, X, WW, XX, YY, and ZZ. This constitutes avoidance of a substantial portion of the extant habitat for San Diego fairy shrimp on site. Of the features to be preserved, three features (Pools P, Q, and R) were identified with plants of wetland indicator status, but no vernal pool indicator plant species. These features were not observed to pond during several years of studies conducted by GLA, but were noted (and preserved) due to their occurrence within one of the historic H17 pool groups identified by Ellen Bauder. In addition, the area to be conserved supports a population of Orcutt's brodiaea (*Brodiaea orcuttii*), which is a sensitive plant associated with vernal pool upland habitats.

[11] Although the basin of feature II is avoided, approximately 18% of it's watershed will be lost.

Figure 5. Redding Soils Impacted and Conserved



Pardee Homes will develop a vernal pool restoration plan for Lots 126, 127, 128 and WW, and potentially within Lots XX, YY, and B. Restoration of these areas will involve grading to re-contour depressional features for enhancement of vernal pools that could kill San Diego fairy shrimp by crushing their cysts. In addition, restoration activities, such as grading and movement of soils, have the potential to spread *B. lindahli* into pools that may not be currently occupied by *B. lindahli*. *B. lindahli* were observed within depressional feature Z located within Lot WW, which is the lot proposed for restoration. This is of concern because *B. lindahli* have been observed to hybridize with San Diego fairy shrimp in the lab though it is not currently known if they have hybridized in the field. Pardee Homes will develop and incorporate measures into their restoration and enhancement activities to prevent the introduction and spread of *B. lindahli* into the restoration/enhancement areas. In addition, annual identification of fairy shrimp in the depressional features will determine whether *B. lindahli* occurs within the restored and enhanced pools. If B. *lindahli* are found within the restored or enhanced pools, measures will be taken as directed by the Service and Corps to eradicate and prevent further spread of *B. lindahli*.

As stated above in section 2.1.7, the status of San Diego fairy shrimp has remained unchanged from the time of listing. This project will not change that determination. The overall acreage of impacts is small relative to the overall habitat available for the shrimp range wide. The site was thought to have been lost to agriculture at the time of listing, therefore we did not rely on this site for the recovery of the species in the Recovery plan. The fact that the site has recovered to the degree that it has, without any active restoration demonstrates that active restoration of the Mitigation Site should maintain habitat for the shrimp thus maintaining the same acreage. The loss of the site compared to the overall habitat of the species is small and the identified mitigation site would adequately offset the impacts. Therefore, the project would be a "no net loss" to the shrimp population on-site or range-wide. With active restoration and management, the density of cysts may increase, thus making this site more viable in the long term for the shrimp by eliminating the threats from lack of management.

4.3 *Indirect Impacts*

The proposed project will introduce development on the mesa top surrounding and adjacent to extant depressional features to be preserved. Many of the vernal pools will be completely surrounded by development (e.g., residential buildings, roads, and trails), and will have little to no habitat buffers to development. The Conserved lots are relatively small, ranging in size from 0.03 to 3.63 acres, and likely do not contain enough acreage of upland habitat to support such essential ecological interactions between vernal pools, pollinators, and herbivores and their predators. Therefore, plants in vernal pools that are isolated from other natural ecosystems, such as in many of the extant depressional features conserved by the Shaw Lorenz project, may experience reduced pollination and thus produce less offspring. Five of the eight lots containing vernal pools are either not contiguous with preserved open space (i.e., Lots X) or are configured to only provide a narrow connection from relatively large native open spaces to depressional features within the Lots (i.e., depressional features P, Q, R, S, T, CC, DD, EE, HH, TT, and YY in Lot J; depressional feature II in Lot N; depressional feature W in Lot O; and depressional

features U, A, and B in Lot ZZ). Lot J is further fragmented by a trail and its associated fencing, which separates depressional features HH, S, EE, and T from the other depressional features in that lot. Lot B is also fragmented by a trail and fence which separates depressional features in Lots XX and YY from the contiguous open space of the Multiple Habitat Preserve Area (MHPA).

Because the lots containing preserved depressional features will be isolated from each other and lack a significant connection, if any, to contiguous open space, the long-term viability of the "Conserved habitat" for San Diego fairy shrimp is questionable. The continued existence of these vernal pool species is dependent upon the long-term survival of a functioning vernal pool ecosystem. Although ecological processes in vernal pools may be viewed at relatively small temporal (e.g., weeks to months during wetting and drying cycle) and spatial (e.g., tens of m^2) scales, they are greatly influenced by large landscape scale processes (e.g., hydrology, plant and animal dispersal) (Leidy and White 1998). Unlike the Conserved Habitat, the Mitigation site (Lots WW, 126, 127, and 128) is connected to open space and will be the focus of the restoration efforts. Because of this connection, these indirect effects should be minimized within the Mitigation Site. The habitat within the Mitigation Site will be restored to achieve at least a 2:1 replacement of the habitat being lost within the development footprint as well as indirectly within the Conserved habitat, thereby offsetting the indirect impacts to the Conserved areas.

As described above in section 4.1, vernal pool preserves with a high edge-to-area ratio, such as the Conserved Habitat, will be subject to continual edge effects, including unauthorized dumping, human and pet intrusion, trampling, vandalism, plant and animal collection, runoff, erosion and siltation, spills and contamination, invasion of nonnative species, and off-road vehicles and bicycles. The Shaw Lorenz project is incorporating several conservation measures to minimize edge effects associated with the proposed development. Fencing will be located around the lots containing depressional features to reduce human encroachment; landscaping adjacent to these lots will include plantings with a 'native naturalized character'; drainage swales and/or concrete ditches will be used to divert irrigation away from depressional features located down-grade of landscaping; lighting will be directed away from lots containing depressional features; and a public information package will be given to all homebuyers, explaining the importance of the vernal pools and the need for avoidance. In addition, maintenance of the lots containing depressional features will include regular weeding to remove all new invasions of non-native species, removal of trash, and maintenance of the fencing. However, landscaping within the lots containing depressional features includes species that are not native (e.g., *Acacia*) and if landscaping in other parts of the project site utilize species that are non-native and invasive, there is the potential that non-native invasive species could colonize and expand into the depressional features. The long-term maintenance plan will address this potential impact through education of the homeowners and weeding of both the Mitigation Site and the Conserved areas.

Changes in grade and increased irrigation surrounding the depressional features will influence changes in hydrology and may result in increased runoff, erosion, sedimentation, and

contamination into the depressional features. The proposed project will directly grade approximately 20 percent of the watershed (i.e., 425 square feet of the 2311 square-foot watershed) for depressional feature II (460 square-foot basin area; 0.01 acre) located in Lot N, resulting in potential changes to the hydrology of that depressional feature. Carmel Mountain Road will be above grade to Lots ZZ (which contains features U, A, and B), YY (which contains features V, C, and D), and X (which contains feature L). Though the road or the lot is outside the mapped watershed of the depressional features in these lots, the grade of the road is higher than the watershed so it is highly probable that storm water runoff from the road could enter into the depressional features, potentially carrying road pollutants (e.g., oil, grease, coolants) into the depressional features. Similarly, the proposed grade adjacent to Lot J in proximity to depressional feature GG is above the mapped watershed of GG. Lot X has a graded slope that will drain into the lot and potentially depressional feature FF. A concrete ditch will be constructed at the base of this slope in Lot X to direct runoff away from depressional feature FF (and its watershed). However, if maintenance of the ditch is inadequate, excess runoff could enter depressional feature FF, altering the hydrology of the depressional feature. Runoff laden with fertilizers and pesticides from the adjacent landscaping also could enter depressional features FF (Lot X) and GG (Lot J). The introduction of fill dirt or polluted runoff to adjacent landscapes can alter the specific water chemistry (Gonzalez et al. 1996) and temperature (Hathaway and Simovich 1996) required by San Diego fairy shrimp, thus negatively affecting their ability to mature and reproduce (Gonzalez et al. 1996, Holtz 2003). The project proponent will adequately fund the long-term maintenance of the site to ensure that the drainage features are maintained, thus minimizing this threat.

Other parts of the project will be graded to below the watershed of the depressional features, so the potential for stormwater flow from the developed areas entering the depressional features will be largely eliminated. For instance, most of the development adjacent to Lots WW (which contains features M, E, F, G, H, I, AA, LL, O, and BB), J (which contains features S, EE, HH, CC, P, Q, R, T), X (which contains feature FF), and P (which contains features X and Y) is proposed to be below the watersheds of the depressional features. Retaining walls will be placed within Lot J contiguous with the depressional features T, EE, S, and HH to keep development below the features. The road section adjacent to the Mitigation Site will be graded in the manner as described on Figure 4 to minimize the amount of grade change and construction that will occur on lots 126, 127 and 128 in order to favor the natural hydrological regime for the Mitigation Site. .

Additionally the Shaw Lorenz project includes landscaping adjacent to depressional features and installation of permanent irrigation systems. To prevent alterations in vernal pool hydrology, Pardee Homes proposes to not allow any water from installed irrigation systems to enter lots that contain depressional features. Furthermore, if it is found that enhanced depressional features differ significantly from reference or control pools, Pardee Homes has committed to provide adequate contingency measures to the restored and enhanced depressional features as identified in their Vernal Pool Restoration and Enhancement Plan. These measures will be funded with the $500,000 that they are providing for this purpose. In the event that this funding is not needed

to implement contingency measures, it can be directed to other vernal pool restoration and/or enhancement efforts in the Del Mar Mesa Area.

Pardee Homes is proposing to offset impacts to vernal pool habitat by enhancing the existing 37 depressional features, their watersheds, and surrounding upland habitat to be avoided in Lots 127, 128, J, N, O, P, X, WW, XX, YY, and ZZ (Figure 2). In addition, appropriate upland habitat, topography, vernal pools, and their watersheds in the Mitigation Site (Figure 3) will be restored/enhanced to a typical species composition and size compared to other vernal pools within the H series. This is consistent with Recovery Task 2 from the Recovery Plan that emphasized the need to reestablish vernal pool habitat to historic structure and composition. As described above, if the restoration effort is unsuccessful, Pardee proposes to provide $500,000[12] to be used for restoration of vernal pool habitat offsite at a location within the H series [e.g., Del Mar Mesa/Carmel Mountain, on Carmel Mountain where the project proponent has vernal pool mitigation opportunities per their development agreement with the City of San Diego for Pacific Highlands Ranch Subarea III, North City Future Urbanizing Area (dated September 8, 1998)] approved by the Corps and the Service or elsewhere, if approved by the Service. The size and shape of the depressional features shall be suggested by the restoration biologist and approved by Agencies.

The Recovery Plan emphasizes the need to manage and monitor protected habitat (see Recovery Tasks 4 and 5). Consistent with this task, the long term maintenance and monitoring of the Mitigation Site will be secured and implemented as described in Conservation Measure 3.

4.4 *Cumulative Effects*

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. We do not anticipate any activities to occur within the action area that will not have a federal action associated with it.

5.0 **CONCLUSION**

After reviewing the current status of the species at issue, the environmental baseline for the action area, the effects of the proposed Shaw Lorenz project, and the cumulative effects, it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of the San Diego fairy shrimp. We present this conclusion based on the following reasons:

1. The loss of 19 depressional features and the fairy shrimp they currently support is not expected to appreciably reduce the long-term viability of this species. The loss of 2515

[12] As described in Conservation Measure 2d.

square feet (0.06 acre) of depressional feature surface ponding area is not large relative to the extent of habitat remaining over the San Diego fairy shrimp's range, and the species has not been observed in large numbers on the site.

2. The indirect impacts to 37 depressional features occupied by San Diego fairy shrimp is not expected to appreciably reduce the long-term viability of this species because the habitat of San Diego fairy shrimp affected by this project (5967 square feet; 0.14 acre) is not large relative to the extent of habitat remaining over San Diego's fairy shrimp's range and the impacts will be offset through the restoration of an equal or greater area of habitat within the Mitigation Site.

3. The conservation measures and compensation ratios that will be implemented as part of the project description will ensure there will be a net increase in higher quality vernal pool habitat within the Mitigation Site.

4. There will be a net benefit to the species ,under active management, since the project provides for long-term management of the species in the action area and reduces the threats that occur do to lack of management.

5. The project is consistent with the goals outlined in the Recovery Plan for the SD fairy shrimp because there will be a net increase in higher quality vernal pool habitat upon project completion.

6.0 INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened animal species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Corps and/or the applicant (i.e., Pardee Homes) designated by the Corps. The Corps has ongoing responsibility to regulate the activity that is covered by this incidental take statement. If the

Corps: (1) fails to assume and implement the terms and conditions or (2) fails to require its designated agency(ies) and individual(s) to adhere to the terms and conditions of this incidental take statement through enforceable terms incorporated into contracts, grants, and permits related to work activities associated with the project, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of the incidental take, the Corps or Pardee Homes, must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR § 402.14(I)(3)].

6.1 Amount or Extent of Take

The Service anticipates that it will be difficult to quantify the exact number of SD fairy shrimp that could be affected by the proposed action for the following reason:

1. The exact population size is difficult to estimate due to the dynamic conditions associated with their habitat. The reproductive success of SD fairy shrimp is dependent on seasonal fluctuations in their habitat, such as presence or absence of water during specific times of the year, duration of inundation, and other environmental factors that likely include specific salinity, conductivity, dissolved solids, and pH levels (See Section 2.2.5). Therefore, the population of SD fairy in any given pool varies dramatically.

Nevertheless, we anticipate that all SD fairy shrimp and/or cysts within 19 of the depressional features within the action area (i.e., JJ, KK, NN, OO, PP, QQ, RR, SS, TT, UU, VV, WW, XX, YY, ZZ, and the 4 additional features identified in Winter 2006) will be taken in the form of direct mortality (i.e., harm) by grading and filling the depressional features they occupy. The Service anticipates that a major portion of San Diego fairy shrimp in the 24 depressional features within the Conservation Area will be taken due to indirect edge effects that can ultimately become direct impacts (e.g., changes in hydrology and water quality, trampling, dumping, and invasion of nonnative species). In addition, some SD fairly shrimp and/or cysts within the 13 conserved pools within the Mitigation Site will be taken during the restoration activities (e.g. crushing of cysts during recontouring of the basins). Should project construction directly impact more than the 19 depressional features listed above, or if indirect effects are greater than the 24 depressional features described above, or if the restoration activities require any additional grading or cyst removal beyond that described in the restoration plan, reinitiation of formal consultation will be required.

6.2 Effect of the Take

In the accompanying biological opinion, the Service determined that this level of take is not likely to result in jeopardy to San Diego fairy shrimp.

7.0 REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of SD fairy shrimp:

7.1 Take of SD fairy shrimp will be avoided and minimized through project design and implementation of best management practices during construction of the project.

7.2 Effects of the project on SD fairy shrimp and vernal pools will be minimized by restoring/enhancing new vernal pool habitat on the project site that can support SD fairy shrimp, and by preserving and managing the enhanced and/or restored vernal pools in perpetuity.

7.3 Take of SD fairy shrimp shall be quantified to the extent possible by the development and implementation of a SD fairy shrimp monitoring program.

8.0 TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. The Project Proponent shall implement all of the Conservation Measures as listed above in Section 1.1. Conservation Measures 1, 2, 6, 7, 10, 11, 12, 13, and 14 implement Reasonable and Prudent Measure 7.1. Conservation Measures 3, 4, 5, 8, 15, and 16 implement Reasonable and Prudent Measure 7.2. Conservation Measure 3 also implements Reasonable and Prudent Measure 7.3.

The Service retains the right to access and inspect the project site for compliance with the proposed project description and with the terms and conditions of this biological opinion. Any habitat destroyed that is not in the identified project footprint should be disclosed immediately to the Service for possible reinitiation of consultation. Compensation for such habitat loss will be requested at a minimum ratio of 5:1.

The Service believes that all of the SD fairy shrimp within 0.06 acre of SD fairy shrimp habitat, comprised of 19 vernal pool basins and a subset of the SD fairy shrimp and/or cysts within the remaining 37 vernal pool basins, will be incidentally taken as a result of the proposed action. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Corps and/or the project proponent must

immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

9.0 MONITORING REQUIREMENTS

Pursuant to 50 CFR 402.14(i)3, the Corps of Engineers and/or the project proponent "...must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement." The reporting requirements are established in accordance with 50 CFR 13.45 and 18.27. To receive coverage under this biological opinion, the Corps of Engineers and/or the project proponent must provide annual monitoring reports of the estimated take that may have occurred in relation to the amount of take that is identified in this Incidental Take Statement. Annual reports are due prior to January 31st of each year for the duration of this project. The monitoring report will also identify the amount of habitat affected and must specify whether pre-project surveys were conducted and the results of those surveys.

10.0 CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans or to develop information.

> Wherever possible, for all projects involving vernal pools, the Corps should work with applicants to establish a minimum 100-foot wide habitat buffer to be preserved around vernal pools and their watersheds to limit the more immediate indirect edge effects caused by surrounding development and to ensure natural hydrological regimes are maintained.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

11.0 REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in the request for consultation. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances

where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Sincerely,

Therese O'Rourke
Assistant Field Supervisor

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ATTACHMENT 2

Alta Del Mar (previously Shaw Lorenz) Proposal to Satisfy Biological Opinion Conditions at Alta Del Mar (RECON Number 3057-2)

RECON

An Employee-Owned Company

February 2, 2021

Mr. David Zoutendyk
Ms. Susan Wynn
U.S. Fish and Wildlife Service
2177 Salk Avenue, Suite 250
Carlsbad, CA 92008

Reference: Alta Del Mar (previously Shaw Lorenz) Proposal to Satisfy Biological Opinion Conditions at Alta Del Mar (RECON Number 3057-2)

Dear Mr. Zoutendyk and Ms. Wynn:

This letter has been prepared on behalf of Tri Pointe Homes IE-SD, Inc. (formerly Pardee Homes) in order to support a discussion of mitigation options to satisfy the conditions of the Biological Opinion (FWS-SD-08B0023/08F0016R001, dated November 5, 2007) issued for impacts to vernal pools and the San Diego fairy shrimp (*Branchinecta sandiegonensis*) on the Alta Del Mar project (formerly Shaw Lorenz). Tri Pointe Homes seeks a resolution that is acceptable to the U.S. Fish and Wildlife Service (USFWS), with the goal that it would be relieved of vernal pool restoration and enhancement responsibility at Alta Del Mar, once the agreed upon mitigation alternative is completed. Project background and a description of mitigation alternatives are provided below.

Background

The 278-acre Alta Del Mar housing development project is located in the Del Mar Mesa area of the city of San Diego and comprised the construction of approximately 139 single-family homes on approximately 125.3 acres. The project included the dedication of approximately 118.3 acres the City of San Diego Multi-Habitat Planning Area (MHPA), 30 acres set-aside as open space within an Urban Amenity, and preservation of vernal pool habitat within open space lots totaling 11.21 acres. The project impacted a number of vernal pools and mitigation for these was composed of both avoidance, through the preservation of 37 vernal pools within the 11.21 acres of open space lots (Conserved Areas) and the creation of new vernal pool basins and habitat within an open space lot (Mitigation Site).

The vernal pool mitigation efforts at Alta Del Mar were implemented per the Final Shaw Lorenz Vernal Pool Restoration and Enhancement Plan prepared by RECON, dated March 26, 2008. Construction of the pools at the Mitigation Site occurred in October 2008. Weed maintenance and hydrological and fairy shrimp monitoring at the Mitigation Site began in the 2008–09 season. In April 2009, project construction was suspended at Alta Del Mar in response to market conditions. As a result, the associated vernal pool restoration was also suspended as permitted under the Biological Opinion and Restoration and Enhancement Plan.

In November 2011, active project management resumed in accordance with the Restoration and Enhancement Plan, including the weed control program for vernal pools and depressional features, and re-initiation of protocol fairy shrimp surveys at the Mitigation Site. Annual maintenance and monitoring pursuant to applicable agency guidelines continued through the 2014–15 season.

Over the previous five years of monitoring (2008–09, 2011–12, 2012–13, 2013–14, and 2014–15), all of which had well below average rainfall, 47 of the 48 mitigation pools were observed to have held water. Forty-three of the pools held water for 10–14 days or more during the 2008–2009 rainy season, when, in general, the

longest ponding durations were observed. Fairy shrimp were observed and identified to species in 25 of the 48 pools. Of those 25 pools, a single species, versatile fairy shrimp (*Branchinecta lindahli*), was found in 21 pools, both versatile and San Diego fairy shrimp were found together in three pools, and a single species, San Diego fairy shrimp, was found in a single pool. Immature fairy shrimp, that had not developed enough to be identified to species, were found in three pools. An additional survey conducted in 2015–2016 detected San Diego fairy shrimp in three pools. The four pools occupied by San Diego fairy shrimp have a combined surface area of 738 square feet. A total of 5,227 square feet of vernal pools occupied by San Diego fairy shrimp are required for the mitigation of impacts.

In the 2014–2015 annual report for the vernal pool mitigation project RECON requested permission from the USFWS to collect San Diego fairy shrimp eggs from preserved pools owned and managed by the City of San Diego located in the Del Mar Mesa area. These shrimp eggs would have been used to inoculate the remaining 18 established pools that did not support fairy shrimp of any species. Due to the presence of versatile fairy shrimp and questions regarding the adequacy of ponding at the Mitigation Site, the USFWS denied permission for the project biologist to collect San Diego fairy shrimp eggs to inoculate the mitigation pools at Alta Del Mar. After permission to proceed with the shrimp inoculation was denied, the mitigation and monitoring efforts at Alta Del Mar ceased, with the exception of an additional fairy shrimp survey conducted in 2015-2016, the time frame in which success criteria must be met or off-site restoration pursued per the Biological Opinion.

Biological Opinion Language

Language from the Alta Del Mar Biological Opinion FWS-SD-08B0023/08F0016R001, dated November 5, 2007, with respect to the vernal pool/San Diego fairy shrimp mitigation requirements, specific to the Mitigation Site, is provided below for reference and subsequent discussion.

Conservation Measure 4 (pages 15-16)

> *l. At least 0.12 acre of the restored vernal pools will support San Diego fairy shrimp . . .*
>
> *o. Verification that restoration/enhancement of San Diego fairy shrimp habitat is complete will require written sign-off by the Service. If . . . the final success criteria are not met, the project proponent will prepare an analysis of the cause(s) of failure and . . . propose remedial actions for approval . . . .*

Response: While over 0.12 acre (5,227 square feet) of vernal pool habitat was created in the Mitigation Site, only 738 square feet supported San Diego fairy shrimp within four separate basins. At least two of these also supported the common versatile fairy shrimp, which was also detected in a number of other basins across the Mitigation Site. As discussed above, a request was made to collect soil containing cysts of San Diego fairy shrimp from a nearby location in order to inoculate the pools that did not support San Diego fairy shrimp. Given the challenges of the site supporting both the common and sensitive fairy shrimp species and concerns about the two potentially hybridizing, this request was not supported.

> *p. If success criteria are not met within the eight years following implementation of the Plan, the project proponent will pursue restoration offsite at a location within the H series [e.g. Del Mar Mesa/Carmel Mountain on Carmel Mountain where the project proponent has vernal pool mitigation opportunities per their development agreement with the City of San Diego for the Pacific Highlands Ranch Subarea III, North City Future Urbanizing Area (dated September 8, 1998)] approved by the City and the Service or elsewhere, if approved by the Service . . . .*

Response: Success criteria were not met within eight years following implementation. However, Tri Pointe Homes does not have property rights to any other similarly situated land suitable for vernal pool restoration in the Del Mar Mesa/Carmel Mountain area. Alternative mitigation options are discussed below.

Biological Opinion (page 43–44)

> *. . . Pardee Homes has committed to provide adequate contingency measures to the restored and enhanced depressional features as identified in their Vernal Pool Restoration and Enhancement Plan. These measures will be funded with the $500,000 that they are providing for this purpose. In the event that this funding is not needed to implement contingency measures, it can be directed to other vernal pool restoration and/or enhancement efforts in the Del Mar Mesa area.*

Response: Tri Pointe Homes has completed the funding of this contingency fund (Attachment 1). The current value of the fund is $532,307.66.

Off-site Mitigation Opportunities

In order to meet the requirements of Conservation Measure 4.p, Tri Pointe Homes is able to proceed with any of the following mitigation options as directed by the USFWS:

1. Provide mitigation for the vernal pools (5,227 square feet [0.12 acre] x 2 = 0.24 acre) through restoration at the Southwest Village Vernal Pool Preserve, providing a double mitigation ratio based on the out of area restoration. The $532,307.66 contingency fund could be used either for implementation and initial maintenance and monitoring, or can be designated specifically for long-term management of the site, as part of the overall Southwest Village Vernal Pool Restoration Program. We estimate approximately $500,000 for restoration of 0.24 acre of vernal pools including planning, implementation, fairy shrimp focused wet season surveys, and five years of maintenance and monitoring. This would be in addition to any mitigation required for Southwest Village.

2. Provide the contingency fund held by The San Diego Foundation to David Hogan with The Chaparral Lands Conservancy (TCLC) in order to support vernal pool restoration opportunities in Del Mar Mesa. We estimate restoration of 0.12 acre of vernal pools including planning, implementation, fairy shrimp focused wet season surveys, and five years of maintenance and monitoring would cost approximately $350,000, although the cost may vary depending on project specifics and monitoring requirements. Any remaining funds would be used to support long-term management.

3. Using the funds held at The San Diego Foundation, purchase mitigation credits for 5,227 square feet at a mitigation bank being established in the Kearny Mesa area by Great Ecology/Tellurium Partners. These credits are available for purchase as of January 2021 and anticipated to cost approximately $120,000. The remaining funding could be provided to another entity to support vernal pool restoration (e.g., TCLC, USFWS, or the City of San Diego).

4. Identify City of San Diego-owned land in Del Mar Mesa that is suitable for restoration. This option would require coordination with the City to determine the availability of suitable land. It is not known if the City has land in Del Mar Mesa suitable for vernal pool restoration; based on review of the Vernal Pool Habitat Conservation Plan (VPHCP), a majority of land with restoration opportunity is located in south Otay Mesa. Should appropriate land be identified, the funding could be provided to the City to implement restoration, or RECON could implement restoration on behalf of the City and Tri Pointe Homes. This would require access and agreements for Tri Point Homes to restore vernal pools. We estimate approximately $350,000 for restoration for 0.12 acre of vernal pools including planning, implementation, fairy shrimp focused wet season surveys, and five years of maintenance and monitoring. Any remaining funds would be used to support long-term management.

Status of Remaining On-Site Vernal Pools

All open space lands supporting vernal pools are currently owned by the homeowner's association (HOA), including the Conserved Areas and the Mitigation Site. Attachment 2 provides a site map that indicates the HOA-owned parcels that support vernal pools. These are funded through HOA-obligated funds and the

CC&Rs require that these funds may not be removed or reduced. The HOA is required to follow the maintenance program outlined in the Vernal Pool Management and Maintenance Program to be conducted in perpetuity, which includes:

- Weeding lots at least twice a year to remove non-native/invasive species.
- Preparation of a public information package to be given to homebuyers, specifically those adjacent to the Conserved Areas and Mitigation Site, to direct them to avoid excessive irrigation, use native plants, and shield lighting away from the open space areas.
- Remove trash.
- Monitor and repair fencing, signage, and drainage ditches and swales to ensure water is diverted away from depressional features.
- Avoid brush management from the Mitigation Site and Conserved Areas that support depressional features, with the exception of Lot O (although any brush management in Lot O will avoid the depressional feature.

- Avoid brush management from the Mitigation Site and Conserved Areas that support depressional features, with the exception of Lot O (although any brush management in Lot O will avoid the depressional feature).

The HOA is aware of and performing the aforementioned requirements. The HOA has funding and responsibility for long-term management of the Conserved Areas and Mitigation Site as part of its Covenants Codes and Restrictions.

Conclusion

Tri Pointe Homes is seeking to complete the final USFWS Biological Opinion requirements at Alta Del Mar to ensure compliance with all permit obligations. We appreciate your review of these options and assistance with identifying the preferred solution. Considering the large vernal pool preserve area within Tri Pointe Homes ownership in Otay Mesa, completing the restoration obligation within the Southwest Village Vernal Pool preserve is a preferred option. We look forward to your review and determination of the preferred mitigation option, with the understanding that upon completion of the mitigation, Tri Pointe Homes would be relieved of their vernal pool restoration and enhancement responsibility at Alta Del Mar.

Please direct any questions or comments you have regarding this letter to Jimmy Ayala of Tri Pointe Homes at (858) 794-2579.

Sincerely,

Wendy Loeffler
Biology Program Manager/Environmental Project Director

WEL:sh

Attachments

cc/att: Jimmy Ayala, Tri Pointe Homes

ATTACHMENTS

ATTACHMENT 1

The San Diego Foundation
Growing a Vibrant Region

Fund Advisor Statement

4573: Pardee Homes Vernal Pool Species Enhancement Fund #1

Statement Dates: 1/1/2011 - 12/31/2016

Fund Information
Fund#: 4573 **Endowment, Endowment Portfolio Advised**

PRINCIPAL	
Beginning Principal Balance on 1/1/2011	$0.00
Principal Contributions	$500,027.40
Earnings on Investment Activity	$43,344.01
Other Income / Adjustments	$0.00
Net Interfund Transfers	$0.00
Distributable Allocation	($28,840.81)
Principal Reinvestment	$0.00
Ending Principal Balance on 12/31/2016	**$514,530.60**

Beginning Balance on 1/1/2011	$0.00
Contributions	$0.00
Distributable Allocation	$28,840.81
Grants Approved	$0.00
Charitable Expenses	$0.00
Foundation Support Fees	($11,063.75)
Reinvested to Principal	$0.00
Other Income / Adjustments	$0.00
Net Interfund Transfers	$0.00
Ending Distributable Balance on 12/31/2016	**$17,777.06**

Total Fund Balance on 12/31/2016	**$532,307.66**

Date	Description	Amount
07/15/2011	Pardee Homes	$25,000.00
03/04/2013	Pardee Homes	$10,477.95
03/04/2013	Pardee Homes	$13,982.60

For assistance with your fund, please contact us during business hours at (619) 814-1332 or donorservices@sdfoundation.org to speak with a member of our staff. To access your fund information online, please visit https://sdfoundation.spectrumportal.net

The San Diego Foundation
Growing a Vibrant Region

Fund Advisor Statement

4573: Pardee Homes Vernal Pool Species Enhancement Fund #1

Statement Dates: 1/1/2011 - 12/31/2016

Contributions For Period: 1/1/2011 - 12/31/2016

Date	Description	Amount
03/04/2013	Pardee Homes	$17,478.25
07/26/2013	Pardee Homes	$3,492.65
07/29/2013	Pardee Homes	$3,492.65
07/29/2013	Pardee Homes	$3,492.65
07/30/2013	Pardee Homes	$3,492.65
09/09/2013	Pardee Homes	$3,492.65
10/01/2013	Pardee Homes	$3,492.65
10/29/2013	Pardee Homes	$3,492.65
10/31/2013	Pardee Homes	$3,492.65
11/12/2013	Pardee Homes	$3,492.65
11/27/2013	Pardee Homes	$3,492.65
12/09/2013	Pardee Homes	$13,970.60
12/09/2013	Pardee Homes	$3,492.65
12/20/2013	Pardee Homes	$3,492.65
12/31/2013	Pardee Homes	$3,492.65
01/30/2014	Pardee Homes	$3,492.65
02/03/2014	Pardee Homes	$3,492.65
02/07/2014	Pardee Homes	$111,764.80
02/20/2014	Pardee Homes	$3,492.65
06/20/2014	Pardee Homes	$3,492.65
08/29/2014	Pardee Homes	$3,492.65
09/12/2014	Pardee Homes	$3,492.65
09/30/2014	Pardee Homes	$3,492.65
11/07/2014	Pardee Homes	$3,492.65
12/12/2014	Pardee Homes	$3,492.65
12/15/2014	Pardee Homes	$3,492.65
01/22/2015	Pardee Homes	$45,404.45
04/09/2015	Pardee Homes	$3,492.65
04/17/2015	Pardee Homes	$3,492.65
05/29/2015	Pardee Homes	$3,492.65
08/06/2015	Pardee Homes	$3,492.65
09/21/2015	Pardee Homes	$3,492.65
01/04/2016	Pardee Homes	$3,492.65
10/04/2016	Pardee Homes	$160,661.90
	Total Contributions	$500,027.40

For assistance with your fund, please contact us during business hours at (619) 814-1332 or donorservices@sdfoundation.org to speak with a member of our staff. To access your fund information online, please visit https://sdfoundation.spectrumportal.net

The San Diego Foundation
Growing a Vibrant Region

Fund Advisor Statement

4573: Pardee Homes Vernal Pool Species Enhancement Fund #1

Statement Dates: 1/1/2011 - 12/31/2016

ATTACHMENT 2

ALTA DEL MAR
TECHNICAL SITE PLAN

HOA REPONSIBILITIES

1. OWNERSHIP AND MAINTENANCE OF LOTS:
   "D,E,F,G,H,I,J,K,L,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z,AA,BB,CC,DD,EE,FF,GG,HH,II,JJ,KK
   LL,MM,PP,RR,SS,TT,UU,VV,WW,XX,YY,ZZ,AAA,BBB,CCC,DDD,EEE"
2. PRIVATE STORM DRAIN ON LOTS 6, 36, 42, 92, 96 AND 99
3. BRUSH MANAGEMENT ON LOTS R,S,T, U AND A PORTION OF LOTS O AND N
4. OWNERSHIP AND MAINTENANCE OF TRAIL WITHIN LOT 'E'
5. OWNERSHIP AND MAINTENANCE OF D.G. ACCESS ROAD WITHIN LOT 'F'
6. OWNERSHIP AND MAINTENANCE OF VERNAL POOLS WITHIN LOTS J,O,P,X,WW,XX,YY AND ZZ

ACREAGE

GROSS: 277.813 ACRES

DISCLAIMER

THIS MAP IS INTENDED FOR THE SOLE USE OF PARDEE HOMES. IT SHOULD NOT BE RELIED ON AS AN ACCURATE REPRESENTATION OF EXISTING OR FUTURE DEVELOPMENT OR LAND USES. ANY REFERENCES ON THIS MAP TO DEVELOPMENT "COMING SOON" MEAN DEVELOPEMENT THAT IS CURRENTLY PROPOSED; PARDEE HOMES CANNOT OFFER ANY ASSURANCE ABOUT ANY SUCH ULTIMATE DEVELOPMENT.

PARDEE RESERVES THE RIGHT TO CHANGE THE SIZE, DESIGN, CONFIGURATION AND LOCATION OF UNSOLD LOTS AND THE COMMON AREAS, INCLUDING, BUT NOT LIMITED TO STREETS, OPEN SPACE, LANDSCAPE AREAS AND ACCESS FACILITIES IN THAT PORTION OF THE PROJECT DEPICTED WHICH IT OWNS. PARDEE FURTHER RESERVES THE RIGHT TO CHANGE ITS MARKETING PLAN AT ANY TIME TO A DIFFERENT PLAN, WHICH MAY INVOLVE CHANGES IN THE SIZES OF HOMES TO BE BUILT, THE NUMBER AND TYPES OF ROOMS IN THOSE HOMES, STANDARD AND OPTIONAL AMENITIES FOR THOSE HOMES, AND THE ARCHITECTURAL STYLES OF THE HOMES.

TO THE EXTENT THAT THE MAP INCLUDES PROPERTY NOT OWNED BY PARDEE HOMES, PARDEE HAS NO CONTROL OVER THE DEVELOPMENT OR OTHER USE OF SUCH LAND. LIKEWISE, IF PARDEE HOMES SELLS ANY PROPERTY WHICH IT OWNS, IT WILL NO LONGER HAVE CONTROL OVER THE DEVELOPMENT OR USE OF SUCH LAND. CONVERSELY, PARDEE HOMES MAY ACQUIRE LAND DEPICTED ON THIS MAP WHICH IT CURRENTLY DOES NOT OWN.

FOR CURRENT INFORMATION REGARDING DEVELOPMENT WITHIN THIS AREA, CONSULT THE APPROPRIATE GOVERNING AGENCY EXERCISING JURISDICTION OR CONTROL OVER THE SUBJECT MATTER OF THE INQUIRY.

NOTES

1. FRONT YARD SETBACKS TO HOUSE STRUCTURE IS 25' PER DEL MAR MESA SPECIFIC PLAN, BUT MAY BE REDUCED TO 15' AT SIDE TURNED OR REAR FACING GARAGES (IN ORDER TO ENCOURAGE GARAGE DOORS TO NOT FACE THE STREET).

2. MINIMUM SIDEYARD SETBACK IS 10' FOR ALL LOTS. HOWEVER, THE MINIMUM SPACING BETWEEN ANY TWO HOUSES IS 25 FEET FOR ANY PAIR OF HOUSES FOR WHICH ONE IS A ONE-STORY STRUCTURE. THE MINIMUM SPACING IS 30 FEET IF BOTH HOUSES ARE TWO STORIES.

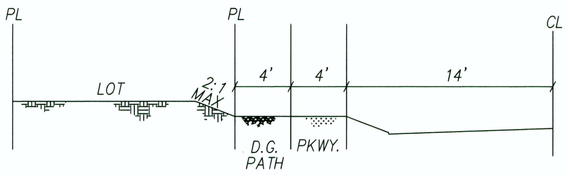
3. DRIVEWAY SHALL BE 3' FROM THE PROPERTY LINE EXTENDED TO THE CURB.

4. FOR PARKWAY, TRESS ARE PERMANENT, IRRIGATION IS NOT.

5. LOT COVERAGE
   PLAN 1A – 5,290 SQ. FT. PLAN 1B – 5,060 SQ. FT. PLAN 1C – 5,180 SQ. FT.
   PLAN 2A – 5,890 SQ. FT. PLAN 2B – 5,401 SQ. FT. PLAN 2C – 5,591 SQ. FT.
   PLAN 3A – 3,580 SQ. FT. PLAN 3B – 3,570 SQ. FT. PLAN 3D – 3,620 SQ. FT.
   PLAN 4A – 4,684 SQ. FT. PLAN 4B – 4,800 SQ. FT. PLAN 4D – 4,390 SQ. FT.
6. ALL ORNAMENTAL LIGHTS WILL BE MAINTAINED BY THE HOA AND IF A LIGHT IS ON A HOME OWNER LOT AN EASEMENT WILL BE ESTABLISHED TO GRANT MAINTENANCE RIGHTS TO THE HOA.

LOT SUMMARY TABLE

	RESIDENTIAL LOTS		BRUSH MGMT. LOTS	HOA LOTS	MAD LOTS	POTENTIAL VIEW LOTS	OPEN SPACE LOTS	LOTS	CVN 10 LOTS
	LOT NO.	PROP. ZONING							
	1–136	AR–1–1	LOTS R,S,T,U	D–Z	NONE	1,2,7–21	"A,B,C"	136	GGG
			PORTION OF	AA–ZZ		22–29			FFF
			LOTS N,O	AAA–FFF		36–52,62–67			
						83–101			
						108–120			
						124–125			
						129–136			
TOTAL	136	136	6	55	0	90	3	136	2



STREET SECTION
NOT TO SCALE

NOT TO SCALE

LEGEND

- PROPOSED 5' METAL IRON FENCE (MAINTAINED BY HOMEOWNER)
- PROPOSED 5' WOOD FENCE (MAINTAINED BY HOA
- PROPOSED 5' BLOCK WALL (MAINTAINED BY HOMEOWNER)
- PROPOSED 4' ENTRY WALL (MAINTAINED BY HOA)
- PERIMETER COMBO WALL (MAINTAINED BY HOA)
- PROPOSED 3' PEELER POLE FENCE (MAINTAINED BY HOA)
- PROPOSED END BLOCK WALL (MAINTAINED BY HOA)
- PROPOSED REAR COMBO WALL (MAINTAINED BY HOMEOWNER
- 16" PILASTER (MAINTAINED BY HOMEOWNER)
- SUBDIVISION BOUNDARY

COLOR LEGEND

1 HOA AREAS CONTAINING VERNAL POOLS (OWNED AND MAINTAINED BY HOA)
1B PRESERVED OPEN SPACE (OWNED AND MAINTAINED BY HOA)
2 URBAN AMENITY OPEN SPACE (OWNED AND MAINTAINED BY HOA)
3 DRAINAGE LOT/DETENTION BASIN (OWNED AND MAINTAINED BY HOA)
4 DRAINAGE D.G. ACCESS ROAD (OWNED AND MAINTAINED BY HOA)
5 BRUSH MANAGEMENT ZONE 2 (OWNED AND MAINTAINED BY HOA)
6 BRUSH MANAGEMENT ZONE 1 (MAINTAINED BY HOMEOWNER)
7 BRUSH MANAGEMENT ZONE 1 (MAINTAINED BY HOA)
8 LANDSCAPING (OWNED AND MAINTAINED BY HOA)
9 MSCP OPEN SPACE (OWNED AND MAINTAINED BY CITY OF SAN DIEGO)
10 MAJOR STREET PAVING (PUBLIC) (OWNED AND MAINTAINED BY CITY OF SAN DIEGO)
11 LOCAL STREET PAVING (PRIVATE) (OWNED AND MAINTAINED BY HOA)
12 TRAIL (OWNED AND MAINTAINED BY HOA)
13 MULTI-USE TRAIL (OWNED AND MAINTAINED BY CITY OF SAN DIEGO) NOTE: SDG&E WILL MAINTAIN THE ACCESS EASEMENT AS NECESSARY FOR IT'S USE UNDER THE GRANTED EASEMENT, BUT SDG&E SHALL NOT BE REQUIRED TO CONTRIBUTE TO JOINT MAINTENANCE EFFORTS. (D.G. PATH MIANTAINED BY CITY OF SAN DIEGO, FENCE MAINTAINED BY HOA)
14 PROPOSED PEDESTRIAN WALKWAY (OWNED AND MAINTAINED BY HOA)
15 PARKWAY (OWNED BY HOA, MAINTAINED BY HOMEOWNER)
16 HOMEOWNER SLOPE
17 UTILITY ACCESS EASEMENT (SEWER) (GRANTED TO CITY OF SAN DIEGO) MAINTAINED BY CITY OF SAN DIEGO LANDSCAPE TO BE MAINTAINED BY HOA.
18 HOA EASEMENT (STORM DRAIN) (GRANTED TO HOA) HOMEOWNER OWNED, HOA MAINTAINED
19 CUSTOM HOME LOTS
20 STORM DRAIN EASEMENT (HOA OWNED, MAINTAINED BY CITY OF SAN DIEGO) LANDSCAPE TO BE MAINTAINED BY HOA.
21 CARMEL VALLEY NEIGHBORHOOD 10 MAINTAINED BRUSH MANAGEMENT ZONES
21 PARKWAY (OWNED BY CITY OF SAN DIEGO, MAINTAINED BY HOA)

NO.	REVISION	PREPARED BY	DATE
1	FIRST SUBMITTAL	PDC	

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Environmental | Engineering | Survey
701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

PREPARED FOR:

PardeeHomes
6025 EDGEWOOD BEND COURT
San Diego, CA 92130
Tel.(858)794-2500, Fax(858)794-2599

PARDEE HOMES APPROVALS:

LANDSCAPING — DATE 8/19/13
LAND DEVELOPMENT — DATE 8/12/13
COMMUNITY RELATIONS — DATE 8/12/2013

SHEET 1 OF 1

ATTACHMENT 3

Restored and Enhanced Vernal Pools

Attachment 3 Restored and Enhanced Vernal Pools										
Proposed Pool Number	City Biology Guidelines Defined Mitigation Type	USACE Defined Compensatory Mitigation Type	Proposed Activities	Vernal Pool Size (sq ft.)	Target Depth (inches)	Ponding Depth After 14 days[1]	Ponding Depth After 21 days[1]	Existing Native Species	Target Native Vernal Pool Species[3]	Existing Non-native Species
1	Restoration	Re-establishment	Grading/Seeding/Weeding	1376	12	3.3	2.6		-	Non-native grasses
2	Restoration	Re-establishment	Grading/Seeding/Weeding	1303	10	1.3	0.6		-	Non-native grasses
3	Restoration	Re-establishment	Grading/Seeding/Weeding	976	12	3.8	3.1		-	Non-native grasses
4	Restoration	Re-establishment	Grading/Seeding/Weeding	1283	12	3.4	2.7		-	Non-native grasses
5	Restoration	Re-establishment	Grading/Seeding/Weeding	627	6	2.6	1.9		-	Non-native grasses
6	Restoration	Re-establishment	Grading/Seeding/Weeding	930	8	1.6	0.9		-	Non-native grasses
7	Restoration	Re-establishment	Grading/Seeding/Weeding	862	8	2.3	1.6		-	Non-native grasses
8	Restoration	Re-establishment	Grading/Seeding/Weeding	403	6	6.8	6.1		-	Non-native grasses
9	Restoration	Re-establishment	Grading/Seeding/Weeding	415	6	2.0	1.3		-	Non-native grasses
10	Restoration	Re-establishment	Grading/Seeding/Weeding	1120	10	1.8	1.1			Non-native grasses
11	Restoration	Re-establishment	Grading/Seeding/Weeding	1040	10	1.2	0.5		-	Non-native grasses
12	Restoration	Re-establishment	Grading/Seeding/Weeding	875	8	1.5	0.8		-	Non-native grasses
13	Restoration	Re-establishment	Grading/Seeding/Weeding	406	6	2.0	1.3		-	Non-native grasses
14	Restoration	Re-establishment	Grading/Seeding/Weeding	795	8	1.6	0.9		-	Non-native grasses
15	Restoration	Re-establishment	Grading/Seeding/Weeding	572	8	4.9	4.2		-	Non-native grasses
16	Restoration	Re-establishment	Grading/Seeding/Weeding	943	8	1.6	0.9		-	Non-native grasses
17	Restoration	Re-establishment	Grading/Seeding/Weeding	641	8	4.9	4.2		-	Non-native grasses
18	Restoration	Re-establishment	Grading/Seeding/Weeding	957	10	1.6	0.9		-	Non-native grasses
19	Restoration	Re-establishment	Grading/Seeding/Weeding	888	8	1.3	0.6		-	Non-native grasses
20	Restoration	Re-establishment	Grading/Seeding/Weeding	864	8	1.1	0.4		-	Non-native grasses
21	Restoration	Re-establishment	Grading/Seeding/Weeding	692	8	1.3	0.6		-	Non-native grasses
22	Restoration	Re-establishment	Grading/Seeding/Weeding	524	6	2.8	2.1		-	Non-native grasses
23	Restoration	Re-establishment	Grading/Seeding/Weeding	760	8	3.6	2.9		-	Non-native grasses
24	Restoration	Re-establishment	Grading/Seeding/Weeding	619	8	3.2	2.5		-	Non-native grasses
25	Restoration	Re-establishment	Grading/Seeding/Weeding	580	6	3.1	2.4		-	Non-native grasses
26	Restoration	Re-establishment	Grading/Seeding/Weeding	745	8	1.7	1.0		-	Non-native grasses
27	Restoration	Re-establishment	Grading/Seeding/Weeding	712	8	1.0	0.3		-	Non-native grasses
28	Restoration	Re-establishment	Grading/Seeding/Weeding	544	6	5.5	4.8		-	Non-native grasses
29	Restoration	Re-establishment	Grading/Seeding/Weeding	1254	12	2.7	2.0		-	Non-native grasses
30	Restoration	Re-establishment	Grading/Seeding/Weeding	587	6	4.7	4.0		-	Non-native grasses
31	Restoration	Re-establishment	Grading/Seeding/Weeding	558	6	2.2	1.5		-	Non-native grasses
32	Restoration	Re-establishment	Grading/Seeding/Weeding	596	10	1.2	0.5		-	Non-native grasses
33	Restoration	Re-establishment	Grading/Seeding/Weeding	1172	10	1.4	0.7		-	Non-native grasses
34	Restoration	Re-establishment	Grading/Seeding/Weeding	431	6	1.8	1.1		-	Non-native grasses
35	Restoration	Re-establishment	Grading/Seeding/Weeding	1061	10	0.9	0.2		-	Non-native grasses
36	Restoration	Re-establishment	Grading/Seeding/Weeding	685	6	1.2	0.5		-	Non-native grasses
37	Restoration	Re-establishment	Grading/Seeding/Weeding	1056	10	2.8	2.1		-	Non-native grasses

Attachment 3 Restored and Enhanced Vernal Pools										
Proposed Pool Number	City Biology Guidelines Defined Mitigation Type	USACE Defined Compensatory Mitigation Type	Proposed Activities	Vernal Pool Size (sq ft.)	Target Depth (inches)	Ponding Depth After 14 days[1]	Ponding Depth After 21 days[1]	Existing Native Species	Target Native Vernal Pool Species[3]	Existing Non-native Species
38	Restoration	Re-establishment	Grading/Seeding/Weeding	616	8	2.2	1.5		-	Non-native grasses
39	Restoration	Re-establishment	Grading/Seeding/Weeding	409	6	2.7	2.0		-	Non-native grasses
40	Restoration	Re-establishment	Grading/Seeding/Weeding	405	6	3.7	3.0		-	Non-native grasses
41	Restoration	Re-establishment	Grading/Seeding/Weeding	640	10	2.3	1.6		-	Non-native grasses
42	Restoration	Re-establishment	Grading/Seeding/Weeding	430	6	4.7	4.0		-	Non-native grasses
43	Restoration	Re-establishment	Grading/Seeding/Weeding	406	6	3.0	2.3		-	Non-native grasses
44	Restoration	Re-establishment	Grading/Seeding/Weeding	460	6	3.3	2.6		-	Non-native grasses
45	Restoration	Re-establishment	Grading/Seeding/Weeding	672	8	2.5	1.8		-	Non-native grasses
46	Restoration	Re-establishment	Grading/Seeding/Weeding	408	6	1.0	0.3		-	Non-native grasses
47	Restoration	Re-establishment	Grading/Seeding/Weeding	665	8	2.8	2.1		-	Non-native grasses
48	Restoration	Re-establishment	Grading/Seeding/Weeding	572	8	2.5	1.8		-	Non-native grasses
49	Restoration	Re-establishment	Grading/Seeding/Weeding	403	6	4.7	4.0		-	Non-native grasses
50	Restoration	Re-establishment	Grading/Seeding/Weeding	406	6	6.6	5.9		-	Non-native grasses
51	Restoration	Re-establishment	Grading/Seeding/Weeding	405	6	3.7	3.0		-	Non-native grasses
52	Restoration	Re-establishment	Grading/Seeding/Weeding	410	6	5.5	4.8		-	Non-native grasses
53	Restoration	Re-establishment	Grading/Seeding/Weeding	406	6	11.5	10.8		-	Non-native grasses
54	Restoration	Re-establishment	Grading/Seeding/Weeding	450	6	10.6	9.9		-	Non-native grasses
55	Restoration	Re-establishment	Grading/Seeding/Weeding	406	6	7.3	6.6		-	Non-native grasses
56	Restoration	Re-establishment	Grading/Seeding/Weeding	424	6	3.3	2.6		-	Non-native grasses
57	Restoration	Re-establishment	Grading/Seeding/Weeding	1443	12	2.0	1.3		-	Non-native grasses
58	Restoration	Re-establishment	Grading/Seeding/Weeding	1289	12	5.1	4.4		-	Non-native grasses
59	Restoration	Re-establishment	Grading/Seeding/Weeding	988	10	3.6	2.9		-	Non-native grasses
60	Restoration	Re-establishment	Grading/Seeding/Weeding	404	6	2.1	1.4		-	Non-native grasses
61	Restoration	Re-establishment	Grading/Seeding/Weeding	407	6	2.8	2.1		-	Non-native grasses
62	Restoration	Re-establishment	Grading/Seeding/Weeding	401	6	2.2	1.5		-	Non-native grasses
63	Restoration	Re-establishment	Grading/Seeding/Weeding	407	6	5.6	4.9		-	Non-native grasses
64	Restoration	Re-establishment	Grading/Seeding/Weeding	684	8	0.6	0.0		-	Non-native grasses
65	Restoration	Re-establishment	Grading/Seeding/Weeding	518	6	10.8	10.1		-	Non-native grasses
66	Restoration	Re-establishment	Grading/Seeding/Weeding	1009	10	1.7	1.0		-	Non-native grasses
67	Restoration	Re-establishment	Grading/Seeding/Weeding	652	6	3.3	2.6		-	Non-native grasses
68	Restoration	Re-establishment	Grading/Seeding/Weeding	1125	10	1.8	1.1		-	Non-native grasses
69	Restoration	Re-establishment	Grading/Seeding/Weeding	1218	12	1.5	0.8		-	Non-native grasses
70	Restoration	Re-establishment	Grading/Seeding/Weeding	1217	12	1.3	0.6		-	Non-native grasses
71	Restoration	Re-establishment	Grading/Seeding/Weeding	510	6	1.4	0.7		-	Non-native grasses
72	Restoration	Re-establishment	Grading/Seeding/Weeding	437	6	2.7	2.0		-	Non-native grasses
73	Restoration	Re-establishment	Grading/Seeding/Weeding	902	10	1.8	1.1		-	Non-native grasses
74	Restoration	Re-establishment	Grading/Seeding/Weeding	598	6	1.9	1.2		-	Non-native grasses

Attachment 3 Restored and Enhanced Vernal Pools										
Proposed Pool Number	City Biology Guidelines Defined Mitigation Type	USACE Defined Compensatory Mitigation Type	Proposed Activities	Vernal Pool Size (sq ft.)	Target Depth (inches)	Ponding Depth After 14 days[1]	Ponding Depth After 21 days[1]	Existing Native Species	Target Native Vernal Pool Species[3]	Existing Non-native Species
75	Restoration	Re-establishment	Grading/Seeding/Weeding	943	10	1.7	1.0		-	Non-native grasses
76	Restoration	Re-establishment	Grading/Seeding/Weeding	864	8	2.2	1.5		-	Non-native grasses
77	Restoration	Re-establishment	Grading/Seeding/Weeding	692	6	1.2	0.5		-	Non-native grasses
78	Restoration	Re-establishment	Grading/Seeding/Weeding	976	10	2.4	1.7		-	Non-native grasses
79	Restoration	Re-establishment	Grading/Seeding/Weeding	409	6	7.8	7.1		-	Non-native grasses
80	Restoration	Re-establishment	Grading/Seeding/Weeding	748	8	1.7	1.0		-	Non-native grasses
81	Restoration	Re-establishment	Grading/Seeding/Weeding	406	6	1.5	0.8		-	Non-native grasses
82	Restoration	Re-establishment	Grading/Seeding/Weeding	1376	12	1.3	0.6		-	Non-native grasses
83	Restoration	Re-establishment	Grading/Seeding/Weeding	507	6	3.2	2.5		-	Non-native grasses
84	Restoration	Re-establishment	Grading/Seeding/Weeding	795	8	1.4	0.7		-	Non-native grasses
85	Restoration	Re-establishment	Grading/Seeding/Weeding	888	8	1.5	0.8		-	Non-native grasses
86	Restoration	Re-establishment	Grading/Seeding/Weeding	1303	12	4.9	4.2		-	Non-native grasses
87	Restoration	Re-establishment	Grading/Seeding/Weeding	685	8	1.2	0.5		-	Non-native grasses
88	Restoration	Re-establishment	Grading/Seeding/Weeding	957	10	2.0	1.3		-	Non-native grasses
89	Restoration	Re-establishment	Grading/Seeding/Weeding	626	8	1.4	0.7		-	Non-native grasses
90	Restoration	Re-establishment	Grading/Seeding/Weeding	1056	10	2.0	1.3		-	Non-native grasses
91	Restoration	Re-establishment	Grading/Seeding/Weeding	544	6	1.3	0.6		-	Non-native grasses
92	Restoration	Re-establishment	Grading/Seeding/Weeding	404	6	2.1	1.4		-	Non-native grasses
93	Restoration	Re-establishment	Grading/Seeding/Weeding	1061	10	2.9	2.2		-	Non-native grasses
94	Restoration	Re-establishment	Grading/Seeding/Weeding	406	6	4.4	3.7		-	Non-native grasses
95	Restoration	Re-establishment	Grading/Seeding/Weeding	641	8	3.2	2.5		-	Non-native grasses
96	Restoration	Re-establishment	Grading/Seeding/Weeding	407	6	1.1	0.4		-	Non-native grasses
97	Restoration	Re-establishment	Grading/Seeding/Weeding	405	6	1.9	1.2		-	Non-native grasses
98	Restoration	Re-establishment	Grading/Seeding/Weeding	596	6	5.1	4.4		-	Non-native grasses
99	Restoration	Re-establishment	Grading/Seeding/Weeding	919	10	4.0	3.3		-	Non-native grasses
100	Restoration	Re-establishment	Grading/Seeding/Weeding	1048	10	1.4	0.7		-	Non-native grasses
101	Restoration	Re-establishment	Grading/Seeding/Weeding	690	6	1.3	0.6		-	Non-native grasses
102	Restoration	Re-establishment	Grading/Seeding/Weeding	1498	12	0.9	0.2		-	Non-native grasses
103	Restoration	Re-establishment	Grading/Seeding/Weeding	841	10	1.6	0.9		-	Non-native grasses
104	Restoration	Re-establishment	Grading/Seeding/Weeding	1048	10	1.5	0.8		-	Non-native grasses
105	Restoration	Re-establishment	Grading/Seeding/Weeding	700	6	2.5	1.8		-	Non-native grasses
106	Restoration	Re-establishment	Grading/Seeding/Weeding	660	6	3.8	3.1		-	Non-native grasses
107	Restoration	Re-establishment	Grading/Seeding/Weeding	1184	12	0.9	0.2		-	Non-native grasses
108	Restoration	Re-establishment	Grading/Seeding/Weeding	570	6	3.6	2.9		-	Non-native grasses
109	Restoration	Re-establishment	Grading/Seeding/Weeding	697	8	3.1	2.4		-	Non-native grasses
110	Restoration	Re-establishment	Grading/Seeding/Weeding	836	10	3.6	2.9		-	Non-native grasses
111	Restoration	Re-establishment	Grading/Seeding/Weeding	965	10	3.8	3.1		-	Non-native grasses

Attachment 3 Restored and Enhanced Vernal Pools										
Proposed Pool Number	City Biology Guidelines Defined Mitigation Type	USACE Defined Compensatory Mitigation Type	Proposed Activities	Vernal Pool Size (sq ft.)	Target Depth (inches)	Ponding Depth After 14 days[1]	Ponding Depth After 21 days[1]	Existing Native Species	Target Native Vernal Pool Species[3]	Existing Non-native Species
112	Restoration	Re-establishment	Grading/Seeding/Weeding	629	6	1.4	0.7		-	Non-native grasses
113	Restoration	Re-establishment	Grading/Seeding/Weeding	888	10	2.6	1.9		-	Non-native grasses
114	Restoration	Re-establishment	Grading/Seeding/Weeding	1026	10	2.9	2.2		-	Non-native grasses
115	Restoration	Re-establishment	Grading/Seeding/Weeding	1476	12	1.7	1.0		-	Non-native grasses
116	Restoration	Re-establishment	Grading/Seeding/Weeding	1113	10	2.7	2.0		-	Non-native grasses
117	Restoration	Re-establishment	Grading/Seeding/Weeding	862	10	2.5	1.8		-	Non-native grasses
118	Restoration	Re-establishment	Grading/Seeding/Weeding	743	8	4.2	3.5		-	Non-native grasses
119	Restoration	Re-establishment	Grading/Seeding/Weeding	421	6	7.5	6.8		-	Non-native grasses
120	Restoration	Re-establishment	Grading/Seeding/Weeding	974	10	2.5	1.8		-	Non-native grasses
121	Restoration	Re-establishment	Grading/Seeding/Weeding	759	8	3.1	2.4		-	Non-native grasses
122	Restoration	Re-establishment	Grading/Seeding/Weeding	1488	12	1.9	1.2		-	Non-native grasses
123	Restoration	Re-establishment	Grading/Seeding/Weeding	1414	12	3.0	2.3		-	Non-native grasses
124	Restoration	Re-establishment	Grading/Seeding/Weeding	884	10	3.4	2.7		-	Non-native grasses
125	Restoration	Re-establishment	Grading/Seeding/Weeding	649	6	2.0	1.31		-	Non-native grasses
126	Restoration	Re-establishment	Grading/Seeding/Weeding	1045	10	2.4	1.7		-	Non-native grasses
127	Restoration	Re-establishment	Grading/Seeding/Weeding	905	10	2.8	2.1		-	Non-native grasses
128	Restoration	Re-establishment	Grading/Seeding/Weeding	778	8	0.9	0.2		-	Non-native grasses
129	Restoration	Re-establishment	Grading/Seeding/Weeding	1491	12	2.1	1.4		-	Non-native grasses
130	Restoration	Re-establishment	Grading/Seeding/Weeding	770	8	2.20	1.5		-	Non-native grasses
131	Restoration	Re-establishment	Grading/Seeding/Weeding	1102	10	3.1	2.4		-	Non-native grasses
132	Restoration	Re-establishment	Grading/Seeding/Weeding	1500	12	1.0	0.3		-	Non-native grasses
133	Restoration	Re-establishment	Grading/Seeding/Weeding	1486	12	1.5	0.8		-	Non-native grasses
134	Restoration	Re-establishment	Grading/Seeding/Weeding	881	10	3.5	2.8		-	Non-native grasses
135	Restoration	Re-establishment	Grading/Seeding/Weeding	1118	12	3.0	2.3		-	Non-native grasses
136	Restoration	Re-establishment	Grading/Seeding/Weeding	408	6	5.3	4.6		-	Non-native grasses
137	Restoration	Re-establishment	Grading/Seeding/Weeding	924	10	2.4	1.7		-	Non-native grasses
138	Restoration	Re-establishment	Grading/Seeding/Weeding	893	10	1.8	1.1		-	Non-native grasses
139	Restoration	Re-establishment	Grading/Seeding/Weeding	1500	12	2.4	1.7		-	Non-native grasses
140	Restoration	Re-establishment	Grading/Seeding/Weeding	482	10	8.7	8.0		-	Non-native grasses
141	Restoration	Re-establishment	Grading/Seeding/Weeding	608	10	6.0	5.3		-	Non-native grasses
142	Restoration	Re-establishment	Grading/Seeding/Weeding	1497	12	4.2	3.5		-	Non-native grasses
143	Restoration	Re-establishment	Grading/Seeding/Weeding	537	6	2.3	1.6		-	Non-native grasses
144	Restoration	Re-establishment	Grading/Seeding/Weeding	1471	12	1.1	0.4		-	Non-native grasses
145	Restoration	Re-establishment	Grading/Seeding/Weeding	560	6	1.6	0.9		-	Non-native grasses
146	Restoration	Re-establishment	Grading/Seeding/Weeding	1463	12	1.6	0.9		-	Non-native grasses
147	Restoration	Re-establishment	Grading/Seeding/Weeding	1483	12	1.3	0.6		-	Non-native grasses
148	Restoration	Re-establishment	Grading/Seeding/Weeding	692	6	2.5	1.8		-	Non-native grasses

Attachment 3 Restored and Enhanced Vernal Pools										
Proposed Pool Number	City Biology Guidelines Defined Mitigation Type	USACE Defined Compensatory Mitigation Type	Proposed Activities	Vernal Pool Size (sq ft.)	Target Depth (inches)	Ponding Depth After 14 days[1]	Ponding Depth After 21 days[1]	Existing Native Species	Target Native Vernal Pool Species[3]	Existing Non-native Species
149/P10	Restoration	Re-establishment	Grading/Seeding/Weeding	1994	12	1.4	0.7		-	Non-native grasses
150	Restoration	Re-establishment	Grading/Seeding/Weeding	1428	12	1.5	0.8		-	Non-native grasses
151	Restoration	Re-establishment	Grading/Seeding/Weeding	1174	10	0.9	0.2		-	Non-native grasses
152	Restoration	Re-establishment	Grading/Seeding/Weeding	1047	10	2.5	1.8		-	Non-native grasses
153	Restoration	Re-establishment	Grading/Seeding/Weeding	976	8	1.0	0.3		-	Non-native grasses
154	Restoration	Re-establishment	Grading/Seeding/Weeding	850	8	3.2	2.5		-	Non-native grasses
155	Restoration	Re-establishment	Grading/Seeding/Weeding	906	8	2.2	1.5		-	Non-native grasses
156	Restoration	Re-establishment	Grading/Seeding/Weeding	1053	10	6.0	5.3		-	Non-native grasses
157	Restoration	Re-establishment	Grading/Seeding/Weeding	708	8	5.8	5.1		-	Non-native grasses
158	Restoration	Re-establishment	Grading/Seeding/Weeding	1091	8	2.9	2.2		-	Non-native grasses
159	Restoration	Re-establishment	Grading/Seeding/Weeding	1363	10	5.6	4.9		-	Non-native grasses
160	Restoration	Re-establishment	Grading/Seeding/Weeding	1416	12	0.5	0.0		-	Non-native grasses
161	Restoration	Re-establishment	Grading/Seeding/Weeding	1243	12	5.0	4.3		-	Non-native grasses
162	Restoration	Re-establishment	Grading/Seeding/Weeding	712	8	3.0	2.3		-	Non-native grasses
163	Restoration	Re-establishment	Grading/Seeding/Weeding	674	8	6.5	5.8		-	Non-native grasses
164	Restoration	Re-establishment	Grading/Seeding/Weeding	1470	12	3.4	2.7		-	Non-native grasses
165	Restoration	Re-establishment	Grading/Seeding/Weeding	1449	12	2.5	1.8		-	Non-native grasses
166	Restoration	Re-establishment	Grading/Seeding/Weeding	1196	12	4.7	4.0		-	Non-native grasses
167	Restoration	Re-establishment	Grading/Seeding/Weeding	1470	12	3.8	3.1		-	Non-native grasses
168	Restoration	Re-establishment	Grading/Seeding/Weeding	1366	10	1.1	0.4		-	Non-native grasses
169	Restoration	Re-establishment	Grading/Seeding/Weeding	1123	12	1.2	0.5		-	Non-native grasses
170	Restoration	Re-establishment	Grading/Seeding/Weeding	959	10	1.7	1.0		-	Non-native grasses
171	Restoration	Re-establishment	Grading/Seeding/Weeding	1497	12	4.1	3.4		-	Non-native grasses
172	Restoration	Re-establishment	Grading/Seeding/Weeding	1243	12	2.4	1.7		-	Non-native grasses
173	Restoration	Re-establishment	Grading/Seeding/Weeding	1012	10	2.0	1.3		-	Non-native grasses
174	Restoration	Re-establishment	Grading/Seeding/Weeding	1242	10	1.2	0.5		-	Non-native grasses
175	Restoration	Re-establishment	Grading/Seeding/Weeding	781	8	1.5	0.8		-	Non-native grasses
176	Restoration	Re-establishment	Grading/Seeding/Weeding	405	6	2.2	1.5		-	Non-native grasses
177	Restoration	Re-establishment	Grading/Seeding/Weeding	796	6	1.4	0.7		-	Non-native grasses
178	Restoration	Re-establishment	Grading/Seeding/Weeding	810	10	5.7	5.0		-	Non-native grasses
179	Restoration	Re-establishment	Grading/Seeding/Weeding	667	10	5.9	5.2		-	Non-native grasses
180	Restoration	Re-establishment	Grading/Seeding/Weeding	696	10	1.8	1.1		-	Non-native grasses
181	Restoration	Re-establishment	Grading/Seeding/Weeding	724	10	4.8	4.1		-	Non-native grasses
182	Restoration	Re-establishment	Grading/Seeding/Weeding	410	6	12.6	11.9		-	Non-native grasses
183	Restoration	Re-establishment	Grading/Seeding/Weeding	421	6	4.8	4.1		-	Non-native grasses
184	Restoration	Re-establishment	Grading/Seeding/Weeding	1000	10	4.1	3.4		-	Non-native grasses
185	Restoration	Re-establishment	Grading/Seeding/Weeding	1032	10	3.8	3.1		-	Non-native grasses

Attachment 3 Restored and Enhanced Vernal Pools										
Proposed Pool Number	City Biology Guidelines Defined Mitigation Type	USACE Defined Compensatory Mitigation Type	Proposed Activities	Vernal Pool Size (sq ft.)	Target Depth (inches)	Ponding Depth After 14 days[1]	Ponding Depth After 21 days[1]	Existing Native Species	Target Native Vernal Pool Species[3]	Existing Non-native Species
186	Restoration	Re-establishment	Grading/Seeding/Weeding	894	10	1.8	1.1			Non-native grasses
187	Restoration	Re-establishment	Grading/Seeding/Weeding	562	6	1.6	0.9			Non-native grasses
188/P18	Restoration	Re-establishment	Grading/Seeding/Weeding	1282	10	5.7	5.0			
189	Restoration	Re-establishment	Grading/Seeding/Weeding	700	8	5.4	4.7			Non-native grasses
190/P9/P16	Restoration	Re-establishment	Grading/Seeding/Weeding	1171	10	5.3	4.6			
191	Restoration	Re-establishment	Grading/Seeding/Weeding	635	6	2.3	1.6			Non-native grasses
192	Restoration	Re-establishment	Grading/Seeding/Weeding	698	6	2.7	2.0			Non-native grasses
193	Restoration	Re-establishment	Grading/Seeding/Weeding	898	8	4.2	3.5			Non-native grasses
194/P19	Restoration	Re-establishment	Grading/Seeding/Weeding	1781	12	2.7	2.0			
P2	Restoration	Re-establishment	Seeding/Weeding	27	4			PSIBRE		FESPER
P5	Restoration	Re-establishment	Seeding/Weeding	174	6			PSIBRE		FESPER, SPEBOC
P8	Restoration	Re-establishment	Seeding/Weeding	245	6			PSIBRE		RUMCRI, FESPER
P11	Restoration	Re-establishment	Seeding/Weeding	348	10					Non-native grasses
P12	Restoration	Re-establishment	Seeding/Weeding	19	6			DEIFAS, PLAACA		HORMUR
P15	Restoration	Re-establishment	Grading/Seeding/Weeding	33	6			PLAACA, PSIBRE		HORDEP
P17	Restoration	Re-establishment	Grading/Seeding/Weeding	72	6			PLAACA		FESPER, HORDEP
VPHCP1203	Restoration	Re-establishment	Grading/Seeding/Weeding	22	6			PSIBRE		FESPER
VPHCP1204	Restoration	Re-establishment	Grading/Seeding/Weeding	24	6			PSIBRE		FESPER
VPHCP2338	Restoration	Re-establishment	Grading/Seeding/Weeding	133	8			PSIBRE		FESPER
P1	Enhancement	Enhancement	Seeding/Weeding	126	-			PSIBRE	CRETRU DISSPI ELEMAC MALLEP	FESPER, HORDEP
P3	Enhancement	Enhancement	Seeding/Weeding	107	-			PSIBRE	CRETRU DISSPI ELEMAC MALLEP	FESPER
P4	Enhancement	Enhancement	Seeding/Weeding	238	-			PSIBRE	CRETRU DISSPI ELEMAC MALLEP	RUMCRI, FESPER
P6	Enhancement	Enhancement	Seeding/Weeding	1019	-				CRETRU DISSPI ELEMAC	FESPER, HORDEP, BRODIA, LYTHYS

Attachment 3 Restored and Enhanced Vernal Pools										
Proposed Pool Number	City Biology Guidelines Defined Mitigation Type	USACE Defined Compensatory Mitigation Type	Proposed Activities	Vernal Pool Size (sq ft.)	Target Depth (inches)	Ponding Depth After 14 days[1]	Ponding Depth After 21 days[1]	Existing Native Species	Target Native Vernal Pool Species[3]	Existing Non-native Species
									MALLEP	
P7	Enhancement	Enhancement	Seeding/Weeding	128	-			PSIBRE	CRETRU DISSPI ELEMAC MALLEP	FESPER, BRANIG
P13	Enhancement	Enhancement	Seeding/Weeding	447	-			PSIBRE, JUNBUF	CRETRU DISSPI ELEMAC MALLEP	FESPER
TOTAL				**170,057**						
Re-established square feet				*167,991*						
Enhanced square feet				*2,066*						

[1]SOURCE: Hydraulic Analysis (Rick Engineering 2023).
[2]SOURCE: VPHCP (City of San Diego 2017b and RECON 2019)
[3]CRAAQU, DESDAN, JUNBUF, LYSMIN, PILAME, PLAACA, PLAELO, POGNUD, PSIBRE targeted to be present in all pools. ELEMAC, ORCCAL, TRISCI targeted to be present in deeper pools with a longer ponding duration. ERYARI targeted to be in at least three re-establishment pools totaling at least 0.03 acre to achieve mitigation requirements.

Key for Species:

ATRSEM = *Atriplex semibaccata*
BRANIG = *Brassica nigra*
BRODIA = *Bromus diandrus*
CALMAR = *Callitriche marginata*
CRAAQU = *Crassula aquatica*
CRETRU = *Cressa truxillensis*
DESDAN = *Deschampsia danthonioides*
DOWCUS = *Downingia cuspidata*
ELEMAC = *Eleocharis macrostachya*
ERYARI = *Eryngium aristulatum*
FESPER = *Festuca perennis*
JUNBUF = *Juncus bufonius*
LYSMIN = *Lysimachia minima*
LYTHYS = *Lythrum hyssopifolia*
MALLEP = *Malvella leprosa*
MYOMIN = *Myosurus minimus*
NAVFOS = *Navarettia fossalis*
ORCCAL = *Orcuttia californica*
PILAME = *Pilularia american*
PLAACA = *Plagiobothrys acanthocarpus*
PLAELO = *Plantago elongata*
POGNUD = *Pogogyne nudiuscula*
PSIBRE = *Psilocarphus brevissimus*
RUMCRI = *Rumex crispus*
TRISCI = *Triglochin scilloides*

ATTACHMENT 4

Hydraulic Analysis

RICK ENGINEERING COMPANY

June 27, 2023

Ms. Meagan Olson
Restoration Project Director
Recon Environmental, Inc.
3111 Camino del Rio North, Suite 600
San Diego, CA 92108

SUBJECT: HYDROLOGY STUDY FOR VERNAL POOLS FOR THE SOUTHWEST VILLAGE PROJECT (RICK ENGINEERING COMPANY JOB NUMBER 19066-J)

Dear Ms. Olson:

This letter has been prepared in support of the proposed vernal pools for the Southwest Village project (herein referred to as the "project"). The Vernal Pools are located directly south of Dillon Canyon and bound on the east by Dillon's trail. The specific focus of this letter report is on the hydrologic analyses performed in support of the proposed vernal pools.

Basis of Design

Based on input received from the habitat restoration specialist from RECON Environmental, the basis of design pertaining to hydrologic characteristics is listed below:

- Approximately one (1) mima mound per vernal pool.
- The ratio of the drainage area to vernal pool area should be approximately 8:1.
- Based on a typical storm event (i.e. – 1-year, 24-hour storm event), one (1) to three (3) inches of ponding is to remain for approximately fourteen (14) days.

The design criteria, including the design storm event as well as the depth and duration requirements, were recommended based on frequency and need of both San Diego and Riverside fairy shrimp, as well as the development of hydric soils.

Hydrology

Pursuant to the basis of design, the primary goal of the hydrologic analysis is to confirm each vernal pool is designed to receive enough runoff from its micro-drainage area to collect and store approximately one (1) to three (3) inches of runoff for fourteen (14) days during a typical storm event (1-year, 24-hour storm event). Additionally, to satisfy the depth and duration requirements for the Riverside fairy shrimp, 193 pools hold water for twenty-one (21) days.

requirements for the Riverside fairy shrimp, 193 pools hold water for twenty-one (21) days. Please see Attachment 1 for results. In order to reach the primary goal, several steps took place. An initial delineation of vernal pool locations and sub-basin drainage areas were developed. A target size of 1/8 of the drainage area was used as the basis of design for the vernal pools, however, in locations where site constraints limited the area tributary to the vernal pool it was verified that there would be one (1) to three (3) inches of ponding remaining after 14-days following a typical storm event (1-year, 24-hour). The total surface area of the vernal pools were determined and further adjustments to the size and depth of each pool complex were made.

With the location, size, and drainage area of each vernal pool identified, the rainfall volume was determined by multiplying the sub-basin area by the rainfall depth. The 24-hour rainfall depth for the 1-year storm event was obtained from the NOAA Atlas 14 Precipitation Frequency Data Server. Refer to Attachment 2 for the precipitation data. The rainfall volume was then multiplied by the runoff factor to determine the runoff volume. A runoff factor of 0.30 (City of San Diego Storm Water Standards Manual; Table B.1-1) was used for natural Type-D soils that are found at the project site. See Attachment 2 for Table B.1-1. This is consistent with both the County of San Diego Hydrology manual, June 2003, which recommends 0.35 for Type-D soils in undisturbed natural terrain, and the Caltrans Highway Design Manual, December 2015, which uses a range 0.30 - 0.40 for undisturbed natural desert or desert landscaping. The runoff factor considers antecedent soil moisture content and is on the low end of recommended runoff factor/coefficient values and is therefore a conservative approach to calculating total runoff. Type D soils typically have low infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward movement of water. Type D soils are clay loam, silty clay loam, sandy clay, silty clay, or clay.

The next step was determining the capacity of the vernal pools. The vernal pool storage volumes were calculated using volumetric measuring tools in CAD. A stage storage curve was developed by dividing the pool stage into quarters (i.e. – storage at ¼ the vernal pool depth, ½, ¾, and full depth). Based on a 1-year, 24-hour storm event, the final step was to check the depth of ponding, pan evaporation levels, and ponding depth remaining after fourteen (14) and twenty-one (21) days. The 1-year ponding depth was identified by comparing the runoff volume to the available storage capacity, and interpolating the depth based on the vernal pool stage-storage rating curve described above. The pan evaporation uses the monthly average data from the Chula Vista station. The typical monthly average pan evaporation during the wet season (October through March) is approximately 3.8-inches. Therefore, the 14-day average pan evaporation is 1.9-inches; however, a correction factor of 0.75 is used to account for radiation on the side walls and heat exchanges with the pan material. The final corrected total of the 14-day average pan evaporation is 1.4 inches. Using the same approach, the average 21-day pan evaporation is 2.1 inches. Refer to Attachment 2 for back-up regarding pan evaporation data. The evaporation rates are subtracted from the total ponding depth in the vernal pool after a 1-year, 24-hour storm event. The result provides the ponding depth that remains after fourteen (14) and twenty-one (21) days of evaporation for a 1-year, 24-hour storm event.

Refer to Attachment 1 for a table that includes the detailed hydrologic analyses for each vernal pool and refer to Map Pocket 1 for a drainage map of the overall vernal pool area, including identification of each pool, mima mound, and drainage area. As indicated above, additional backup for the Hydrologic Analyses has been included as Attachment 2, including reference material from the NOAA Atlas 14 precipitation data and Monthly Average Pan Evaporation Data for the Chula Vista Evaporation Station.

Conclusion

This letter has been prepared in support of the Vernal Pool project for the Southwest Village and has been provided to show that the hydrologic characteristics of the vernal pool complexes have been designed consistent with the basis of design. Based on typical evaporation over fourteen (14) days, the ponding depth remaining in all vernal pools is one (1) to three (3) inches or greater which reflects the design intent and the primary goal of the hydrologic analyses.

Please feel free to contact me if you have any questions and/or concerns at (619) 291-0707.

Sincerely,

RICK ENGINEERING COMPANY

Thomas Zanetti
RCE #72631, Exp. 12/23
Associate

ATTACHMENT 1

Vernal Pools - Hydrologic Analyses

SOUTHWEST VILLAGE MITIGATION: VERNAL POOLS - HYDROLOGIC ANALYSES

Storm Event:	1-yr
P 24-hr Rainfall Depth [1] (in)	1.25
Runoff Coefficient [2]:	0.30
14-Day Average Pan Evaporation with adjustment factor (0.75) [3,1] (in):	1.4
21-Day Average Pan Evaporation with adjustment factor (0.75) [3,2] (in)	2.1

Proposed VP #	Area of Sub-Basin (sf)	Area of Sub-Basin (ac)	Area of Vernal Pool [4] (sf)	Runoff Volume (Runoff C x Area of Subbasin x rainfall depth) (cf)	Available Storage Volume in Vernal Pool (cf)	Check Depth, Evaporation, and Ponding for 1-Year Storm Event				
				1-yr	VP Full Depth[5]	Depth of Ponding from 1-Year Storm Event [6] (in)	14 Day Average Pan Evaporation [7] (cf)	21 Day Average Pan Evaporation[8] (cf)	Ponding Depth Remaining After 14 Days for 1-Year Storm [9] (in)	Ponding Depth Remaining After 21 Days for 1-year Storm[10] (in)
VP1	8,685	0.20	1,376	271	846	4.7	1.4	2.1	3.3	2.6
VP2	4,560	0.10	1,303	142	705	2.7	1.4	2.1	1.3	0.6
VP3	5,094	0.12	976	159	430	5.2	1.4	2.1	3.8	3.1
VP4	7,626	0.18	1,283	238	717	4.8	1.4	2.1	3.4	2.7
VP5	4,186	0.10	627	131	216	4.0	1.4	2.1	2.6	1.9
VP6	4,262	0.10	930	133	427	3.0	1.4	2.1	1.6	0.9
VP7	4,622	0.11	862	144	363	3.7	1.4	2.1	2.3	1.6
VP8	5,951	0.14	403	186	141	8.2	1.4	2.1	6.8	6.1
VP9	2,350	0.05	415	73	144	3.4	1.4	2.1	2.0	1.3
VP10	4,808	0.11	1,120	150	612	3.2	1.4	2.1	1.8	1.1
VP11	3,409	0.08	1,040	107	580	2.6	1.4	2.1	1.2	0.5
VP12	3,332	0.08	875	104	348	2.9	1.4	2.1	1.5	0.8
VP13	2,183	0.05	406	68	137	3.4	1.4	2.1	2.0	1.3
VP14	3,129	0.07	795	98	318	3.0	1.4	2.1	1.6	0.9
VP15	5,610	0.13	572	175	240	6.3	1.4	2.1	4.9	4.2
VP16	4,302	0.10	943	134	438	3.0	1.4	2.1	1.6	0.9
VP17	2,358	0.05	641	74	270	2.7	1.4	2.1	1.3	0.6
VP18	2,708	0.06	957	85	483	2.5	1.4	2.1	1.1	0.4
VP19	3,346	0.08	888	105	387	2.7	1.4	2.1	1.3	0.6
VP20	5,194	0.12	864	162	350	4.2	1.4	2.1	2.8	2.1
VP21	5,032	0.12	692	157	277	5.0	1.4	2.1	3.6	2.9
VP22	4,164	0.10	524	130	185	4.6	1.4	2.1	3.2	2.5
VP23	5,374	0.12	760	168	333	4.5	1.4	2.1	3.1	2.4
VP24	2,715	0.06	619	85	269	3.1	1.4	2.1	1.7	1.0
VP25	2,106	0.05	580	66	201	2.4	1.4	2.1	1.0	0.3
VP26	8,522	0.20	745	266	332	6.9	1.4	2.1	5.5	4.8
VP27	4,644	0.11	712	145	329	4.1	1.4	2.1	2.7	2.0
VP28	2,495	0.06	544	78	187	2.9	1.4	2.1	1.5	0.8
VP29	6,082	0.14	1,254	190	612	4.6	1.4	2.1	3.2	2.5
VP30	6,235	0.14	587	195	203	6.1	1.4	2.1	4.7	4.0
VP31	3,159	0.07	558	99	184	3.6	1.4	2.1	2.2	1.5
VP32	5,323	0.12	596	55	300	2.6	1.4	2.1	1.2	0.5
VP33	3,558	0.08	1,172	111	547	2.8	1.4	2.1	1.4	0.7
VP34	2,194	0.05	431	69	148	3.2	1.4	2.1	1.8	1.1
VP35	2,914	0.07	1,061	91	593	2.3	1.4	2.1	0.9	0.2
VP36	2,993	0.07	685	94	251	2.6	1.4	2.1	1.2	0.5
VP37	6,483	0.15	1,056	203	572	4.2	1.4	2.1	2.8	2.1
VP38	3,355	0.08	616	105	274	3.6	1.4	2.1	2.2	1.5
VP39	2,669	0.06	409	83	136	4.1	1.4	2.1	2.7	2.0
VP40	3,483	0.08	405	109	139	5.1	1.4	2.1	3.7	3.0
VP41	3,202	0.07	640	100	331	3.7	1.4	2.1	2.3	1.6
VP42	4,612	0.11	430	144	148	6.1	1.4	2.1	4.7	4.0
VP43	2,953	0.07	406	92	136	4.4	1.4	2.1	3.0	2.3
VP44	3,556	0.08	460	111	153	4.7	1.4	2.1	3.3	2.6
VP45	3,100	0.07	672	97	232	3.9	1.4	2.1	2.5	1.8
VP46	1,501	0.03	408	47	141	2.4	1.4	2.1	1.0	0.3
VP47	4,325	0.10	665	135	297	4.2	1.4	2.1	2.8	2.1
VP48	3,513	0.08	572	110	259	3.9	1.4	2.1	2.5	1.8
VP49	4,231	0.10	403	132	137	6.1	1.4	2.1	4.7	4.0
VP50	5,733	0.13	406	179	139	8.0	1.4	2.1	6.6	5.9
VP51	3,348	0.08	405	105	132	5.1	1.4	2.1	3.7	3.0
VP52	4,855	0.11	410	152	139	6.9	1.4	2.1	5.5	4.8
VP53	9,533	0.22	406	298	140	12.9	1.4	2.1	11.5	10.8
VP54	8,663	0.20	450	271	138	12.0	1.4	2.1	10.6	9.9
VP55	6,036	0.14	406	189	133	8.7	1.4	2.1	7.3	6.6
VP56	3,400	0.08	424	106	147	4.7	1.4	2.1	3.3	2.6
VP57	6,674	0.15	1,443	209	975	3.4	1.4	2.1	2.0	1.3
VP58	11,801	0.27	1,289	369	778	6.5	1.4	2.1	5.1	4.4
VP59	7,368	0.17	988	230	526	5.0	1.4	2.1	3.6	2.9
VP60	2,294	0.05	404	72	139	3.5	1.4	2.1	2.1	1.4
VP61	2,823	0.06	407	88	138	4.2	1.4	2.1	2.8	2.1
VP62	2,367	0.05	401	74	139	3.6	1.4	2.1	2.2	1.5
VP63	4,928	0.11	407	154	139	7.0	1.4	2.1	5.6	4.9
VP64	5,213	0.12	684	54	309	2.0	1.4	2.1	0.6	0.0
VP65	11,700	0.27	518	366	182	12.2	1.4	2.1	10.8	10.1
VP66	4,276	0.10	1,009	134	565	3.1	1.4	2.1	1.7	1.0
VP67	5,278	0.12	652	165	228	4.7	1.4	2.1	3.3	2.6
VP68	4,860	0.11	1,125	152	617	3.2	1.4	2.1	1.8	1.1
VP69	4,266	0.10	1,218	133	787	2.9	1.4	2.1	1.5	0.8
VP70	3,101	0.07	1,217	97	646	2.7	1.4	2.1	1.3	0.6
VP71	2,304	0.05	510	72	177	2.8	1.4	2.1	1.4	0.7
VP72	2,632	0.06	437	82	132	4.1	1.4	2.1	2.7	2.0
VP73	3,653	0.08	902	114	451	3.2	1.4	2.1	1.8	1.1
VP74	3,122	0.07	598	98	203	3.3	1.4	2.1	1.9	1.2
VP75	4,033	0.09	943	126	525	3.1	1.4	2.1	1.7	1.0
VP76	3,410	0.08	864	107	279	3.6	1.4	2.1	2.2	1.5
VP77	2,620	0.06	692	82	220	2.6	1.4	2.1	1.2	0.5
VP78	4,422	0.10	976	138	446	3.8	1.4	2.1	2.4	1.7
VP79	6,443	0.15	409	201	135	9.2	1.4	2.1	7.8	7.1
VP80	3,507	0.08	748	110	339	3.1	1.4	2.1	1.7	1.0
VP81	1,875	0.04	406	59	139	2.9	1.4	2.1	1.5	0.8
VP82	4,178	0.10	1,376	131	871	2.7	1.4	2.1	1.3	0.6
VP83	4,019	0.09	507	126	177	4.6	1.4	2.1	3.2	2.5
VP84	3,326	0.08	795	104	378	2.8	1.4	2.1	1.4	0.7
VP85	3,452	0.08	888	108	367	2.9	1.4	2.1	1.5	0.8
VP86	9,792	0.22	1,303	306	664	6.3	1.4	2.1	4.9	4.2
VP87	2,505	0.06	685	78	311	2.6	1.4	2.1	1.2	0.5
VP88	4,165	0.10	957	130	480	3.4	1.4	2.1	2.0	1.3
VP89	2,463	0.06	626	77	278	2.8	1.4	2.1	1.4	0.7
VP90	4,904	0.11	1,056	153	573	3.4	1.4	2.1	2.0	1.3
VP91	2,321	0.05	544	73	189	2.7	1.4	2.1	1.3	0.6
VP92	2,332	0.05	404	73	139	3.5	1.4	2.1	2.1	1.4
VP93	6,775	0.16	1,061	212	591	4.3	1.4	2.1	2.9	2.2
VP94	3,979	0.09	406	124	136	5.8	1.4	2.1	4.4	3.7
VP95	4,463	0.10	641	139	270	4.6	1.4	2.1	3.2	2.5
VP96	4,720	0.11	407	49	139	2.5	1.4	2.1	1.1	0.4
VP97	2,103	0.05	405	66	139	3.3	1.4	2.1	1.9	1.2
VP98	6,896	0.16	596	216	209	6.5	1.4	2.1	5.1	4.4
VP99	6,796	0.16	919	212	448	5.4	1.4	2.1	4.0	3.3
VP100	3,971	0.09	1,048	124	583	2.8	1.4	2.1	1.4	0.7
VP101	2,983	0.07	690	93	246	2.7	1.4	2.1	1.3	0.6
VP102	3,345	0.08	1,498	105	859	2.3	1.4	2.1	0.9	0.2
VP103	3,259	0.07	841	102	445	3.0	1.4	2.1	1.6	0.9
VP104	3,833	0.09	1,048	120	549	2.9	1.4	2.1	1.5	0.8
VP105	4,435	0.10	700	139	234	3.9	1.4	2.1	2.5	1.8
VP106	6,104	0.14	660	191	236	5.2	1.4	2.1	3.8	3.1
VP107	2,779	0.06	1,184	87	719	2.3	1.4	2.1	0.9	0.2
VP108	4,751	0.11	570	148	191	5.0	1.4	2.1	3.6	2.9

Proposed VP #	Area of Sub-Basin (sf)	Area of Sub-Basin (ac)	Area of Vernal Pool [4] (sf)	Runoff Volume (Runoff C x Area of Subbasin x rainfall depth) (cf)	Available Storage Volume in Vernal Pool (cf)	Check Depth, Evaporation, and Ponding for 1-Year Storm Event				
				1-yr	VP Full Depth[5]	Depth of Ponding from 1-Year Storm Event [6] (in)	14 Day Average Pan Evaporation [7] (cf)	21 Day Average Pan Evaporation[8] (cf)	Ponding Depth Remaining After 14 Days for 1-Year Storm [9] (in)	Ponding Depth Remaining After 21 Days for 1-year Storm[10] (in)
VP109	5,041	0.12	697	158	318	4.5	1.4	2.1	3.1	2.4
VP110	6,285	0.14	836	196	451	5.0	1.4	2.1	3.6	2.9
VP111	7,798	0.18	965	244	538	5.2	1.4	2.1	3.8	3.1
VP112	2,523	0.06	629	79	198	2.8	1.4	2.1	1.4	0.7
VP113	3,511	0.08	888	110	327	4.0	1.4	2.1	2.6	1.9
VP114	5,810	0.13	1,026	182	495	4.3	1.4	2.1	2.9	2.2
VP115	5,787	0.13	1,476	181	979	3.1	1.4	2.1	1.7	1.0
VP116	5,714	0.13	1,113	179	522	4.1	1.4	2.1	2.7	2.0
VP117	4,882	0.11	862	153	477	3.9	1.4	2.1	2.5	1.8
VP118	5,888	0.14	743	184	288	5.6	1.4	2.1	4.2	3.5
VP119	6,220	0.14	421	194	135	8.9	1.4	2.1	7.5	6.8
VP120	5,366	0.12	974	168	521	3.9	1.4	2.1	2.5	1.8
VP121	5,922	0.14	759	185	375	4.5	1.4	2.1	3.1	2.4
VP122	6,219	0.14	1,488	194	961	3.3	1.4	2.1	1.9	1.2
VP123	8,524	0.20	1,414	266	907	4.4	1.4	2.1	3.0	2.3
VP124	4,712	0.11	884	147	357	4.8	1.4	2.1	3.4	2.7
VP125	3,585	0.08	649	112	226	3.4	1.4	2.1	2.0	1.3
VP126	5,096	0.12	1,045	159	518	3.8	1.4	2.1	2.4	1.7
VP127	5,017	0.12	905	157	448	4.2	1.4	2.1	2.8	2.1
VP128	7,273	0.17	778	76	348	2.3	1.4	2.1	0.9	0.2
VP129	6,933	0.16	1,491	217	1011	3.5	1.4	2.1	2.1	1.4
VP130	4,359	0.10	770	136	354	3.6	1.4	2.1	2.2	1.5
VP131	7,312	0.17	1,102	229	600	4.5	1.4	2.1	3.1	2.4
VP132	3,971	0.09	1,500	124	991	2.4	1.4	2.1	1.0	0.3
VP133	5,019	0.12	1,486	157	948	2.9	1.4	2.1	1.5	0.8
VP134	5,621	0.13	881	176	417	4.9	1.4	2.1	3.5	2.8
VP135	5,737	0.13	1,118	179	597	4.4	1.4	2.1	3.0	2.3
VP136	4,128	0.09	408	129	121	6.7	1.4	2.1	5.3	4.6
VP137	4,627	0.11	924	145	459	3.8	1.4	2.1	2.4	1.7
VP138	3,959	0.09	893	124	490	3.2	1.4	2.1	1.8	1.1
VP139	6,850	0.16	1,500	214	878	3.8	1.4	2.1	2.4	1.7
VP140	4,904	0.11	482	153	159	10.1	1.4	2.1	8.7	8.0
VP141	3,945	0.09	608	123	182	7.4	1.4	2.1	6.0	5.3
VP142	6,728	0.15	1,497	210	523	5.6	1.4	2.1	4.2	3.5
VP143	3,287	0.08	537	103	184	3.7	1.4	2.1	2.3	1.6
VP144	3,977	0.09	1,471	124	939	2.5	1.4	2.1	1.1	0.4
VP145	2,749	0.06	560	86	197	3.0	1.4	2.1	1.6	0.9
VP146	5,343	0.12	1,463	167	934	3.0	1.4	2.1	1.6	0.9
VP147	4,352	0.10	1,483	136	906	2.7	1.4	2.1	1.3	0.6
VP148	4,305	0.10	692	135	228	3.9	1.4	2.1	2.5	1.8
VP149	7,010	0.16	1,994	219	1391	2.8	1.4	2.1	1.4	0.7
VP150	4,837	0.11	1,428	151	872	2.9	1.4	2.1	1.5	0.8
VP151	3,130	0.07	1,174	98	632	2.3	1.4	2.1	0.9	0.2
VP152	5,784	0.13	1,047	181	558	3.9	1.4	2.1	2.5	1.8
VP153	3,297	0.08	976	103	445	2.4	1.4	2.1	1.0	0.3
VP154	6,122	0.14	850	191	377	4.6	1.4	2.1	3.2	2.5
VP155	4,879	0.11	906	152	394	3.6	1.4	2.1	2.2	1.5
VP156	9,814	0.23	1,053	307	450	7.4	1.4	2.1	6.0	5.3
VP157	6,447	0.15	708	201	240	7.2	1.4	2.1	5.8	5.1
VP158	7,487	0.17	1,091	234	491	4.3	1.4	2.1	2.9	2.2
VP159	9,901	0.23	1,363	309	482	7.0	1.4	2.1	5.6	4.9
VP160	7,699	0.18	1,416	80	910	1.9	1.4	2.1	0.5	0.0
VP161	11,165	0.26	1,243	349	745	6.4	1.4	2.1	5.0	4.3
VP162	4,648	0.11	712	145	296	4.4	1.4	2.1	3.0	2.3
VP163	8,811	0.20	674	275	294	7.9	1.4	2.1	6.5	5.8
VP164	10,181	0.23	1,470	318	969	4.8	1.4	2.1	3.4	2.7
VP165	7,866	0.18	1,449	246	966	3.9	1.4	2.1	2.5	1.8
VP166	9,040	0.21	1,196	283	640	6.1	1.4	2.1	4.7	4.0
VP167	8,612	0.20	1,470	269	735	5.2	1.4	2.1	3.8	3.1
VP168	4,076	0.09	1,366	127	716	2.5	1.4	2.1	1.1	0.4
VP169	3,174	0.07	1,123	99	692	2.6	1.4	2.1	1.2	0.5
VP170	4,018	0.09	959	126	516	3.1	1.4	2.1	1.7	1.0
VP171	11,140	0.26	1,497	348	898	5.5	1.4	2.1	4.1	3.4
VP172	4,528	0.10	1,243	141	577	3.8	1.4	2.1	2.4	1.7
VP173	4,457	0.10	1,012	139	517	3.4	1.4	2.1	2.0	1.3
VP174	4,196	0.10	1,242	131	692	2.6	1.4	2.1	1.2	0.5
VP175	3,405	0.08	781	106	369	2.9	1.4	2.1	1.5	0.8
VP176	2,185	0.05	405	68	129	3.6	1.4	2.1	2.2	1.5
VP177	3,129	0.07	796	98	242	2.8	1.4	2.1	1.4	0.7
VP178	8,465	0.19	810	265	405	7.1	1.4	2.1	5.7	5.0
VP179	5,312	0.12	667	166	246	7.3	1.4	2.1	5.9	5.2
VP180	2,872	0.07	696	90	359	3.2	1.4	2.1	1.8	1.1
VP181	6,856	0.16	724	214	386	6.2	1.4	2.1	4.8	4.1
VP182	2,205	0.05	410	69	30	14.0	1.4	2.1	12.6	11.9
VP183	4,379	0.10	421	137	141	6.2	1.4	2.1	4.8	4.1
VP184	7,770	0.18	1,000	243	504	5.5	1.4	2.1	4.1	3.4
VP185	8,518	0.20	1,032	266	592	5.2	1.4	2.1	3.8	3.1
VP186	3,528	0.08	894	110	440	3.2	1.4	2.1	1.8	1.1
VP187	2,631	0.06	562	82	188	3.0	1.4	2.1	1.6	0.9
VP188	15,325	0.35	1,282	479	736	7.1	1.4	2.1	5.7	5.0
VP189	6,981	0.16	700	218	277	6.8	1.4	2.1	5.4	4.7
VP190	10,694	0.25	1,171	334	547	6.7	1.4	2.1	5.3	4.6
VP191	3,943	0.09	635	123	224	3.7	1.4	2.1	2.3	1.6
VP192	4,732	0.11	698	148	235	4.1	1.4	2.1	2.7	2.0
VP193	8,450	0.19	898	264	416	5.6	1.4	2.1	4.2	3.5
VP194	9,241	0.21	1,781	289	1043	4.1	1.4	2.1	2.7	2.0
VP195	2,756	0.06	547	86	257	4.3	1.4	2.1	2.9	2.2
TOTAL	977,817	22.40	166350.00							

Notes:

1. 24-hr rainfall depth determined from NOAA Atlas 14 Precipitation Frequency Data Server. Refer to Attachment 2 for back up precipitation data.
2. Runoff factor determined by City of San Diego Storm Water Standards Manual for Type D Soils = 0.30

the pan material. Therefore, the 14-day average pan evaporation is 1.9*0.75 = 1.4-inches. See Attachment 2 for back up pan evaporation rates.

3.2 The monthly average pan evaporation during the wet season (October-March) is 3.8-inches. Based on 21 days (3/4 of a month), then 3.8 inches*0.75 = 2.9 inches. Including a correction factor of 0.75 to account for radiation on the side walls and heat exchanges

4. Area of Vernal Pool is based on shapes provided by RECON consulting with the target ratio of 8:1 drainage area to vernal pool area
5. Vernal pool storage determined by volume calculations in CAD
6. 1-year ponding depth interpolated from vernal pool storage volume
7. 14-day evaporation volume determined by pan evaporation rates with an adjustment factor of 0.75 applied. See Attachment 2 for back up pan evaporation rates.
8. 21-day evaporation volume determined by pan evaporation rates with an adjustment factor of 0.75 applied. See Attachment 2 for back up pan evaporation rates.
9. Ponding depth after evaporation determined by subtracting 14-day evaporation from 1-yr ponding
10. Ponding depth after evaporation determined by subtracting 21-day evaporation from 1-yr ponding
11. This analysis includes proposed vernal pools and does not include existing vernal pool analysis.

ATTACHMENT 2

Back-up Material for Hydrologic Analyses

- **24-Hour Rainfall Depth from NOAA Atlas 14 Precipitation Frequency Data Server**
- **Runoff Factor Table B.1-1**
- **Monthly Average Pan Evaporation Data**

NOAA Atlas 14, Volume 6, Version 2
Location name: San Diego, California, USA*
Latitude: 32.5537°, Longitude: -116.999°
Elevation: m/ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.102 (0.086-0.124)	0.128 (0.107-0.155)	0.164 (0.136-0.199)	0.194 (0.160-0.237)	0.236 (0.189-0.299)	0.271 (0.211-0.350)	0.307 (0.234-0.408)	0.346 (0.256-0.473)	0.401 (0.284-0.571)	0.445 (0.304-0.658)
10-min	0.147 (0.123-0.177)	0.184 (0.153-0.222)	0.234 (0.195-0.285)	0.278 (0.229-0.340)	0.339 (0.270-0.429)	0.388 (0.303-0.502)	0.440 (0.335-0.584)	0.496 (0.367-0.677)	0.574 (0.407-0.819)	0.638 (0.436-0.943)
15-min	0.177 (0.148-0.215)	0.222 (0.185-0.269)	0.284 (0.236-0.344)	0.336 (0.277-0.411)	0.410 (0.327-0.519)	0.469 (0.366-0.607)	0.532 (0.405-0.706)	0.600 (0.443-0.819)	0.695 (0.492-0.990)	0.772 (0.528-1.14)
30-min	0.249 (0.208-0.301)	0.312 (0.261-0.378)	0.398 (0.332-0.483)	0.472 (0.389-0.577)	0.576 (0.459-0.729)	0.659 (0.515-0.854)	0.748 (0.569-0.993)	0.842 (0.623-1.15)	0.976 (0.691-1.39)	1.08 (0.741-1.60)
60-min	0.345 (0.288-0.417)	0.432 (0.361-0.523)	0.551 (0.459-0.669)	0.653 (0.539-0.799)	0.797 (0.635-1.01)	0.913 (0.712-1.18)	1.03 (0.788-1.37)	1.17 (0.862-1.59)	1.35 (0.957-1.93)	1.50 (1.03-2.22)
2-hr	0.480 (0.401-0.580)	0.602 (0.502-0.728)	0.766 (0.637-0.929)	0.902 (0.745-1.10)	1.09 (0.871-1.38)	1.24 (0.969-1.61)	1.40 (1.06-1.86)	1.56 (1.15-2.13)	1.79 (1.27-2.55)	1.97 (1.34-2.90)
3-hr	0.587 (0.491-0.710)	0.738 (0.616-0.893)	0.938 (0.781-1.14)	1.10 (0.911-1.35)	1.33 (1.06-1.69)	1.51 (1.18-1.96)	1.70 (1.29-2.25)	1.89 (1.40-2.58)	2.15 (1.53-3.07)	2.36 (1.62-3.49)
6-hr	0.768 (0.642-0.928)	0.967 (0.807-1.17)	1.23 (1.02-1.49)	1.45 (1.19-1.77)	1.74 (1.39-2.21)	1.97 (1.54-2.56)	2.21 (1.68-2.93)	2.46 (1.82-3.36)	2.79 (1.98-3.98)	3.05 (2.09-4.51)
12-hr	0.985 (0.824-1.19)	1.24 (1.04-1.50)	1.58 (1.32-1.92)	1.86 (1.54-2.28)	2.25 (1.80-2.85)	2.55 (1.99-3.30)	2.86 (2.18-3.80)	3.19 (2.36-4.35)	3.63 (2.57-5.18)	3.98 (2.72-5.88)
[illegible]	[illegible]	1.58 (1.38-1.84)	2.02 (1.76-2.36)	2.38 (2.06-2.81)	2.89 (2.42-3.51)	3.28 (2.71-4.06)	3.69 (2.98-4.67)	4.11 (3.24-5.34)	4.70 (3.56-6.33)	5.16 (3.79-7.17)
2-day	1.54 (1.34-1.79)	1.98 (1.73-2.31)	2.56 (2.23-2.99)	3.03 (2.62-3.58)	3.68 (3.09-4.47)	4.19 (3.45-5.18)	4.71 (3.80-5.95)	5.24 (4.12-6.80)	5.97 (4.53-8.04)	6.55 (4.81-9.09)
3-day	1.71 (1.50-2.00)	2.23 (1.95-2.60)	2.90 (2.53-3.40)	3.45 (2.99-4.07)	4.20 (3.53-5.10)	4.78 (3.94-5.91)	5.36 (4.33-6.78)	5.97 (4.70-7.74)	6.79 (5.15-9.14)	7.43 (5.46-10.3)
4-day	1.86 (1.63-2.17)	2.43 (2.12-2.83)	3.17 (2.77-3.72)	3.78 (3.27-4.46)	4.61 (3.87-5.60)	5.24 (4.32-6.49)	5.89 (4.75-7.45)	6.55 (5.15-8.49)	7.45 (5.64-10.0)	8.14 (5.98-11.3)
7-day	2.15 (1.88-2.51)	2.81 (2.46-3.29)	3.69 (3.21-4.32)	4.40 (3.80-5.19)	5.37 (4.51-6.52)	6.11 (5.04-7.57)	6.87 (5.54-8.69)	7.65 (6.02-9.93)	8.71 (6.60-11.7)	9.53 (7.00-13.2)
10-day	2.35 (2.06-2.75)	3.08 (2.69-3.60)	4.04 (3.52-4.72)	4.82 (4.17-5.68)	5.88 (4.94-7.14)	6.70 (5.52-8.29)	7.53 (6.07-9.53)	8.39 (6.60-10.9)	9.55 (7.23-12.9)	10.4 (7.67-14.5)
20-day	2.84 (2.48-3.31)	3.74 (3.27-4.37)	4.92 (4.29-5.76)	5.87 (5.08-6.92)	7.15 (6.01-8.69)	8.13 (6.70-10.1)	9.11 (7.35-11.5)	10.1 (7.96-13.1)	11.5 (8.68-15.4)	12.5 (9.17-17.3)
30-day	3.42 (2.99-3.99)	4.52 (3.95-5.28)	5.94 (5.18-6.96)	7.08 (6.13-8.35)	8.60 (7.22-10.4)	9.74 (8.03-12.1)	10.9 (8.78-13.8)	12.0 (9.47-15.6)	13.6 (10.3-18.3)	14.7 (10.8-20.4)
45-day	4.01 (3.50-4.68)	5.30 (4.63-6.20)	6.95 (6.06-8.14)	8.26 (7.15-9.74)	9.98 (8.38-12.1)	11.3 (9.29-13.9)	12.5 (10.1-15.8)	13.8 (10.8-17.9)	15.4 (11.7-20.8)	16.6 (12.2-23.1)
60-day	4.66 (4.08-5.44)	6.16 (5.38-7.20)	8.05 (7.01-9.42)	9.52 (8.24-11.2)	11.4 (9.61-13.9)	12.9 (10.6-15.9)	14.2 (11.5-18.0)	15.6 (12.3-20.2)	17.3 (13.1-23.4)	18.6 (13.7-25.9)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

B.1.1 Runoff Factor

Estimate the area weighted runoff factor for the tributary area to the BMP using runoff factor (from Table B.1-1) and area of each surface type in the tributary area and Equation B.1-2.

Equation B.1-2: Estimating Runoff Factor for Area

$$C = \frac{\sum C_x A_x}{\sum A_x}$$

where:

C_x = Runoff factor for area X

A_x = Tributary area X (acres)

These runoff factors apply to areas receiving direct rainfall only. For conditions in which runoff is routed onto a surface from an adjacent surface, see Section B.2 for determining composite runoff factors for these areas.

Table B.1-1: Runoff factors for surfaces draining to BMPs – Pollutant Control BMPs

Surface	Runoff Factor
Roofs[1]	0.90
Concrete or Asphalt[1]	0.90
Unit Pavers (grouted)[1]	0.90
Decomposed Granite	0.30
Cobbles or Crushed Aggregate	0.30
Amended, Mulched Soils or Landscape[2]	0.10
Compacted Soil (e.g., unpaved parking)	0.30
Natural (A Soil)	0.10
Natural (B Soil)	0.14
Natural (C Soil)	0.23
Natural (D Soil)	0.30

[1]Surface is considered impervious and could benefit from use of Site Design BMPs and adjustment of the runoff factor per Section B.2.1.

[2]Surface shall be designed in accordance with SD-F (Amended soils) fact sheet in Appendix E

Evaporation Stations

Standard daily pan evaporation is measured using the four-foot diameter Class A evaporation pan. The pan water level reading is adjusted when precipitation is measure to obtain the actual evaporation. Most Class A pans are installed above ground, allowing effects such as radiation on the side walls and heat exchnges with the pan material. These effects tend to increase the evaporation totals. The amounts can then be adjusted by multiplying the totals b 0.70 or 0.80 to more closely estimate the evaporation from naturally existing urfaces such as a shallow lake, wet soil or other moist natural surfaces.

Many stations do not measure pan evaportation during winter months. A "0.00" total indicates no measuement is taken.

Stations marked with an asterisk (*) have estimated totals computed from meteorological measurements using a form of the Penman equation.

Click on a State: Arizona, California, Colorado, Hawaii & Pacific Islands, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming

ALASKA

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
BROOKS RIVER	1967-1990	0.00	0.00	0.00	0.00	0.00	2.48	2.88	1.63	0.73	0.00	0.00	0.00	7.72
CENTRAL 2	1962-2005	0.00	0.00	0.00	0.00	0.00	3.97	4.00	2.43	2.19	0.00	0.00	0.00	12.59
COPPER CENTER	1961-1982	0.00	0.00	0.00	0.00	0.00	6.03	4.06	3.14	1.71	0.00	0.00	0.00	14.94
JUNEAU AP	1949-2005	0.00	0.00	0.00	0.00	3.33	3.29	3.82	3.14	1.02	0.00	0.00	0.00	14.60
MATANUSKA AES	1917-2005	0.00	0.00	0.00	0.00	4.22	4.44	3.92	3.05	1.83	0.00	0.00	0.00	17.46
MC GRATH WB AIRPORT	1939-2005	0.00	0.00	0.00	0.00	4.20	4.42	3.65	2.29	1.40	0.00	0.00	0.00	15.96
MCKINLEY PARK	1949-2005	0.00	0.00	0.00	0.00	0.00	2.96	2.55	1.75	0.53	0.00	0.00	0.00	7.79
OIL WELL ROAD E P	1967-1974	0.00	0.00	0.00	0.00	0.00	5.17	3.83	2.81	1.40	0.00	0.00	0.00	13.21
OLD EDGERTON	1970-1996	0.00	0.00	0.00	0.00	3.31	4.56	4.16	3.04	1.65	0.00	0.00	0.00	16.72
PALMER AAES	1949-2005	0.00	0.00	0.00	0.00	4.44	4.71	4.12	2.96	1.75	0.00	0.00	0.00	17.98
RAMPART 2	1963-1978	0.00	0.00	0.00	0.00	4.23	4.56	3.79	2.56	1.54	0.00	0.00	0.00	16.68
COLLEGE UNIV EXP STN	1931-2005	0.00	0.00	0.00	0.00	4.25	5.04	4.56	2.82	1.38	0.00	0.00	0.00	18.05

ARIZONA

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
BARTLETT DAM	1939-2005	3.92	4.92	7.10	10.02	13.77	16.21	15.56	13.95	12.10	9.66	5.86	4.47	117.54
BLACK RIVER PUMPS	1948-2005	0.00	0.00	0.00	6.93	8.83	10.12	7.99	7.02	5.70	3.94	0.00	0.00	50.53
DAVIS DAM # 2	1958-1977	7.49	7.46	9.75	12.78	16.71	19.48	19.87	17.91	14.64	12.03	8.40	7.80	154.32
DAVIS DAM	1948-1961	3.54	5.13	7.60	9.30	11.33	13.33	13.14	12.15	9.51	7.24	5.38	3.88	101.53
DOUGLAS	1948-2005	0.00	0.00	0.00	11.34	13.19	13.55	10.66	10.27	8.18	6.44	0.00	0.00	73.63
FORT VALLEY	1909-2005	0.00	0.00	0.00	0.00	5.86	7.37	6.03	4.91	3.35	0.00	0.00	0.00	27.52
GRAND CANYON NATL PARK	1957-1977	0.00	0.00	0.00	0.00	6.94	10.45	8.79	8.12	6.83	4.91	0.00	0.00	46.04
GRAND CANYON N P 2	1976-2005	0.00	0.00	0.00	0.00	7.46	9.80	8.94	7.29	6.10	4.45	0.00	0.00	44.04
HAWLEY LAKE	1967-1988	0.00	0.00	0.00	0.00	7.57	8.55	6.89	5.48	4.68	0.00	0.00	0.00	33.17
MANY FARMS SCHOOL	1951-1975	0.00	3.66	5.45	9.18	12.23	15.14	12.87	10.88	9.40	6.54	3.26	2.16	90.77
MC NARY 2 N	1933-2005	0.00	0.00	0.00	0.00	7.86	8.25	6.60	5.98	4.90	3.97	0.00	0.00	37.56
MESA	1896-2005	3.03	4.02	6.11	8.64	11.33	12.67	13.10	11.87	9.69	6.81	4.15	2.96	94.38
NOGALES 6 N	1952-2005	3.59	4.46	7.01	9.35	11.91	13.31	10.00	8.28	8.06	7.17	4.49	3.57	91.20
PAGE	1957-2005	0.00	2.60	5.84	8.27	10.72	12.86	13.06	11.38	8.42	5.13	2.29	0.00	80.57
ROOSEVELT 1 WNW	1905-2005	2.44	3.54	5.90	8.64	11.96	14.50	14.36	12.27	10.10	6.78	3.68	2.32	96.49
SACATON	1908-2005	3.83	5.15	7.51	10.06	13.56	14.89	13.69	12.05	10.20	7.91	4.94	3.63	107.42
SAFFORD AGRICULTRL CTR	1948-2005	2.63	3.83	7.14	10.54	13.81	15.38	13.13	10.68	8.73	5.90	3.28	2.52	97.57
SAN CARLOS RESERVOIR	1948-2005	2.25	3.27	5.66	8.40	11.70	13.94	13.43	11.40	9.23	6.31	3.53	2.18	91.30
SIERRA ANCHA	1913-1979	2.19	2.93	4.58	6.42	8.97	10.94	10.39	8.88	8.00	6.22	3.50	2.37	75.39
SNOWFLAKE 15 W	1965-1998	0.00	0.00	0.00	0.00	11.03	14.38	11.29	9.12	7.96	6.45	3.40	0.00	63.63
STEWART MOUNTAIN	1948-2005	3.52	4.56	6.94	10.04	13.11	14.27	14.44	13.10	10.69	7.95	4.53	3.08	106.23
TEMPE A S U	1953-2005	1.56	2.93	4.79	7.04	9.44	10.85	10.99	9.92	7.63	5.14	2.56	1.44	74.29
TUCSON UNIV OF ARIZONA	1894-2005	3.25	4.57	6.95	9.88	12.87	14.91	13.17	11.65	10.35	7.81	4.73	3.37	103.51
TUCSON U OF ARIZ # 1	1982-2005	3.94	4.68	7.53	10.57	14.14	16.51	14.61	12.17	10.71	8.05	4.93	3.23	111.07
WAHWEAP	1961-2005	1.95	2.77	6.30	9.42	12.82	14.94	15.26	13.31	10.06	7.06	3.69	2.60	100.18
WHITERIVER 1 SW	1900-2005	1.69	2.94	5.84	8.01	9.92	11.70	9.48	8.47	7.68	5.87	3.51	2.54	77.65
WINKELMAN 6 S	1942-1980	3.12	4.03	7.00	9.98	12.40	13.90	11.19	9.84	9.56	7.51	4.31	2.94	95.78
YUMA CITRUS STATION	1920-2005	3.58	4.36	6.81	9.17	11.75	13.19	13.85	12.28	9.51	6.91	4.43	3.37	99.21

CALIFORNIA

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
ANTIOCH PUMP PLANT 3	1955-2005	1.17	1.99	4.25	6.27	8.96	10.84	11.60	10.06	7.77	4.91	2.07	1.22	71.11
AUBURN DAM PROJECT	1972-1984	1.42	1.89	3.13	4.89	7.73	10.08	11.66	10.70	8.08	5.00	1.97	1.36	67.91
AVENAL 9 SSE	1955-1961	1.80	2.90	6.20	9.39	12.96	16.73	18.67	16.37	12.61	8.05	3.89	2.44	112.01
BACKUS RANCH	1948-1963	2.85	3.86	6.77	9.80	12.69	15.93	16.92	15.95	12.19	8.01	4.25	2.98	112.20
BEAUMONT PUMPING PLANT	1948-1975	2.90	3.29	4.08	5.03	6.40	8.15	10.64	9.97	7.90	5.87	3.22	2.90	70.35
BEAUMONT 1 E	1948-2001	3.10	3.73	4.99	5.23	7.60	9.31	10.97	10.66	8.85	6.53	5.16	3.95	80.08
BERRYESSA LAKE	1957-1970	1.53	2.15	3.79	5.82	8.90	11.00	13.22	12.06	8.67	5.72	2.48	1.66	77.00
BOCA	1948-2005	0.00	0.00	0.00	0.00	6.83	8.52	10.01	9.09	6.48	4.32	0.00	0.00	45.25
BRANNAN ISLAND	1968-1977	1.15	1.74	4.36	7.03	10.49	12.39	13.51	12.02	9.03	4.80	1.83	1.08	79.43
CACHUMA LAKE	1952-2005	2.44	3.53	4.41	6.01	7.55	8.56	9.50	8.98	7.00	5.42	3.49	2.79	69.68
CAMP PARDEE	1948-2005	0.72	1.12	2.32	4.18	7.04	9.43	11.17	9.50	6.51	3.77	1.40	0.72	57.88
CHICO EXPERIMENT STN	1906-2005	1.26	2.13	3.82	5.63	8.28	10.11	11.48	9.71	7.36	4.46	2.09	1.30	67.63
CHULA VISTA	1948-2005	2.81	3.45	5.03	6.06	6.76	6.96	7.63	7.48	6.21	5.02	3.58	2.78	63.77
COW CREEK	1948-1961	3.21	5.62	9.78	13.98	17.25	21.37	21.89	20.17	15.36	10.71	4.91	3.85	148.10
DAVIS 1 WSW	1917-2005	1.49	2.34	4.54	7.13	10.19	12.17	12.77	11.28	9.08	6.35	2.89	1.45	81.68
DEATH VALLEY	1961-2005	3.93	5.38	9.10	13.00	16.76	19.11	20.98	18.86	13.95	9.78	5.54	3.75	140.14
DUTTONS LANDING	1955-1977	1.42	2.09	3.87	5.70	7.74	9.34	9.34	8.27	6.75	4.65	2.25	1.46	62.88
FALL RIVER MILLS INTAKE	1948-2005	0.00	0.00	2.47	5.80	7.54	9.48	12.14	10.57	7.59	3.78	1.14	0.00	60.51
FERNDALE 2 NW	1963-1973	0.70	1.17	2.26	3.21	3.95	4.38	4.49	4.07	3.59	2.06	1.04	0.72	31.64
FOLSOM DAM	1955-1993	0.92	1.90	3.47	5.21	8.07	9.91	11.12	9.93	7.45	4.89	2.06	1.25	66.18
FRIANT GOVERNMENT CAMP	1948-2005	1.46	2.12	3.82	5.89	9.42	12.07	13.96	12.47	9.00	5.76	2.61	1.37	79.95
GRIZZLY ISLAND REFUGE	1971-1977	1.45	2.25	4.00	5.72	8.07	9.82	10.69	8.93	6.88	4.33	2.10	1.55	65.79
HETCH HETCHY	1931-2005	0.00	0.00	0.00	3.84	5.31	7.34	8.78	7.86	5.85	3.23	1.74	0.00	43.95
INDIO FIRE STATION	1927-2005	2.85	4.38	7.15	9.98	12.73	14.85	14.95	13.59	10.80	7.60	3.98	2.49	105.35
KETTLEMAN CITY 1 SSW	1955-2005	1.73	2.99	5.80	8.32	11.75	14.27	16.11	14.74	10.82	7.30	3.46	1.74	99.03
KNIGHTS FERRY 2 ESE	1959-1977	1.00	1.69	3.14	5.65	8.54	10.14	11.60	10.31	7.74	4.62	2.69	1.00	68.12
LAKE PILLSBURY 2	1964-1970	0.58	1.42	3.01	4.62	7.41	8.38	10.31	9.35	6.93	3.61	1.19	0.87	57.68
LAKESHORE 2	1948-1972	1.09	1.68	2.97	4.78	6.15	7.43	9.71	8.79	6.44	3.40	1.41	0.95	54.80
LAKE SOLANO	1975-2005	1.48	2.37	4.28	6.66	9.24	11.24	11.53	9.86	7.58	5.26	2.59	1.67	73.76
LAKE SPAULDING	1914-2003	0.00	0.00	0.00	0.00	4.57	6.52	8.16	6.78	4.54	1.98	0.00	0.00	32.55
LAKE SPAULDING DAM	1955-1971	0.00	0.00	0.00	0.00	7.20	9.98	12.38	11.85	8.94	6.64	0.00	0.00	56.99
LITTLE PANOCHE DET DAM	1968-1975	1.77	2.89	5.87	9.39	14.56	16.31	18.45	16.63	12.46	7.60	3.04	1.78	110.75
LODI	1948-2005	1.19	1.95	3.82	6.01	8.60	9.92	10.63	9.11	6.68	4.08	1.86	1.07	64.92
LOS BANOS DET RESV	1968-2005	1.57	2.71	5.44	9.34	14.18	16.58	17.85	15.63	11.87	7.49	3.34	1.82	107.82
MANDEVILLE ISLAND	1955-1965	1.10	2.38	4.77	6.95	8.55	10.44	11.22	9.71	7.41	5.12	2.47	1.13	71.25
MANTECA	1965-1977	1.20	1.71	4.04	6.33	9.24	10.53	11.64	10.22	7.19	4.13	1.78	1.16	69.17
MARKLEY COVE	1970-2005	1.03	1.51	3.03	4.80	7.33	9.60	10.82	9.45	6.99	4.35	1.75	1.01	61.67
MOJAVE	1948-2005	0.00	4.65	6.45	9.97	13.59	15.33	17.21	16.00	11.83	8.28	4.76	3.52	111.59
MONTICELLO DAM	1957-1970	1.02	1.83	3.24	4.96	7.35	9.36	11.20	10.07	7.56	4.82	1.98	1.08	64.47
NACIMIENTO DAM	1957-1978	1.58	2.20	3.92	5.53	7.92	9.85	11.28	10.43	7.76	5.16	2.57	1.66	69.86
NEWARK	1948-2005	1.71	2.15	4.16	5.76	7.77	8.64	9.04	8.00	6.64	4.52	2.36	1.55	62.30
NEW MELONES DAM	1979-1992	1.34	2.25	3.56	5.93	9.16	11.85	13.73	12.29	8.86	5.75	2.37	1.28	78.37
NEW MELONES DAM HQ	1992-2005	1.30	1.83	3.46	5.25	7.94	10.23	12.23	11.72	8.71	5.52	2.23	1.19	71.61
OAKDALE WOODWARD DAM	1948-1967	1.03	1.72	3.42	5.47	8.95	11.88	14.23	12.22	8.53	5.52	2.10	1.02	76.09
PLACERVILLE IFG	1955-1991	1.53	1.67	2.72	3.98	5.84	7.79	9.41	8.45	6.62	3.93	1.87	1.51	55.32
RIVERSIDE CITRUS EXP ST	1948-2005	3.32	3.59	4.86	6.28	7.33	8.59	10.88	10.28	7.84	5.85	3.81	3.03	75.66
SALT SPRINGS PWR HOUSE	1948-1998	1.84	2.47	3.27	4.86	6.49	7.92	10.30	9.95	7.89	5.18	2.68	2.26	65.11
SAN LUIS DAM	1963-2005	1.41	2.49	5.31	8.67	13.14	15.75	18.38	16.68	12.01	7.42	3.02	1.56	105.84
SHASTA DAM	1948-2005	1.50	2.08	3.17	5.05	7.28	9.18	11.36	10.36	7.55	4.85	2.29	1.63	66.30
STOCKTON MOWRY BRIDGE	1955-1965	0.72	1.58	3.87	5.97	8.47	10.95	10.82	9.56	6.60	3.93	1.70	0.74	64.91
TAHOE	1914-2005	0.00	0.00	0.00	0.00	4.27	5.23	5.98	5.35	3.16	1.57	0.00	0.00	25.56
TRACY PUMPING PLANT	1955-2005	1.53	2.47	5.30	8.20	12.01	14.88	16.92	14.55	10.64	6.57	2.93	1.48	97.48
TRINITY DAM VISTA POINT	1959-1973	0.00	0.00	2.83	3.98	6.56	8.32	10.67	9.15	5.97	2.74	0.57	0.85	51.64
TRINITY RIVER HATCHERY	1974-2005	0.58	1.00	2.77	4.43	6.78	8.32	9.71	8.91	6.15	3.20	0.99	0.51	53.35
TULELAKE	1932-2005	0.00	0.00	0.00	4.56	7.55	8.39	9.52	8.53	6.80	3.49	0.00	0.00	48.84
TURNTABLE CREEK	1948-1969	1.98	2.60	3.76	5.25	6.32	8.29	10.23	9.90	8.35	5.71	3.08	2.37	67.84
TWITCHELL DAM	1962-2005	3.08	3.33	4.47	5.89	7.36	8.15	9.22	8.69	7.42	5.92	4.07	3.14	70.74
WALNUT GROVE	1953-1961	1.53	2.90	4.74	5.73	7.76	10.04	10.22	8.81	6.40	3.60	2.10	1.32	65.15
WARM SPRINGS DAM	1973-1998	1.17	1.83	3.23	5.37	7.83	9.33	10.04	8.49	6.58	4.59	2.10	1.17	61.73
WHISKEYTOWN RESERVOIR	1960-2005	0.87	1.23	2.51	4.05	6.41	8.05	10.04	8.80	6.25	3.40	1.14	0.78	53.53
WILLOW CREEK 1 NW	1968-2005	0.58	1.35	1.81	2.74	4.73	6.50	7.53	6.05	3.79	1.94	0.75	0.92	38.69

COLORADO

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
AKRON 4 E	1918-2005	0.00	0.00	0.00	7.30	9.29	11.43	13.26	11.16	9.09	6.16	0.00	0.00	67.69
ALAMOSA WSO AP	1948-2005	0.00	0.00	0.00	7.06	9.01	10.08	9.16	7.81	6.40	4.39	0.00	0.00	53.91
ARBOLES	1957-1963	0.00	0.00	0.00	5.41	7.95	9.56	9.78	8.61	6.52	0.00	0.00	0.00	47.83
BONNY LAKE	1949-2005	0.00	0.00	0.00	7.26	8.69	10.86	11.78	10.61	8.12	6.12	4.57	0.00	68.01

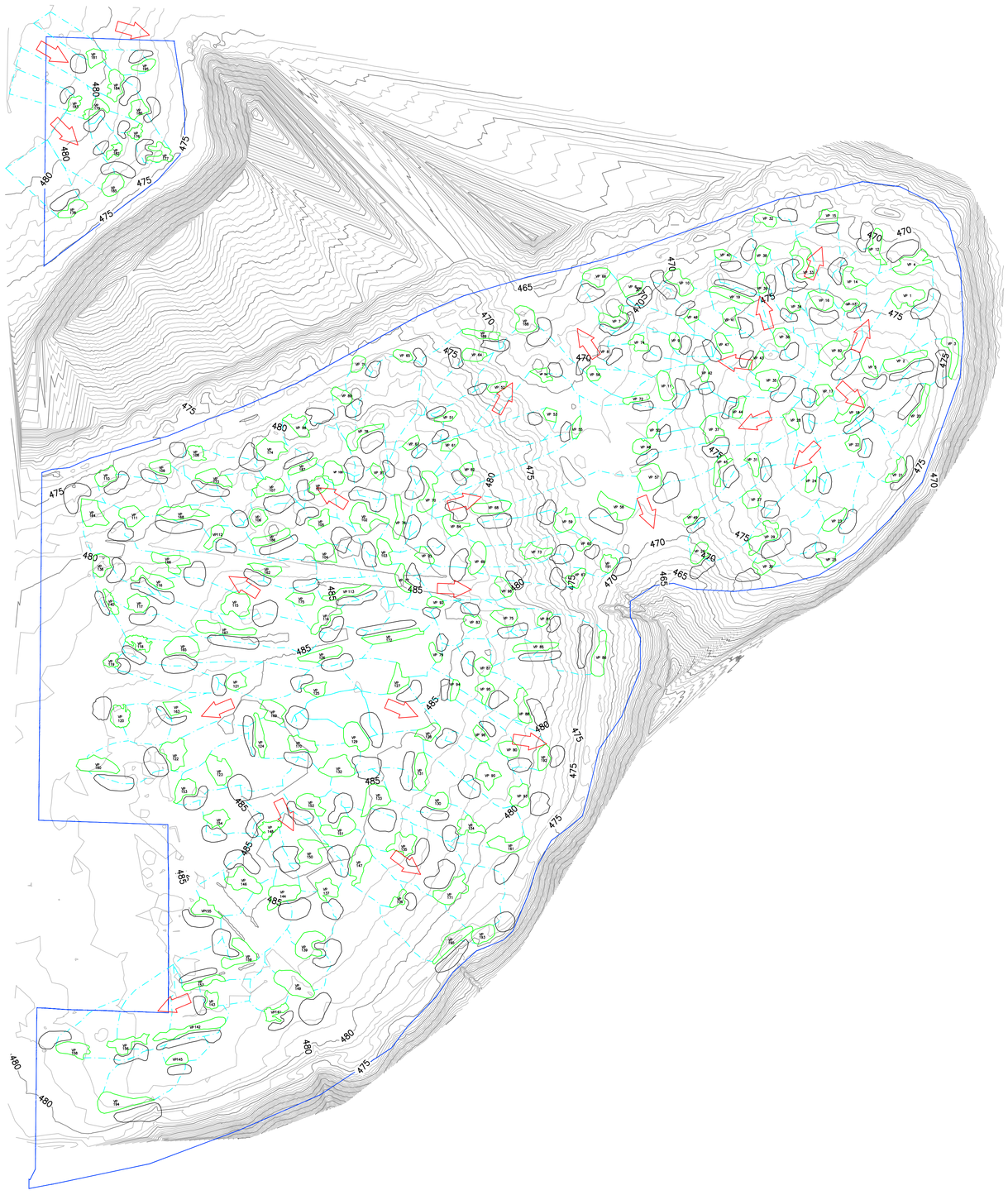
Map Pocket 1

Drainage Exhibit

For

Southwest Village project

Vernal Pools



RICK ENGINEERING COMPANY
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619.291.0707
rickengineering.com

SOUTHWEST VILLAGE

VERNAL POOL EXHIBIT

PROJECT NO:	19066	SCALE:	1"=100'
DRAWN BY:	AB	DATE:	6/27/2023

ATTACHMENT 15

Otay Tarplant and Native Grassland Mitigation Plan for the Southwest Village Specific Plan Project

RECON

Otay Tarplant/Native Grassland Mitigation Plan for the Southwest Village Specific Plan San Diego, California Project No. 614791

Prepared for
Tri Pointe Homes
13520 Evening Creek Drive, Suite 300
San Diego, CA 92128

Prepared by
RECON Environmental, Inc.
3111 Camino del Rio North, Suite 600
San Diego, CA 92108
P 619.308.9333

RECON Number 8868
August 22, 2024

Meagan Olson, Restoration Project Director

Raquel Atik, Restoration Project Manager

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FIGURES

TABLES

Acronyms and Abbreviations

Cal-IPC	California Invasive Plant Council
CBP	Customs and Border Protection
CDFW	California Department of Fish and Wildlife
City	City of San Diego
CNPS	California Native Plant Society
MHPA	Multi-Habitat Planning Area
mitigation site	Otay tarplant mitigation site
MMC	Mitigation Monitoring Coordination
MSCP	Multiple Species Conservation Program
PEP	Plant Establishment Period
Plan	mitigation plan
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 Introduction

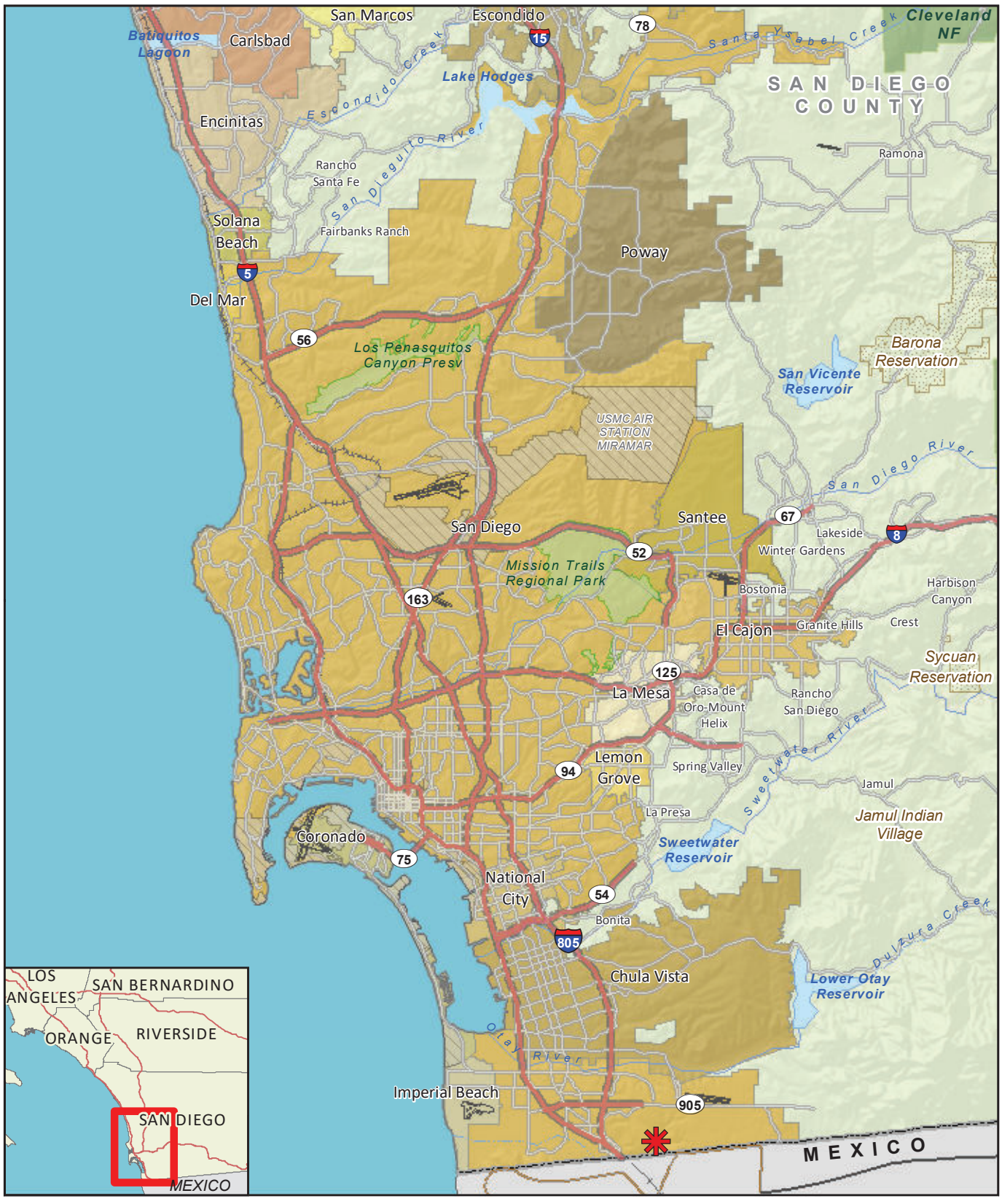
This mitigation plan (plan) details the process for mitigating impacts to Otay tarplant (*Deinandra conjugens*) and native grassland habitat resulting from implementation of portions of the Southwest Village Specific Plan (project). The proposed Southwest Village Specific Plan (Specific Plan) is in the community of Otay Mesa, within the city of San Diego (Figures 1 and 2). The project includes the adoption of the Specific Plan, which is a policy framework intended to guide the future development of residences, commercial and retail spaces, public facilities including an elementary school, parks, and trails, and open space and habitat conservation areas within a 490-acre area. Additionally, the project includes development of a portion of the Specific Plan owned by Tri Pointe Homes, in addition to construction of an extension of Beyer Boulevard connecting San Ysidro to the Specific Plan area. Impacts to Otay tarplant would result from construction of the planned Beyer Boulevard extension (impact site), which is a planned City of San Diego (City) public Mobility Element roadway and impacts to native grassland habitat would result from the Caliente Avenue/Phase 7 planning of the project.

This mitigation plan is prepared in accordance with the California Environmental Quality Act and the City's Multiple Species Conservation Program (MSCP), and as implemented through the Land Development Code - Biology Guidelines (City of San Diego 2018). In addition, the mitigation design described in this plan incorporates recommendations included in the U.S. Fish and Wildlife Service (USFWS) Recovery Plan for *Deinandra conjugens* (Otay tarplant; Recovery Plan; USFWS 2004).

As currently planned, the project will cause permanent impacts to 0.21 acre (1,900 individuals) of Otay tarplant habitat and 0.12 acre of native grassland habitat. The number of Otay tarplant individuals that have been included as impacts (Table 1) was based on the highest numbers observed during surveys performed in the year 2020. Through conversations with the City's MSCP staff, impacts to Otay tarplant shall be restored at a 4:1 ratio to ensure protection of this narrow, endemic plant species. The methods for implementing and maintaining this mitigation are laid out in this plan and include population monitoring measures and protections against edge effects as required by the City's MSCP Appendix A conditions of coverage for Otay tarplant (City of San Diego 1997).

The native grassland vegetation community is classified as Tier 1 (rare uplands) per the City's Biology Guidelines (City of San Diego 2018). As cited in Table 3 of the Land Development Manual – Biology Guidelines, if native grassland is impacted outside of the Multi-Habitat Planning Area (MHPA) with preservation occurring within the MHPA, the mitigation ratio is 1:1. If impacts are inside the MHPA and preservation will also occur with the MHPA, the mitigation ratio is 2:1.

The majority of impacts to native grassland habitat are outside of the MHPA (0.11 acre), with a very small area of native grassland impacts falling within the MHPA (0.004 acre). With the MHPA boundary line adjustment, overall mitigation is still assumed to be 1:1 for native grassland creation. Table 1 below details the impacts to Otay tarplant and native grassland habitat, the mitigation ratios, and the required habitat mitigation.



Project Location

RECON

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FIGURE 1
Regional Location

Map Source: USGS 7.5 minute topographic map series, IMPERIAL BEACH quadrangle,1996, T19S R01W

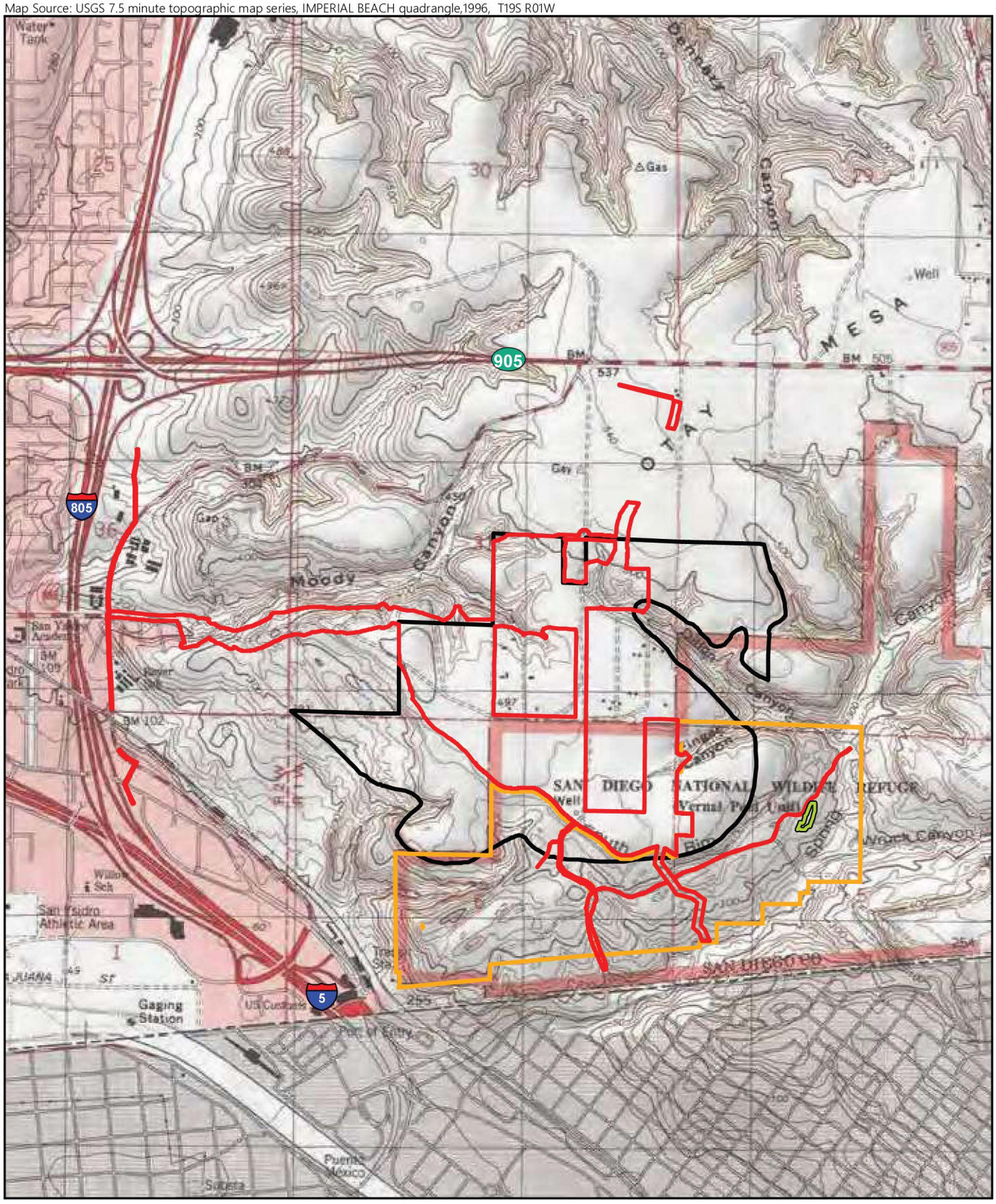

FIGURE 2
Mitigation Site Location
on USGS Map

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Table 1 Impacts and Required Mitigation		
Impacts	Mitigation Ratio	Required Habitat Mitigation
0.21 acre of Otay tarplant habitat (1,900 Otay tarplant individuals)	4:1[1]	0.84 acre of Otay tarplant habitat (7,600 Otay tarplant individuals)
0.12 acre of native grassland habitat	1:1[2]	0.12 acre of native grassland creation
Total Mitigation Acreage		**0.96 acre**
[1]Mitigation ratios are consistent with the City's MSCP Appendix A, and per discussions with City MSCP staff. [2]Mitigation ratio assumes a MHPA boundary line adjustment, with mitigation occurring within the MHPA.		

Mitigation would be accomplished through seed collection, soil translocation, and five years of maintenance and monitoring which would occur concurrent with project implementation. This plan includes a discussion of existing conditions, an implementation and maintenance plan, ecological performance standards, monitoring requirements, and adaptive management.

1.1 Project Location

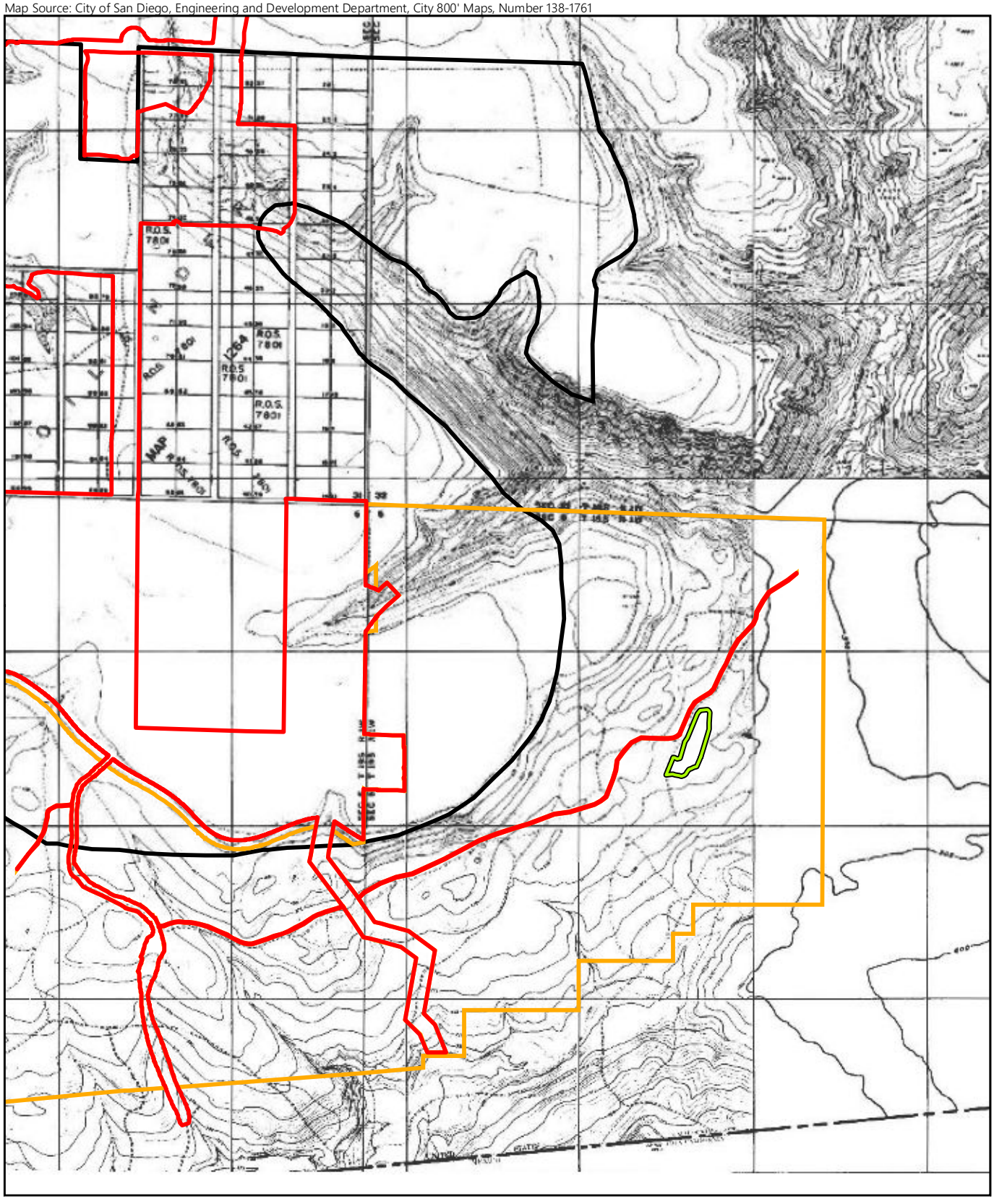
The Otay tarplant/native grassland mitigation site (mitigation site) is in the community of Otay Mesa within the city of San Diego, and more specifically within the Southwest District of the Otay Mesa Community Plan, south of State Route 905 and east of Interstate 805 (see Figure 1). The proposed project is within Township 19 South, Range 01 West, of the U.S. Geological Survey (USGS) 7.5-minute topographic map, Imperial Beach, California quadrangle (see Figure 2; USGS 1996) and is presented on the City's 800-foot-scale map numbers 138-1761 (Figure 3). The mitigation site is surrounded by open space in all directions (Figure 4). The City's MHPA occurs within and adjacent to the project site (see Figure 4).

The mitigation site would total at least 0.96 acre and is surrounded by a weed maintenance buffer that extends 30 feet beyond the boundary of the mitigation site. The mitigation site is located within open space approximately 1.5 miles southeast from the impact site. The mitigation site occurs within non-native grassland on Linne clay loam, which is known to historically support Otay tarplant, as stated in the Recovery Plan (USFWS 2004).

1.2 Otay Tarplant Biology and Status

Otay tarplant is listed as a California endangered species and a federally threatened species (California Department of Fish and Wildlife [CDFW] 2019). It is a California Rare Plant Rank 1B.1 species (California Native Plant Society [CNPS] 2019) and is a covered species and narrow endemic species under the City's MCSP Subarea Plan (City of San Diego 1997). This small, aromatic annual herb in the sunflower family (Asteraceae) produces mostly solitary yellow flower heads in May and June (Munz 1974). It ranges from southwestern San Diego County into Baja California, in open coastal sage scrub and grassland habitats below 1,000 feet (CNPS 2019). It typically occurs in herbaceous plant communities on slopes and mesas with expansive clay soils and may occur in non-native grasslands and fallow agricultural fields where clay soils are present (Reiser 2001).

Map Source: City of San Diego, Engineering and Development Department, City 800' Maps, Number 138-1761



Otay Tarplant / Native Grassland Mitigation Site

Project-level Analysis Area

Land to be Conserved and Managed by the City

Specific Plan Boundary

0 Feet 800

FIGURE 3
Mitigation Site Location
on City 800' Map

RECON

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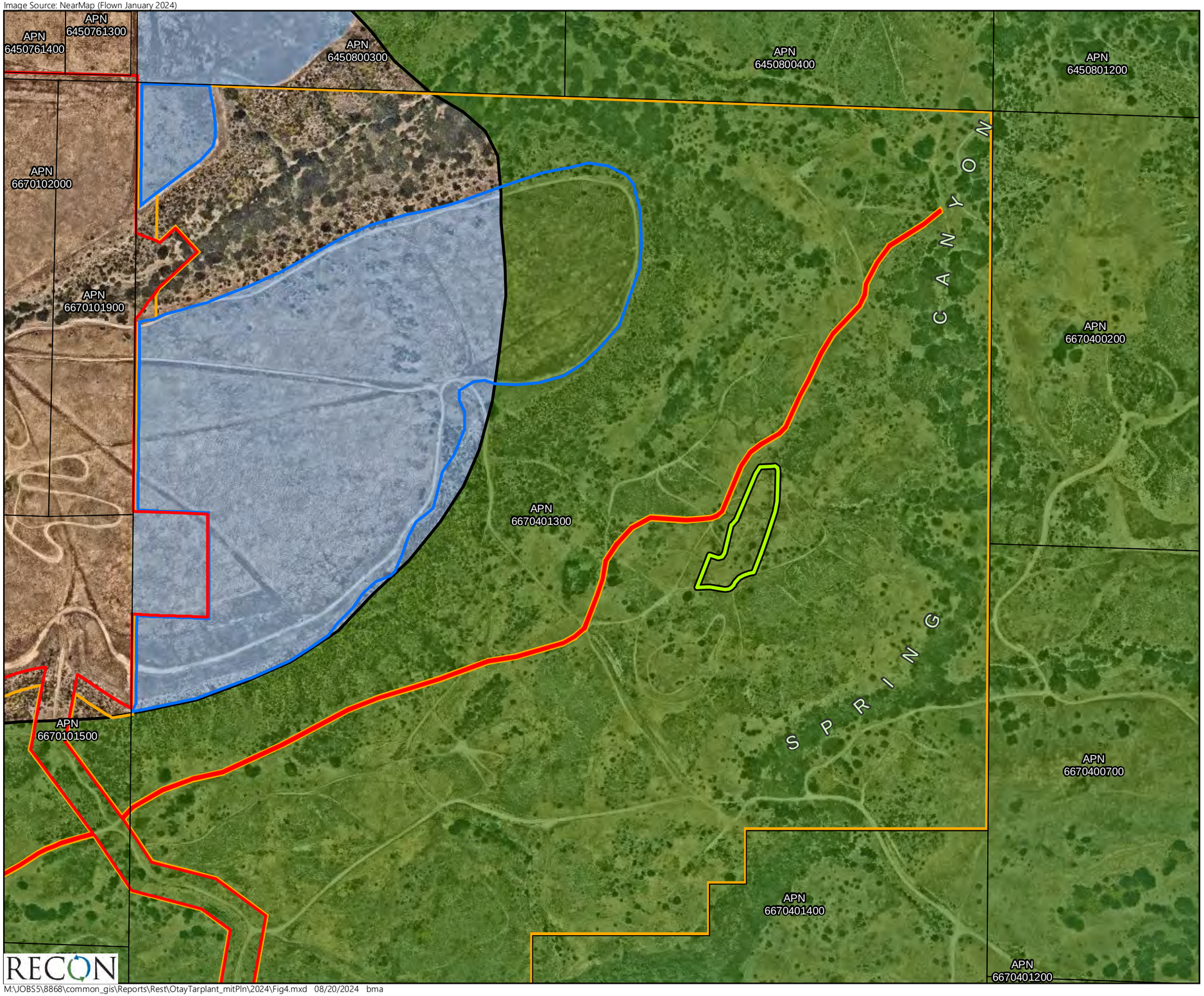
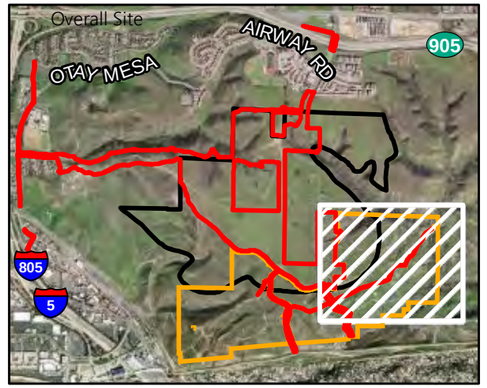
Image Source: NearMap (Flown January 2024)





- Otay Tarplant / Native Grassland Mitigation Site
- Project-level Analysis Area
- Vernal Pool Mitigation Site
- Land to be Conserved and Managed by the City
- Specific Plan Boundary
- City of SD MHPA
- VPHCP MHPA
- Parcels

0 Feet 300

RECON

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FIGURE 4
Mitigation Site Location
on Aerial Photograph

Otay tarplant habitat degradation and fragmentation have occurred largely because of residential and commercial development and highway construction (Reiser 2001). This habitat loss inhibits Otay tarplant's ability to cross-pollinate, increase genetic diversity, and reproduce (USFWS 2004). When habitat is disrupted, pollination and gene flow stop, greatly impacting its resilience and ability to repopulate. Outside of human impacts, non-native invasive plants continuously threaten Otay tarplant due to their ability to outcompete the species (USFWS 2004).

1.3 Native Grassland Vegetation Community

Native grassland is considered a Tier I habitat under the City's Biology Guidelines. A grassland habitat is distinguished as native grassland if it supports at least 5 percent cover by native grass species (Sawyer et al. 2009). Therefore, many native grasslands often have a large component of non-native grasses. This vegetation community usually occurs on fine-textured (often clay) soils that are moist or even waterlogged during winter, but very dry in summer.

Within the project site, native grassland occurs only in one small area within the northeastern portion of the project-level analysis area. This habitat is located on a north-facing slope, close to a drainage, and consists primarily of native bunchgrasses including purple needlegrass (*Stipa pulchra*), other native grasses (*Stipa* spp.), and native bulb species. This area is also characterized as having dense clay soils and minimal shrub cover.

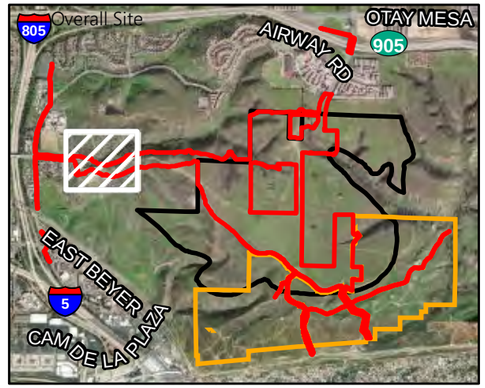
1.4 Mitigation Requirements

In June 2023, the extent of the Otay tarplant was remapped to document the current conditions. It was found that the occurrences of Otay tarplant were less than what was mapped in 2020, which was likely a result of two years of drought (2021 and 2022) in addition to plants being outcompeted by non-native species, such as crown daisy (*Glebionis coronaria*) and tocalote (*Centaurea melitensis*). Therefore, to ensure that this sensitive plant species is mitigated to the maximum extent possible, the original mapping from 2020 was used as the basis for the project's mitigation requirement.

Based on the 2020 mapping and the limits of disturbance associated with the proposed Beyer Boulevard extension, the project would result in direct impacts to approximately 1,900 Otay tarplant individuals which occupy 0.21 acre (Figure 5 and Table 1). These impacts would be mitigated through on-site mitigation at a 4:1 ratio which would result in establishment of 7,600 individuals to create 0.84 acre of Otay tarplant habitat.

Additional mapping that occurred in 2023 for the Caliente Avenue/Phase 7 planning for the project resulted in the discovery of 0.12 acre of native grassland impacts (Figure 6). Project impacts to native grassland habitat will be mitigated through on-site native grassland creation within the MHPA (see Table 1). This creation acreage will be located in the same area as the Otay tarplant mitigation site, for a total of 0.96 acre of mitigation for Otay tarplant and native grassland habitat.

Image Source: NearMap (Flown January 2024)



Impact to Otay Tarplant (0.21 ac)

Otay Tarplant (*Deinandra conjugens*)

Project-level Analysis Area

City of SD MHPA

0 Feet 150

RECON

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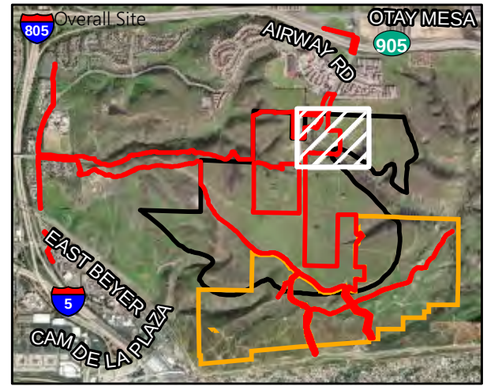
FIGURE 5
Impacts to Otay Tarplant
(*Deinandra conjugens*)

Image Source: NearMap (Flown January 2024)



Impact to Native Grassland (0.12 ac)

Native Grassland Habitat

Project-level Analysis Area

Specific Plan Boundary

City of SD MHPA

VPHCP MHPA

0 Feet 150

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FIGURE 6
Impacts to Native Grassland Habitat

The mitigation for impacts to Otay tarplant and native grassland will be met through establishment of Otay tarplant, native grasses, and other associated native grassland plant species within non-native grassland habitat. The non-native grassland would be replaced with native grasses and forbs to create a native ecosystem that supports Otay tarplant and native grassland habitat. While some of the Otay tarplant and native grassland habitat impacts will occur outside of the MHPA, all mitigation will occur within the MHPA. Implementation of this restoration effort would also provide habitat for Crotch's bumble bee (*Bombus crotchii*).

2.0 Existing Conditions

This section describes the existing physical and biological conditions of the impact sites and the mitigation site. This includes a summary of land use, topographical features, and soils observed during biological surveys conducted between June 30, 2020, and June 14, 2023.

2.1 Impact Site Environmental Conditions

The portion of the site where Otay tarplant would be impacted is located within maritime succulent scrub habitat supported by Olivenhain cobbly loam, 30 to 50 percent north -facing slopes associated with Moody Canyon slopes. The impact location is associated with the planned Beyer Boulevard extension and is located within the City's Beyer Park parcel and the County of San Diego's Furby North Preserve.

The native grassland habitat to be impacted is on a north-facing slope and is composed primarily of native bunchgrasses. It is supported by Olivenhain cobbly loam, 30 to 50 percent slope soils. The impact location is associated with the planned Caliente Avenue extension/Phase 7 of the project.

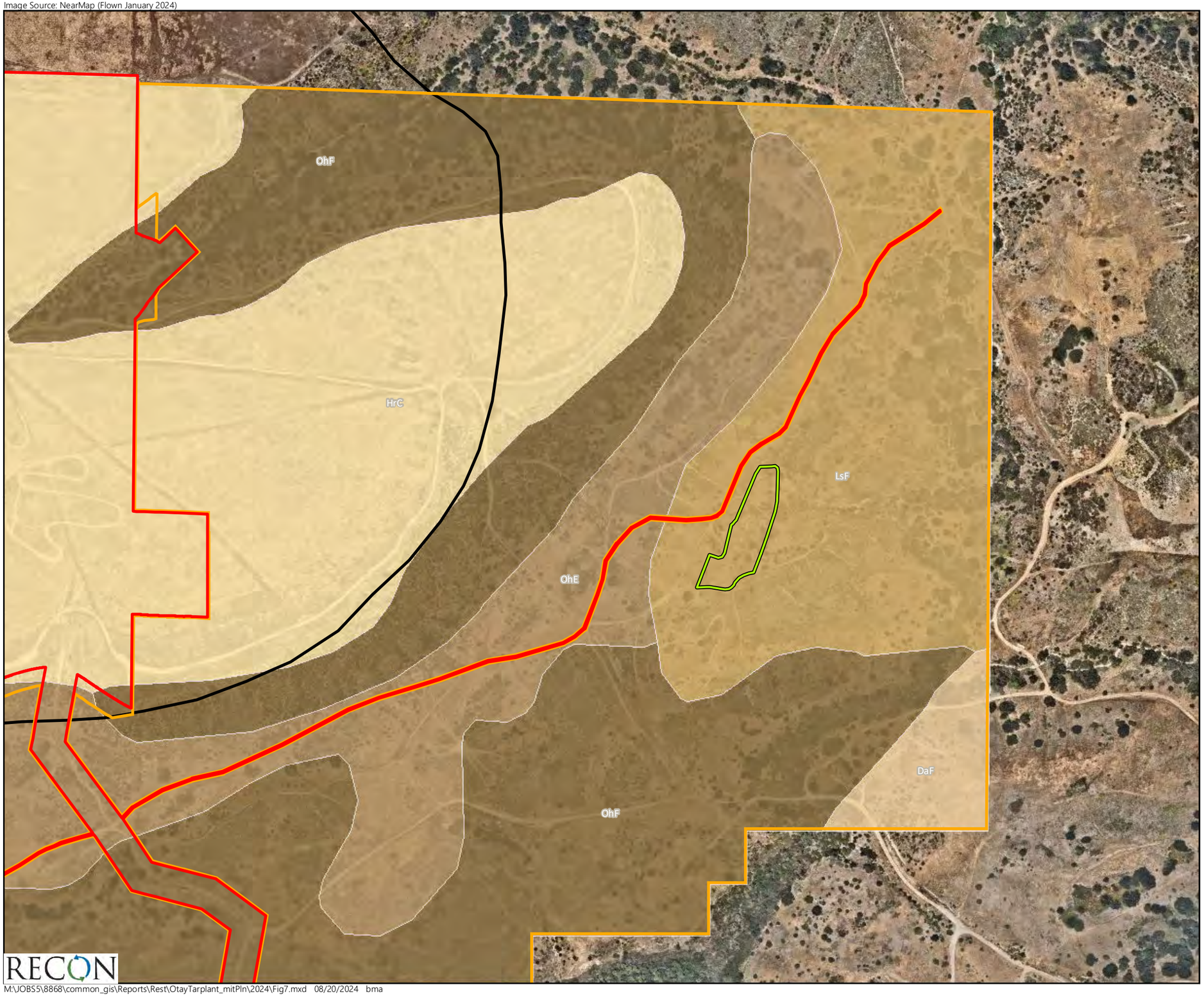
2.2 Mitigation Site Description

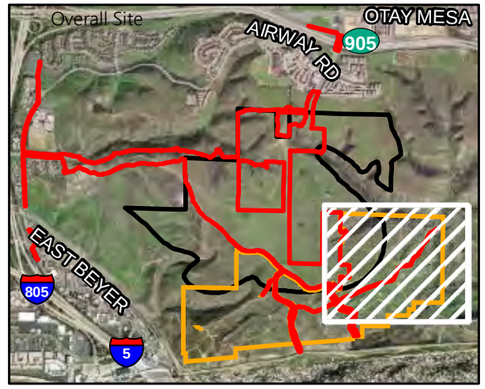
The mitigation site occurs on one undeveloped parcel (Assessor Parcel Number 667-040-13) owned by Tri Pointe Homes (see Figure 4). The mitigation site is approximately 1,000 feet east of the specific plan boundary and 1.7 miles southeast of the impact site. The mitigation site occurs on undulating topography, to the southwest of the proposed vernal pool mitigation. The areas immediately adjacent to the mitigation site are located on undeveloped land. The mitigation site and adjacent areas are located within the MHPA (see Figure 4). The mitigation site has been subjected to some recent and historic disturbances, mostly off-highway vehicle use.

2.3 Topography and Soils

The mitigation site is characterized by east- and south-facing slopes. One soil type occurs within the mitigation site: Linne clay loam, 30 to 50 percent slopes (LsF) (Figure 7; U.S. Department of Agriculture 1973). Linne clay loam soils formed from calcareous sandstone and shale and are located on hillslopes. The soil is typically well drained with medium to very rapid runoff and moderately slow permeability.

Image Source: NearMap (Flown January 2024)





Otay Tarplant / Native Grassland Mitigation Site

Project-level Analysis Area

Land to be Conserved and Managed by the City

Specific Plan Boundary

Soil Type

DaF Diablo clay, 30 to 50 percent slopes

HrC Huerhuero loam, 2 to 9 percent slopes

LsF Linne clay loam, 30 to 50 percent slopes

OhE Olivenhain cobbly loam, 9 to 30 percent slopes

OhF Olivenhain cobbly loam, 30 to 50 percent slopes

0 Feet 300

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FIGURE 7

Mitigation Site Location on Soils Map

2.4 Biological Conditions

Non-native grassland is the dominant existing vegetation community within the mitigation site (Figure 8). The non-native grassland is dominated by dense non-native annual grasses, such as slender wild oat (*Avena barbata*) and wall barley (*Hordeum murinum*), as well as patches of black mustard (*Brassica nigra*), Russian thistle (*Salsola tragus*), tocalote (*Centaurea melitensis*), and fennel (*Foeniculum vulgare*). There are occurrences of native species within the non-native grassland including California encelia (*Encelia californica*), San Diego bur-sage (*Ambrosia chenopodifolia*), jojoba (*Simmondsia chinensis*), and bladderpod (*Peritoma arborea*). In addition, a complex of dirt roads and unauthorized pedestrian and off-road vehicle trails traverse the site.

2.5 Rationale for Expecting Success

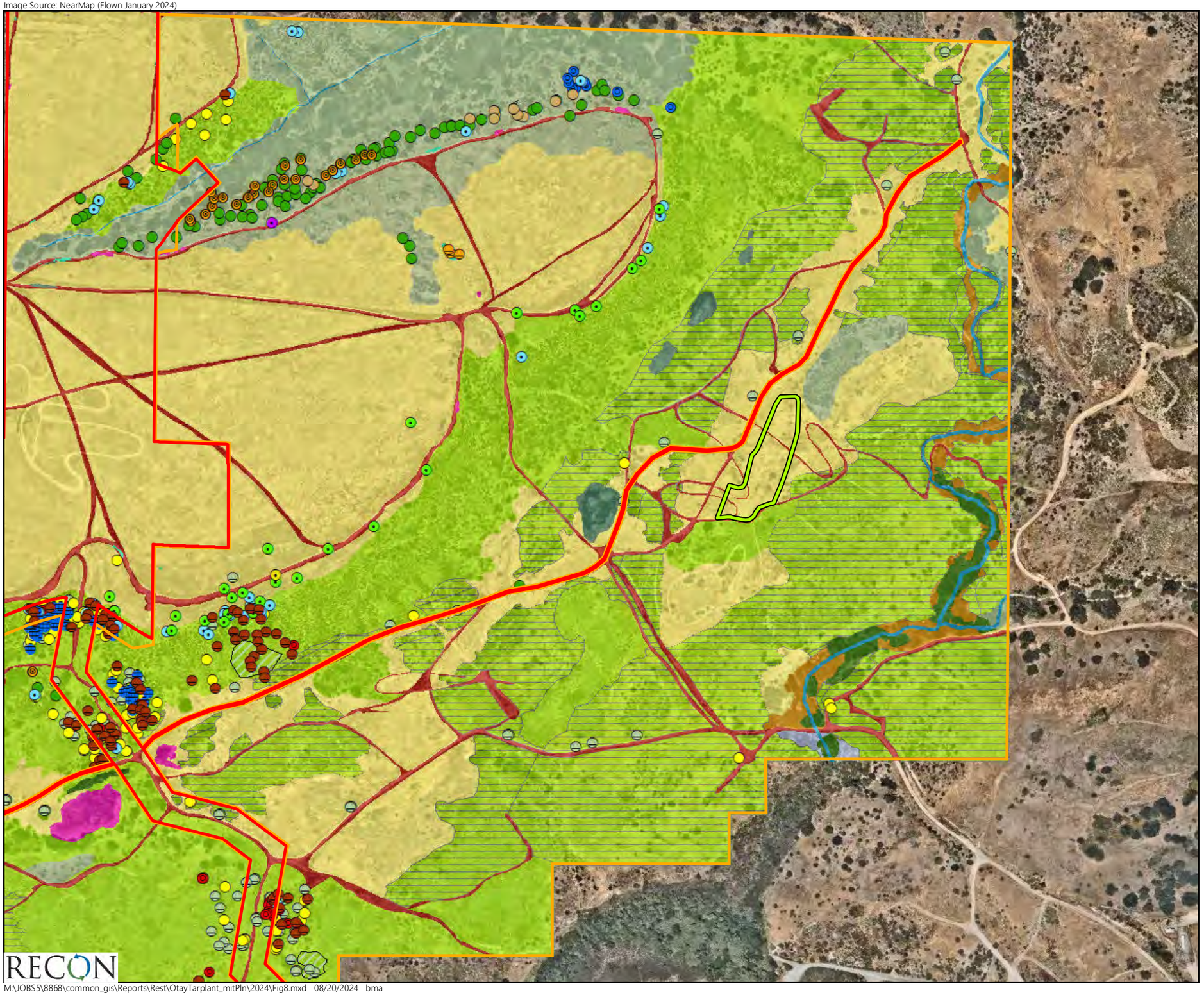
2.5.1 Restoration Goals

The goals for this mitigation project are to restore, enhance, and maintain Otay tarplant and native grassland habitat. The restoration activities aim to establish Otay tarplant individuals while restoring and enhancing native grassland habitat, necessary for the successful establishment of Otay tarplant and other associated native grassland plant species. The restoration activities and methods described in this plan are intended to restore and enhance native grassland habitat that is conducive and supportive to the growth and establishment of Otay tarplant. Restoration and enhancement will maintain as close to natural ecological conditions as possible, creating a self-sufficient, native habitat for a variety of species alongside Otay tarplant.

2.5.2 Restoration Site Suitability

The proposed location of the mitigation site is within 1.7 miles of the Otay tarplant impact locations and less than one mile from native grassland habitat impacts and is located within land to be conserved and managed by City as part of the City's MHPA (see Figure 4; RECON Environmental, Inc. [RECON] 2024a). The mitigation site was chosen based on the Linne clay loam (see Figure 6), which is known historically to support Otay tarplant (USFWS 2004) and native grassland habitat, and therefore, appropriate for Otay tarplant and native grassland growth and establishment. The existing non-native grassland within the mitigation site supports few native species and contains evidence of anthropogenic impacts, through the presence of unauthorized trails used by pedestrians and vehicles. Such anthropogenic impacts result in loss of native habitat and designated pollinators. The restoration activities described in this plan will remove the fragmentation and effects of the anthropogenic impacts to create one contiguous patch of native plant species that supports Otay tarplant and native grassland habitat. In addition, it is anticipated that restoration of the disturbed lands and non-native grassland to native habitat will reduce the extent of non-native invasive plants and will increase the habitat quality of the vegetation communities. These improvements will increase connectivity between populations of Otay tarplant and their pollinators, increasing their ability to reproduce.

Image Source: NearMap (Flown January 2024)



- Otay Tarplant / Native Grassland Mitigation Site
- Project-level Analysis Area
- Land to be Conserved and Managed by the City

Vegetation Communities

- Diegan Coastal Sage Scrub
- Maritime Succulent Scrub
- Disturbed Maritime Succulent Scrub
- Mule Fat Scrub
- Tamarisk Scrub
- Non-native Grassland
- Southern Willow Scrub
- Vernal Pool
- Vernal Pool with Fairy Shrimp
- Disturbed Wetland
- Natural Flood Channel
- Disturbed Land

Sensitive Plants

- San Diego Bur-sage (*Ambrosia chenopodiifolia*)
- Ashy Spike-moss (*Selaginella cinerascens*)
- Cliff Spurge (*Euphorbia misera*)
- Golden-ray Pentachaeta (*Pentachaeta aurea* ssp. *aurea*)
- San Diego Barrel Cactus (*Ferocactus viridescens*)
- San Diego County Viguiera (*Bahiopsis laciniata*)
- Bobtail Barley (*Hordeum intercedens*)
- Dwarf Pepper Grass (*Lepidium latipes*)
- Palmer's Grapplinghook (*Harpagonella palmeri*)
- San Diego Button-celery (*Eryngium aristulatum* var. *parishii*)
- San Diego County Needle Grass (*Stipa diegoensis*)
- Seaside Cistanthe (*Cistanthe maritima*)
- Snake Cholla (*Cylindropuntia californica* var. *californica*)
- Variegated Dudleya (*Dudleya variegata*)

0 Feet 300

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FIGURE 8
Existing Biological Resources

The proposed mitigation site is considered suitable for Otay tarplant and native grassland habitat restoration; factors that support this assessment include:

1) located within and adjacent to the MHPA;
2) the surrounding areas are anticipated to be maintained as open space;
3) adjacent areas have been shown to support grassland habitat;
4) located on Linne clay loam;
5) adequate site access;
6) proximity to vernal pool mitigation site;
7) adjacent to native maritime succulent and coastal sage scrub habitats;
8) sufficient buffering (30 feet) from the planned MHPA trails (see Figure 4);
9) avoidance of utility easements; and
10) outside any brush management zone.

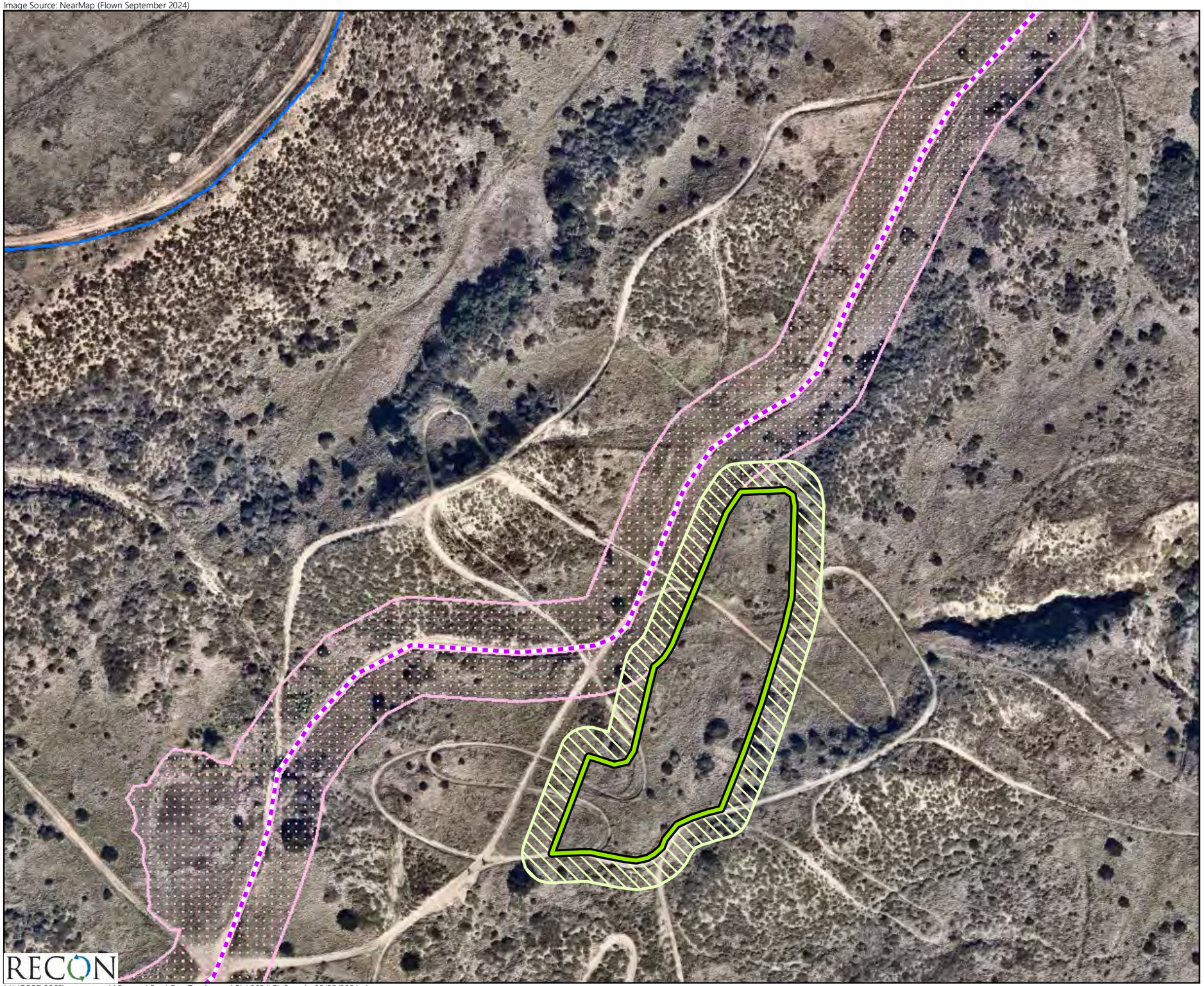
Existing U.S. Customs and Border Protection (CBP) roads and planned MHPA trails (trail restoration) occur near the proposed mitigation site (Figure 9); these roads will facilitate maintenance access for restoration activities while existing roads located within the mitigation site will be closed off and their disuse will be coordinated with CBP and the City. The mitigation site has been planned with a 30-foot buffer, with overlap in the northwestern corner with the trail restoration areas (see Figure 9). Both restoration areas have the same overall goals of providing protection of sensitive resources such as Otay tarplant and native grassland habitat, deterring unauthorized access, and performing regular weed control to allow native species to outcompete non-native invasive species on-site.

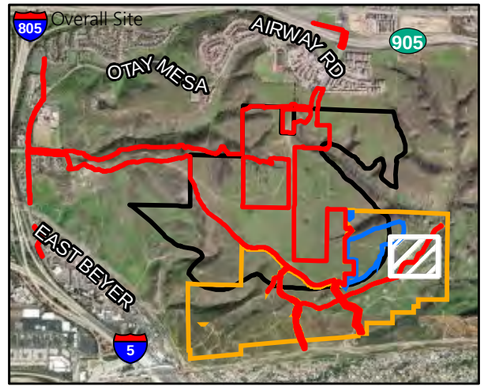
2.5.3 Restoration Viability

The viability of the proposed mitigation was assessed during the preparation of this plan per the City's Land Development Code – Biology Guidelines (City of San Diego 2018). The assessment included consideration of the site's connectivity to larger planned open space and the surrounding land uses. While the Southwest Village development project site boundary will occur largely to the west of the mitigation site, land uses immediately adjacent are planned as open space per the Southwest Village Specific Plan and City's MHPA (see Figure 4). The location of the mitigation site adjacent to the larger open space preserve will reduce fragmentation of this sensitive plant species, and of native habitat, namely native grassland. By increasing habitat connectivity, necessary gene flow for the self-incompatible Otay tarplant will increase boosting viability and longevity of the species and habitat quality. The trail restoration areas are immediately adjacent to the northwestern boundary of the mitigation site. No utility easements are present within the mitigation site as mitigation within utility easements would not be allowed. Potential future development in adjacent areas was taken into consideration when identifying the mitigation site.

The design of the mitigation site includes several modifications to preserve the restored habitat from the adjacent non-native grasslands, including a 30-foot weed maintenance buffer from the edge of the mitigation site to prevent the encroachment of weeds into the mitigation site. The weed maintenance buffer will include the control of all exotic weed cover including non-native grasses. Restoration will aim to maintain the buffer at less than 20 percent absolute cover of exotic weeds; however, coverage of non-native weeds within the buffer will not be a requirement of project success.

Image Source: NearMap (Flown September 2024)





- Otay Tarplant / Native Grassland Mitigation Site
- 30' Weed Maintenaince Buffer
- Vernal Pool Mitigation Site
- MHPA Trails
- Trail Restoration

0 Feet 100

RECON

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FIGURE 9
Otay Tarplant / Native Grassland
Mitigation Site Design

3.0 Roles and Responsibilities

3.1 Project Proponent and Financial Responsibility

The project proponent (Tri Pointe Homes) will be responsible for retaining (1) a qualified restoration specialist with over five years of experience monitoring habitat restoration to oversee the entire installation and monitoring of the mitigation program and (2) a qualified installation/maintenance contractor with expertise in restoration of native habitat and sensitive plant species. Tri Pointe will be responsible for financing the installation, five-year maintenance program, and biological monitoring of the proposed mitigation described in this plan.

3.2 Responsible Agencies

The City Development Services Department and MSCP will be responsible for issuing any necessary permits associated with the entitlements. The following entities will be responsible for reviewing and approving this plan.

Contacts: Ms. Dawna Marshall
City of San Diego
Development Services Department
1222 First Avenue, MS 501
San Diego, CA 92101-4101
DLMarshall@sandiego.gov

Ms. Kristy Forburger
City of San Diego
Planning Department
Multiple Species Conservation Program
9485 Aero Drive
San Diego, CA 92123
kforburger@sandiego.gov

3.3 Restoration Specialist

Overall supervision of the installation and maintenance of this restoration effort will be the responsibility of a restoration specialist with at least five years of native habitat and sensitive plant species restoration experience. The restoration specialist will oversee the installation/maintenance for the life of the mitigation project. Specifically, the restoration specialist will educate all participants about restoration goals and requirements; inspect plant material; directly oversee soil translocation, seeding, weeding, and other maintenance activities; and conduct regular monitoring as well as annual assessments of the restoration effort. The restoration specialist will prepare and submit the required annual reports.

3.4 Installation/Maintenance Contractor

Tri Pointe Homes will hire a qualified restoration contractor. The contractor will be a firm holding a valid C-27 Landscape Contracting License from the State of California, a valid Pest Control Business License, and a Qualified Applicator Certificate or Qualified Applicator License, with Category B, that will allow them to perform the required work for this restoration effort.

During the installation, the contractor will be responsible for initial weed control/dethatching, soil salvage and translocation, seeding, as well as maintenance of the restoration site during the 120-day Plant Establishment Period (PEP) and five-year maintenance period. Soil salvage and placement may be completed by the construction contractor in conjunction with the Beyer Boulevard extension construction.

Following installation, the contractor will submit marked up as-builts for all activities that occurred during implementation to the City. Following formal sign-off of the PEP, the contractor will maintain the mitigation site for five years. During this period, the contractor will service the entire mitigation site according to the maintenance schedule (Section 5.0, below). Service will include, but not be limited to, weed control, trash removal, watering, remedial seeding, and pest and disease management. All activities conducted will be seasonally appropriate and approved by the restoration specialist.

4.0 Implementation Plan

This section describes the design of the proposed restoration and how it will be implemented. Implementation of the restoration efforts would be conducted concurrent with project implementation under the direction of the qualified habitat restoration specialist. Seed collection should commence at least one season prior to the initiation of project impacts. All other restoration activities would commence the first summer-fall season prior to, or concurrently with, construction. The proposed restoration design is shown on Figure 9.

Implementation activities include seed collection and bulking of Otay tarplant, native grasses, and other native plant species, weed dethatching, native soil salvage and translocation, barrier installation, and seed installation. Seed collection will occur prior to the start of construction to collect seed prior to impacts. Weed dethatching and soil salvage and translocation will occur concurrent with the start of the construction of Southwest Village. Restoration activities should occur in the order included in the following sections, although seasonal variability should be taken into consideration and the contractor's best professional judgment should be applied. Some activities may be conducted concurrently.

4.1 Preliminary Design

Mitigation for impacts to Otay tarplant and native grassland habitat will consist of improvements to native habitat through restoration efforts that support germination, flowering, and seed set of Otay tarplant, and native species typically occurring in native grassland habitat. Restoration will occur on approximately 0.96 acre of non-native grasslands. Non-native grassland will be restored to native

grassland habitat that supports Otay tarplant and clay-loving native grasses and annuals with pockets of native shrubs. Restoration will occur through soil salvage and translocation, native seed introduction, and weed maintenance. Decompaction of disturbed areas that are currently unauthorized trails or roads will occur, as needed. The mitigation site will be maintained throughout the five-year maintenance and monitoring period as native grassland habitat that supports Otay tarplant, as described in Section 5.0.

4.2 Implementation Activities

Implementation activities include seed collection and bulking, non-native weed biomass dethatching, soil translocation, barrier/signage installation, and seed installation. The implementation schedule is shown in Table 2. Implementation will commence prior to or concurrently with the start of construction of the project.

Table 2
Restoration Implementation Activities Schedule

Task	Time of Year
1. Seed Collection and Bulking	Fall through spring
2. Dethatching	Summer/Fall
3. Soil Translocation	Fall, after site dethatching
4. Barrier/Signage	Fall, immediately following soil translocation
5. Seeding	Winter, after first winter rains and prior to a predicted rain event

4.2.1 Seed Collection and Bulking

Once the Otay tarplant has set seed, typically between August and November with variability due to seasonal weather patterns, seed will be collected from the existing plant populations found within the impact area. In addition to Otay tarplant seed, native species known to occur in native grassland habitat (see Table 3) will also be collected. Species shown in Table 3 include a wide range of blooming periods to support a range of pollinators. The collected seed will be taken to an approved native plant nursery, rough cleaned, and stored until the fall. In the fall, when temperatures cool and conditions begin to favor native plant germination, a portion of the seed will be sown into flats to germinate over the winter for seed bulking. Individuals will be properly cared for through flowering and seed set and seed will be collected and rough cleaned. The bulking process will continue until adequate seed quantities are obtained to meet the project requirements, which may require several seasons (at least two) of bulking. Seed collection and bulking activities will be closely coordinated between the restoration specialist and native plant nursery to ensure proper timing of collection, bulking, and storage activities. Native seed species, included in Table 3, that are not available for collection may be purchased, with prior approval from the City and restoration specialist. All seed, whether collected or purchased from a nursery, shall be locally indigenous and sourced within 30 miles of the project. The sources of all plant material and seed will be provided to the City prior to dispersal.

Table 3 Plant Species Targeted for Collection and/or Purchase		
Scientific Name	Common Name	Blooming Period[2]
Achillea millefolium[1]	yarrow	April – August
Ambrosia chenopodifolia	San Diego bur-sage	April – June
Amsinckia menziesii[1]	rancher's fiddleneck	March – May
Apiastrum angustifolium[1]	wild celery	March – April
Aristida purpurea	purple three-awn	February – March
Artemisia californica	coastal sage brush	April – October
Bloomeria crocea	common goldenstar	April – June
Bothriochloa barbinodis	cane bluestem	February – September
Chaenactis glabriuscula	pincushion flower	January – August
Cryptantha intermedia[1]	Nievitas cryptantha	March – July
Convolvulus simulans	small-flowered morning-glory	March – July
Daucus pusillus	wild carrot	April – June
Deinandra conjugens[1]	Otay tarplant	May – June
Dipterostemon capitatus	blue dicks	February – April
Encelia californica	California encelia	February – June
Eriophyllum confertiflorum[1]	golden yarrow	February – August
Eschscholzia californica	California poppy	February – September
Grindelia camporum[1]	common gumplant	April – October
Lasthenia gracilis[1]	common goldfields	February – June
Lupinus succulentus	arroyo lupine	February – May
Lupinus truncatus	collared annual lupine	March – May
Melica imperfecta	little California melica	February – March
Microseris douglasii	Douglas' silverpuffs	March – May
Mirabilis laevis	wishbone plant	December – June
Peritoma arborea	bladderpod	November – June
Plantago erecta[1]	dot-seed plantain	March – April
Simmondsia chinensis	jojoba	May – June
Sisyrinchium bellum	blue-eyed grass	March – May
Stipa lepida[1]	foothill needlegrass	March – May
Stipa pulchra[1]	purple needlegrass	March – May
NOTE: Quantities to be determined based on seed collection and bulking quantities as discussed in Section 3.1 [1]Species for which seed will be bulked. [2]Calfora 2023.		

4.2.2 Dethatching

Prior to soil translocation, crews familiar with native and non-native plants will remove the accumulated weedy thatch throughout the mitigation site using line trimmers and rakes. Weedy thatch may be removed using mechanized equipment such as a ride-on mower or tracked skid steer with mowing attachment, if site conditions allow.

Cut material will be raked into piles, removed from the site, and taken to a landfill or put into a green waste dumpster for disposal. Removal of the thatch aides in preparing the site for seeding and

reducing future weed growth that may inhibit establishment of Otay tarplant and native grassland habitat.

4.2.3 Native Soil Salvage and Translocation

Native soil within the impact areas that support Otay tarplant and native grassland habitat will be salvaged prior to construction activities (see Figures 5 and 6). Soil will be salvaged and overseen by the restoration specialist and conducted by heavy equipment and immediately translocated to the mitigation site. Soil will be spread by machine and further worked into the site by hand within open areas of the site that are largely devoid of native plants.

4.2.4 Barrier Installation

After soil translocation, temporary barriers will be installed at all unauthorized access points into the mitigation site to prevent unauthorized access by CBP operational activities and trespassing by the public. Barriers will not be installed at locations that will prohibit entrance into the site by maintenance or water trucks for the purposes of maintaining the mitigation site. Once soil translocation is complete, the mitigation site will be permanently fenced with T-posts and rope along the perimeter. Coast cholla (*Cylindropuntia prolifera*) cuttings will be strategically placed along the trails and in other locations to prevent unauthorized entry and to minimize vandalism. Signs will be installed to provide notice that the area is an ecological preserve, notify that trespassing is prohibited, and cite penalties for trespass violation including liability for repair of any damage to soil or biological resources within the barrier. Signs in both Spanish and English will be mounted at approximately 200-foot intervals around the mitigation site on metal T-posts or similar.

4.2.5 Seed Installation

Seed from Otay tarplant, clay-tolerant native species, and native grassland species (see Table 3) will be distributed within the mitigation site in the approximate quantities determined based on the results of seed collection, bulking, and/or seed purchase. The methods of seed dispersal will be determined based on site access at the time of restoration implementation. Methods will be as recommended by the restoration specialist and may include application via hydroseeding, drill seeding, seed imprinting, or hand seeding. Seed will be scheduled for distribution in the fall/winter sometime following the first significant rain event of the season, and immediately prior to a forecasted rain event (not more than 48 hours). Seeding will also follow a weeding maintenance visit that has targeted all weeds that are germinating during the late fall/early winter season. See Table 4 for the seeding schedule. All seed used for mitigation will be collected from the site vicinity, where feasible, and as approved by the restoration specialist. The recommended seed mix for Otay tarplant and native grassland habitat restoration is listed in Table 3. The seed palette was designed to include native species that perform well in high-clay conditions, co-exist with Otay tarplant, typically occur in native grassland habitat, and provide competition for non-native weed species. In addition, native cactus species salvaged whole or as cuttings from the impact area will be installed within the mitigation site.

4.3 As-Built Reporting

At the completion of implementation, the installation will be approved by the City. An as-built report will be submitted that documents implementation activities and the dates they were completed. The report will include but not be limited to dates of on-site work, details of soil translocation, final seed lists and quantities, and any modifications to the mitigation site design. The report may be a brief letter report with photos of the final site design and figures with locations of site elements.

4.4 120-day Plant Establishment Period

The 120-day PEP will begin once the implementation activities are approved by the City, likely once all soil translocation and native seeding have been completed. The PEP shall last for 120 calendar days and shall consist of all maintenance activities and methods discussed in Section 5.0. Regular (at least every other week) qualitative monitoring will be conducted to assess native seed establishment and non-native weed germination and make recommendations for maintenance activities, as needed (Table 4). Year 1 will begin after successful completion of the PEP and any required remedial seed installation has been completed. At the completion of the PEP, the restoration specialist will prepare a letter report for submittal to the City to document activities conducted during the PEP and the site progress towards final success criteria.

Table 4
Maintenance Schedule

Task	120-day PEP	Year 1	Year 2	Year 3	Year 4	Year 5
Weed Control (herbicide treatment)	As needed	Monthly[1]	Monthly[1]	5 to 6 times per year[1]	4 to 5 times per year[1]	4 times per year[1]
Watering	As needed	As needed	As needed	As needed	--	–
Supplemental Seeding/ Planting	At end of PEP	Fall/Winter	Fall/Winter	–	–	–
Trash Removal	In conjunction with weed control	In conjunction with weed control	In conjunction with weed control	In conjunction with weed control	In conjunction with weed control	In conjunction with weed control
Barrier/Sign Maintenance	As needed	As needed	As needed	As needed	As needed	As needed
[1]Minimum frequency						

4.5 Mitigation Measures

The following species-specific mitigation measures to avoid and minimize impacts to sensitive biological resources are provided as detailed in the Biological Resources Report for the Southwest Village Specific Plan, San Diego, California, Project No. 614791 (RECON 2024a).

4.5.1 Thread-leaved Brodiaea

a. Conduct a focused rare plant survey in the spring prior to the start of construction to determine the presence of thread-leaved brodiaea not previously detected. If no thread-leaved brodiaea are detected, no additional measures would be required.

b. If detected, a qualified biologist will flag or fence any thread-leaved brodiaea that occur within the temporary impact areas prior to initiation of construction activities. Thread-leaved brodiaea shall be avoided to the maximum extent feasible within the temporary impact and restoration areas.

c. Any individuals that cannot be avoided within temporary impact or restoration areas shall be salvaged for transplant and incorporated into the Vernal Pool/Quino Checkerspot Mitigation Plan area (RECON 2024b).

4.5.2 Coastal California Gnatcatcher

a. To avoid indirect impacts to coastal California gnatcatcher nesting in the vicinity of the restoration area, any work that may cause noise in excess of 60 A-weighted decibels hourly average, or the ambient if it is greater, shall be avoided during the breeding season March 1 to August 15.

b. If removal of habitat in the mitigation area must occur during the breeding season, a qualified biologist shall conduct a pre-implementation survey to determine the presence or absence of nesting birds in the proposed area of disturbance. The pre-implementation survey shall be conducted within 3 calendar days prior to the start of mitigation activities (including removal of vegetation).

c. The applicant shall submit the results of the pre-implementation survey to the City for review and approval prior to initiating any mitigation activities. If no nesting birds are detected, no additional monitoring beyond general biological monitoring will be required.

d. If nesting birds are detected, a letter report in conformance with the City's Biology Guidelines (i.e., appropriate follow-up surveys, monitoring schedules, work and noise barriers/buffers, etc.) shall be prepared and include proposed measures to be implemented to ensure that take of birds or eggs or disturbance of breeding activities is avoided.

e. The report shall be submitted to the City for review and approval and implemented to the City's satisfaction. The City's Mitigation Monitoring Coordination (MMC) office shall verify and approve that all measures identified in the report are in place prior to and/or during implementation.

4.5.3 Other Nesting Avian Species

a. To avoid any direct impacts to avian species identified as a listed, candidate, sensitive, or special status species in the MSCP, removal of habitat that supports active nests in the mitigation area should occur outside the breeding season for these species (February 1 to September 15).

b. If removal of habitat in the mitigation area must occur during the breeding season, a qualified biologist shall conduct a pre-implementation survey to determine the presence or absence of nesting birds in the proposed area of disturbance. The pre-implementation survey shall

be conducted within 3 calendar days prior to the start of mitigation activities (including removal of vegetation).

c. The applicant shall submit the results of the pre-implementation survey to the City, CDFW, USFWS, and Regional Water Quality Control Board for review and approval prior to initiating any mitigation activities. If no nesting birds are detected, no additional monitoring beyond general biological monitoring will be required.

d. If nesting birds are detected, a letter report in conformance with the City's Biology Guidelines (i.e., appropriate follow-up surveys, monitoring schedules, work and noise barriers/buffers, etc.) shall be prepared and include proposed measures to be implemented to ensure that take of birds or eggs or disturbance of breeding activities is avoided.

e. The report shall be submitted to the City for review and approval and implemented to the City's satisfaction. The City's MMC shall verify and approve that all measures identified in the report are in place prior to and/or during implementation.

4.5.4 Quino Checkerspot Butterfly

- Prior to restoration implementation, locations of Quino checkerspot butterfly (*Euphydryas editha quino*) host and nectar plants would be mapped.

- During restoration activities, Quino checkerspot butterfly nectar plants shall be avoided.

- Herbicide application would not occur within the 10-foot buffers of Quino checkerspot butterfly host plant patches, if present. Buffers shall be used to prohibit restoration activities from occurring or personnel from entering areas where Quino checkerspot butterfly larvae have potential be present between host plant patches, and to ensure only target species are treated with herbicide. The field crew shall not enter occupied Quino checkerspot butterfly areas or areas where host plants are present.

- Only locations with dense non-native plant cover and no Quino checkerspot butterfly host, if present, may be sprayed with a glyphosate-based herbicide. A field crew trained in habitat restoration would spray weeds in areas where Quino checkerspot butterfly and its host plants have not been documented.

- Herbicide shall not be applied when wind speed and direction may cause herbicide drift to areas with host plants, if present. Marker dye would be added to the herbicide mixture so the restoration field crew can see any drift.

- The California Invasive Plant Council Best Management Practices for wildland stewardship, including covering host plant patches with tarps during herbicide applications, shall be adhered to (California Invasive Plant Council 2015).

4.5.5 Crotch's Bumble Bee

a. Additional coordination and an Incidental Take Permit are anticipated to be conducted with CDFW. The results of this additional coordination may adjust the required mitigation. If Crotch's bumble bee is no longer a candidate or listed species at the time of implementation, this measure would not apply.

b. To avoid impacts to Crotch's bumble bee, removal of habitat in the proposed area of disturbance must occur outside of the Colony Active Period between April 1 through August 31. If removal of habitat in the proposed area of disturbance must occur during the Colony Active Period, a Qualified Biologist shall conduct a pre-construction survey to determine the presence or absence of Crotch's bumble bee within the proposed area of disturbance.

c. The Qualified Biologist must be approved by CDFW and hold a Memorandum of Understanding to catch and release Crotch's bumble bees in accordance with the CDFW guidance (i.e., Survey Considerations for California Endangered Species Act Candidate Bumble Bee Species, dated June 6, 2023). Survey methods that involve lethal take of species are not acceptable.

d. The pre-construction survey shall be conducted during the colony active period between April 1 through August 31 by the Qualified Biologist prior to the issuance of Grading Permit, Demolition Plans/Permits and Building Plans/Permits and within one year prior to the initiation of project activities (including removal of vegetation). The pre-construction survey shall consist of photographic surveys following CDFW guidance (i.e., Survey Considerations for California Endangered Species Act Candidate Bumble Bee Species, dated June 6, 2023). The surveys shall consist of three separate visits spaced two to four weeks apart. Survey results will be considered valid until the start of the next colony active period.

e. The Qualified Biologist/owner/permittee shall submit the results (including positive or negative survey results) of the pre-construction survey to City Development Services Department (Mitigation Monitoring and Coordination) City Planning Department (MSCP) staff and CDFW for review and written approval prior to the issuance of Grading Permit, Demolition Plans/Permits and Building Plans/Permits.

f. If pre-construction surveys identify Crotch's bumble bee individuals on-site, the Qualified Biologist shall notify CDFW and the measures identified in the Incidental Take Permit will be implemented.

g. Survey data shall be submitted by the Qualified Biologist to the California Natural Diversity Database in accordance with the Memorandum of Understanding with CDFW, or Scientific Collecting Permit requirements, as applicable.

h. Herbicide application should consider proximity to known Crotch's bumble bee occurrences or nests (i.e., known occurrences within 1 kilometer of the mitigation site) during the nesting season (February 15 to September 15), and to the extent feasible herbicide shall be avoided during the peak blooming season for potential foraging resources of Crotch's bumble bee.

5.0 Maintenance Plan

Regular maintenance of the mitigation site will be required during the five-year maintenance period to establish Otay tarplant, native grassland habitat, and to control non-native weeds. The need for weeding is expected to decrease substantially by the end of the maintenance period provided successful habitat restoration has been achieved. Maintenance activities will include weed control, watering, supplemental re-planting/re-seeding of native species, trash removal, and barrier/sign maintenance. Maintenance activities will be conducted in a frequency and duration that ensures attainment of the final success criteria. Maintenance activities will be performed per the schedule in Table 4 or as needed to achieve project success.

5.1 Weed Control

Weed control will be performed consistent with the following:

- All herbicide and pesticide use will be under the direction of a licensed qualified applicator and will be applied by personnel trained to apply herbicide. All weeding personnel will be educated to distinguish between native and non-native species with a particular focus on protecting Otay tarplant.
- Herbicide will only be applied when wind speed is less than five miles per hour, and spray nozzles will be of a design to maximize the size of droplets, to reduce the potential for drift of herbicide to non-target plants. Application of herbicide will not occur if rain is projected within 12 hours of the scheduled application.
- If herbicide is used, areas that are known to have Crotch's bumble bee occurrences/nests will be avoided during their nesting season (approximately February 15 – September 15), and to the extent feasible herbicide will be avoided during the peak blooming season for potential foraging resources of Crotch's bumble bee.
- Weeds will only be removed by hand from within areas with dense concentration of Otay tarplant seedlings.
- Weeding will be done at a frequency and duration to ensure that weeds are not allowed to flower and set seed within the site. During the growing season this may be as frequent as every other week, depending on weather patterns. Any weeds that have set seed will be removed by hand and disposed of off-site.
- Weed control efforts will target all non-native invasive species, with a goal of having less than 20 percent absolute cover of exotic weed species at the completion of each monitoring year.

5.2 Watering

Hand watering will be performed consistent with the following:

- The watering frequency and duration will be done in a manner to mimic natural rainfall, support annual plants through seed set, and encourage deep root establishment of shrubs, but not enough to create runoff.
- Watering will be carefully tapered off once Otay tarplant begins to reach the flowering stage to allow plants to experience their typical summer dormancy and avoid overwatering or excessive soil shrinking and swelling that can damage plant roots.

5.3 Supplemental Seeding

Remedial seeding will be performed consistent with the following:

- Areas of the site where native seed struggle to recruit will be remedially seeded during Years 1 and 2.
- Remedial seeding of Otay tarplant will be conducted to increase the number of Otay tarplant individuals and vegetative coverage of Otay tarplant.
- Remedial seeding of native grasses and forbs will be conducted for native grassland habitat establishment and to increase native competition with weed species.

5.4 Supplemental Planting

Supplemental planting will be performed consistent with the following:

- Cactus cuttings will be installed, as needed, within the site to deter trespassing and/or increase vegetative coverage.
- Containers of maritime succulent scrub or native grassland plant species may be introduced to provide competition for non-native weed species and preclude weed encroachment along the mitigation site edges.

5.5 Trash Removal and Barrier/Sign Maintenance

Trash removal and barrier/sign maintenance will be performed consistent with the following:

- Trash and other debris will be removed as necessary.
- All fencing and signs will be checked and repaired as necessary.
- Other site problems, such as vehicle damage and trespassing, will be reported to the City or other adjacent landowners with recommendations for remedial measures.

5.6 Adaptive Management Approach

While the restoration and maintenance measures proposed by this plan are intended to improve the quality of the mitigation site, unforeseen changes may occur because of unpredictable weather patterns, ecological processes, or other natural or anthropogenic stressors. The contractor will respond to any unexpected events that have a detrimental impact on the mitigation site using an adaptive management approach. Adaptive management is defined, for the purposes of this mitigation, as a flexible, iterative approach to the management of biological resources that is directed over time by the results of ongoing monitoring activities and direct observation of environmental stressors that are producing adverse results within the mitigation site.

Achieving the key goals of the mitigation program and establishing self-sustaining native habitats will be the focus of all adaptive management decisions. Adaptive management measures will be based on qualitative data gathered in the field throughout the five-year maintenance and monitoring period and may include collection and dispersal of seed, additional weed control efforts, additional watering, and other actions deemed appropriate through consultation with the City.

If an interim performance standard (see Section 6.0) is not met in any year or if the final performance standards are not met, the restoration specialist will prepare an analysis of the cause(s) of failure and, if deemed necessary by the City, propose remedial actions for approval. If any of the enhanced or restored habitat has not met a performance standard during the initial five-year period, the maintenance and monitoring obligations will continue until the City deems the mitigation successful.

6.0 Performance Standards

6.1 Otay Tarplant

A pre-construction survey to quantify the total number of Otay tarplant will occur prior to impacts in areas where this species is known or expected to occur. At the end of the five-year monitoring period, a minimum of 7,600 Otay tarplant individuals should be present within the mitigation site; however, the number of individuals expected to be present may be adjusted based on the results of the pre-construction survey. If the targeted number of Otay tarplant is achieved prior to the completion of Year 5, then early sign-off may be requested. Ongoing maintenance, such as weed control, would then be the responsibility of the long-term manager (City of San Diego Parks and Recreation Department).

Weed control efforts will aim to maintain non-native weed species at less than 20 percent absolute cover at the completion of each monitoring year; however, project success will ultimately be determined based on the number of Otay tarplant individuals present.

6.2 Native Grassland

The performance standards for the native grassland areas of the mitigation site will be absolute and based on the definition of the target habitat type as defined per the Draft Vegetation Communities

of San Diego County (Oberbauer 2008). Standards will include target values for vegetation cover, species richness, and non-native weed abundance. Yearly target values for the performance standards are presented in Table 5.

Table 5
Native Grassland Performance Standards
(percentage)

Year	Percent Cover – Total Native Species (minimum)[1]	Percent Cover – Native Grass Species (minimum)[1]	Native Species Richness[1]	Percent Cover – Non-native Species (maximum)[1,2]
1	15	5	4	40
2	25	10	5	40
3	35	15	6	40
4	45	20	7	40
5	60	20	8	40

[1]Absolute values.
[2]Percent cover non-native broadleaf species may not exceed 10 percent; no California Invasive Plant Council High or perennial species will be present (California Invasive Plant Council 2024).

6.2.1 Vegetation Cover and Species Richness Performance Standards

The vegetation cover and species richness performance standards are as follows:

- At the end of the five-year maintenance and monitoring period, the site should achieve 60 percent total native cover, including at least 20 percent cover of native grasses. Native cover should be primarily composed of native perennial bunch grasses and native annuals but may include some native shrubs.

- At the end of the five-year maintenance and monitoring period, eight native plant taxa will be present. Native species within the mitigation sites shall be characteristic of native grasslands.

6.2.2 Non-native Weed Cover Performance Standards

The non-native weed cover performance standards are as follows:

- Throughout the monitoring period, non-native broadleaf species within the mitigation sites will not exceed 10 percent cover. Common non-native broadleaf species that are not California Invasive Plant Council (Cal-IPC) High or perennial species include California burclover (*Medicago polymorpha*), filaree (*Erodium* sp.), tocalote (*Centaurea melitensis*), common sow thistle (*Sonchus oleraceus*), black mustard (*Brassica nigra*), nettle-leaf goosefoot (*Chenopodium murale*), Russian thistle (*Salsola tragus*), and spotted spurge (*Euphorbia maculata*).

- Throughout the monitoring period, non-native annual grass species will not exceed 40 percent cover.
- No Cal-IPC List High or perennial species (Cal-IPC 2024) will be present.

7.0 Monitoring Requirements

A minimum commitment of five years of monitoring of the mitigation site would be completed. Restoration monitoring will include qualitative vegetation monitoring, Otay tarplant counts, monitoring for performance standards, including quantitative vegetation monitoring, and photographic documentation. The monitoring schedule is presented in Table 6.

Table 6
Monitoring Schedule

Task	Year 1	Year 2	Year 3	Year 4	Year 5
Qualitative Monitoring	Every other week during the Otay tarplant growing/blooming season (January – June)	Every other week during the Otay tarplant growing/blooming season (January – June)	Monthly	Monthly	Monthly
Quantitative Monitoring	Spring	Spring	Spring	Spring	Spring
Photograph Documentation	As Needed	Spring	Spring	Spring	Spring

[1]Quantitative monitoring to begin in Year 1.

7.1 Qualitative Monitoring

Overall native and non-native cover and species richness will be qualitatively evaluated for the mitigation site as they relate to Otay tarplant health and establishment, and native grassland habitat, but will not be used to determine project success. Qualitative monitoring of the mitigation site will be performed to guide maintenance activities and will be conducted as follows:

- Qualitative monitoring will occur every other week during the growing season in Years 1 and 2 (January – June), monthly thereafter with additional visits conducted during the growing season, as needed to ensure project success (see Table 6).
- Monitoring will include, but not be limited to, assessment of native seed germination, weed presence, and unauthorized trespassing. Monitoring results will be used to determine the timing and frequency of maintenance activities.

7.2 Quantitative Monitoring

7.2.1 Otay Tarplant

Counts of Otay tarplant individuals will be conducted annually throughout the mitigation site during the blooming period for the species, approximately May through June. The timing of these counts will be adjusted based on seasonal weather patterns and qualitative monitoring of the species phenology for that year. The population total will be calculated by counting individuals and estimating the proportion of individuals at each stage of phenology; seedling, vegetative, flowering, seeding. For large areas of dense Otay tarplant individuals, the total number of individuals will be calculated by estimating the density of Otay tarplant within a section and extrapolating for the entire area.

7.2.2 Native Grassland

Overall native and non-native cover and native species richness will be evaluated. These parameters would be measured using the relevé sampling method to measure development towards the individual performance standards for native grassland restoration. Relevé monitoring methods would follow the protocol published by the CNPS in *A Manual of California Vegetation* (Sawyer et al. 2009). Due to the size of the restoration area, this method would be best suited for assessing success criteria. Ocular estimates of total cover will be taken in the spring of each monitoring year.

7.3 Photographic Documentation

A minimum of four permanent photo points will be established prior to the start of restoration activities. Representative photographs will be taken before implementation, at the completion of implementation, completion of the PEP, and annually to visually document the progress of vegetation cover development over the monitoring period.

7.4 Reporting

Annual reports that assess both the attainment of yearly interim and progress toward the final performance standards for the site will be submitted to the City MMC, MSCP, and wildlife agencies by December 1 of each year. The reports will also summarize the mitigation project's compliance with all applicable mitigation measures and permit conditions. A final monitoring report will be prepared and submitted to the City MMC, MSCP and wildlife agencies for use in the notification of completion and final acceptance of the mitigation effort.

8.0 Notification of Completion

If the final success criteria have been met at the end of the five-year monitoring program, notification of these events will be provided with the fifth-year report. If the final success criteria have not been met by the end of the five-year monitoring program, the fifth-year report will discuss the possible reasons and recommendations for remedial measures to aid the site in meeting the criteria. If the mitigation site has not met the performance standards, the project proponent's maintenance and monitoring obligations will continue, until the City MMC, MSCP and wildlife agencies deem the mitigation program as successful.

Following receipt of the final annual report, the City MMC, MSCP and wildlife agencies shall conduct a site visit to the mitigation site in order to approve completion of the mitigation effort. The Otay tarplant and native grassland mitigation requirements shall be deemed complete once the final success criteria are met and after written approval by the City MMC, MSCP and wildlife agencies has been received.

After completion of all proposed restoration efforts within the mitigation site and surrounding lands, ownership would ultimately convey to the City in fee title. Prior to or concurrent with turnover of ownership to the City, the applicant would provide endowment funding to support long-term management of the habitat areas including the Otay tarplant/Native Grassland mitigation site. After the transfer of ownership and funding of an endowment, the City Parks and Recreation Department would take on long-term management of the Otay tarplant/Native Grassland restoration area, in addition to the surrounding lands as part of its ongoing responsibilities for management of lands within the MHPA.

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ATTACHMENT 16

Long-Term Management and Monitoring Plan for the Beyer Boulevard Extension Wildlife Movement Features

Long-Term Management and Monitoring Plan for the Beyer Boulevard Extension Wildlife Movement Features San Diego, California

Prepared for
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P 619.308.9333

RECON Number 8868
August 23, 2024

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Acronyms and Abbreviations

APN	Assessor's Parcel Number
Applicant	Tri Pointe Homes
City	City of San Diego
LTMMP	Long-Term Management and Monitoring Plan
MHPA	Multi-Habitat Planning Area
MSCP	Multiple Species Conservation Program
project	Southwest Village Specific Plan project
Specific Plan	Southwest Village Specific Plan
USGS	U.S. Geological Survey

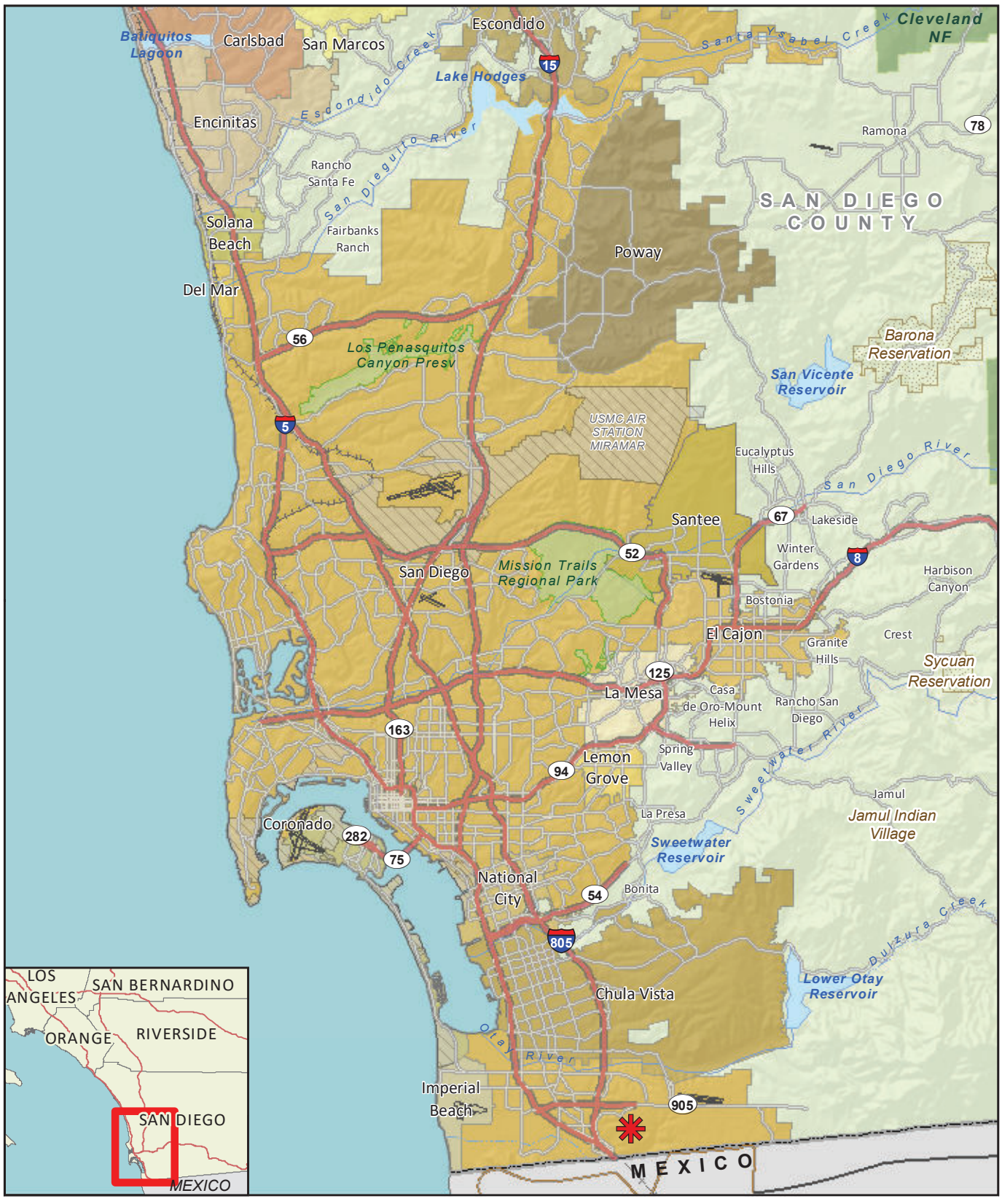
1.0 Introduction

This Long-Term Management and Monitoring Plan (LTMMP) provides guidance for the long-term management of wildlife design features associated with the Beyer Boulevard extension proposed as part of the Southwest Village Specific Plan project (project). Specifically, the wildlife design features include a wildlife overcrossing, three 6-foot-diameter culvert crossings for small animal movement, and wildlife fencing along the north and south sides of the roadway. The wildlife features would avoid potential wildlife connectivity impacts associated with development of the proposed Beyer Boulevard extension which would serve as a primary access point to the Southwest Village Specific Plan (Specific Plan) area.

The proposed Beyer Boulevard extension has long been planned by the City of San Diego (City) as a mobility element roadway in the Otay Mesa Community Plan. As part of implementation of the first phase of residential development of the Specific Plan, the Beyer Boulevard extension would be constructed, connecting San Ysidro to the Specific Plan area. Due to the roadway's proposed location crossing open space lands, it has been designed to safely accommodate wildlife movement. This LTMMP anticipates 10 years of active maintenance and monitoring of the wildlife crossings to document wildlife usage of the wildlife movement features.

1.1 Location and Existing Conditions

The proposed Beyer Boulevard extension is located in the community of Otay Mesa within the city of San Diego, and more specifically just west of the proposed Specific Plan, within the Southwest District of the Otay Mesa Community Plan, south of State Route 905 and east of Interstate 805 (Figure 1). The roadway is located within Township 18 South, Range 01 West and Township 19 South, Range 01 West, of the U.S. Geological Survey (USGS) 7.5-minute topographic map, Imperial Beach, California quadrangle (Figure 2; USGS 1996) and is presented on the City 800-foot-scale map numbers 138-1749 and 138-1761 (Figure 3).



Project Location

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FIGURE 1
Regional Location

Map Source: USGS 7.5 minute topographic map series, IMPERIAL BEACH quadrangle,1996, T18S R01W & T19S R01W

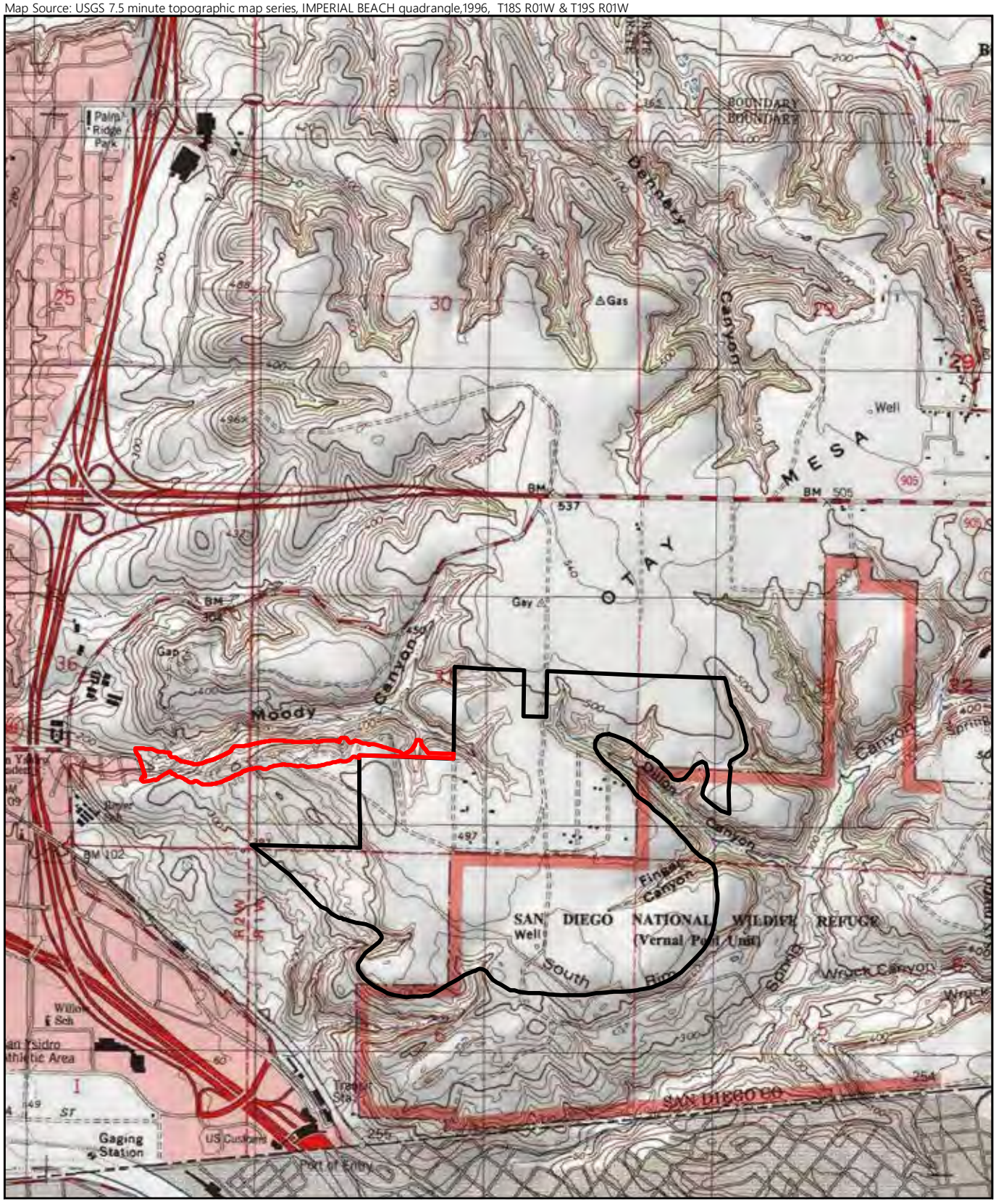

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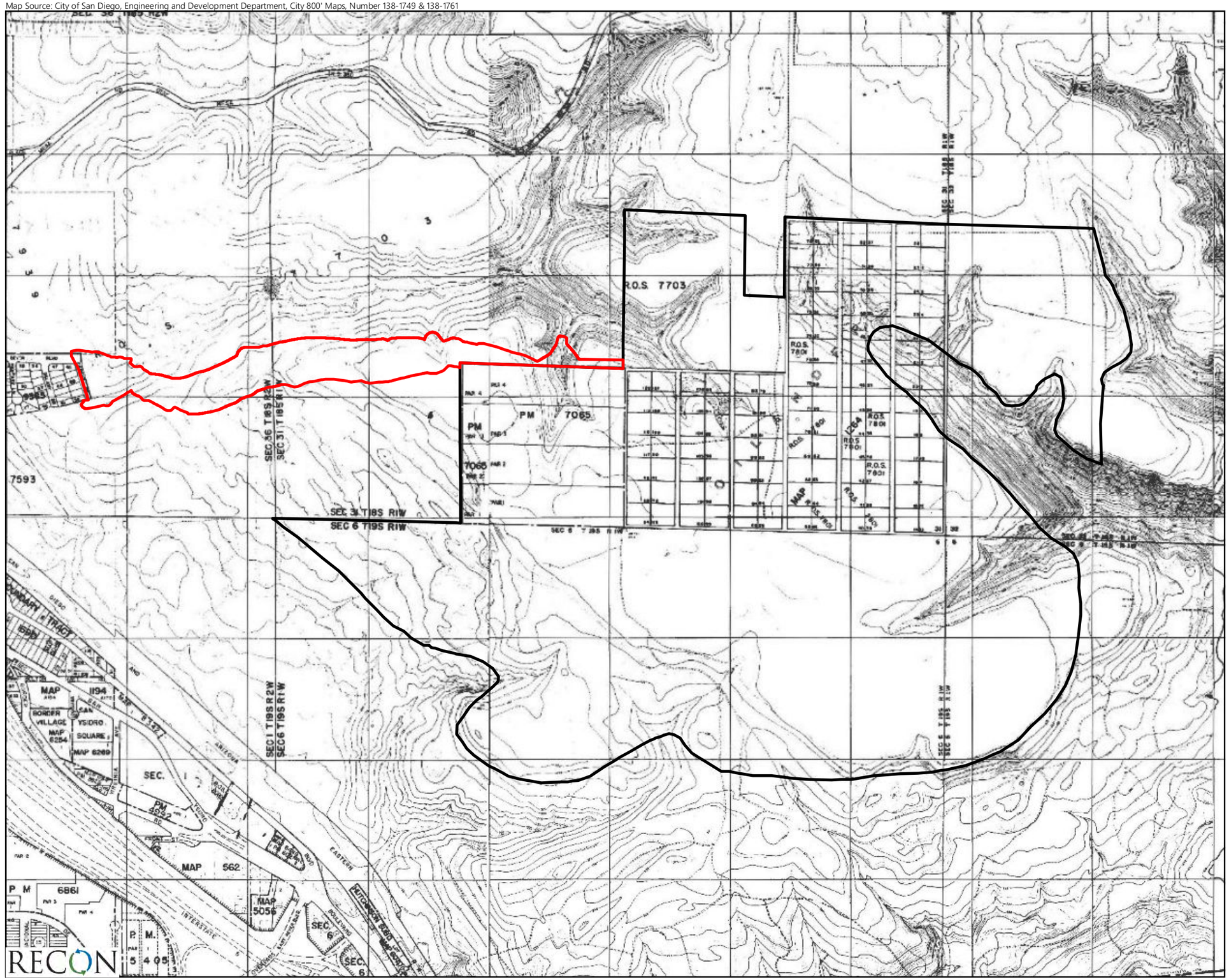
FIGURE 2
Project Location on USGS Map

Map Source: City of San Diego, Engineering and Development Department, City 800' Maps, Number 138-1749 & 138-1761



Specific Plan Boundary

Beyer Boulevard Extension

0 Feet 800

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FIGURE 3
Project Location on City 800' Map

The proposed Beyer Boulevard would extend the existing Beyer Boulevard from its current terminus in San Ysidro east to connect to the Specific Plan area. The road would traverse the south-facing slopes of Moody Canyon, crossing several parcels of publicly owned and/or conserved lands described below and depicted on Figure 4:

1. The City's planned Beyer Park (Assessor's Parcel Number [APN] 6380707100) is located at the current terminus of Beyer Boulevard in San Ysidro. The proposed roadway extension would be located immediately north of the planned public park.

2. The County of San Diego Furby North preserve (APN 6380707400) is located east of the City's Beyer Park parcel. The 83-acre Furby North preserve was acquired by the County of San Diego Department of Parks and Recreation in 2003 to contribute to the conservation of core habitat and contribute to the Multiple Species Conservation Program (MSCP) preserve system consistent with the City MSCP Subarea Plan.

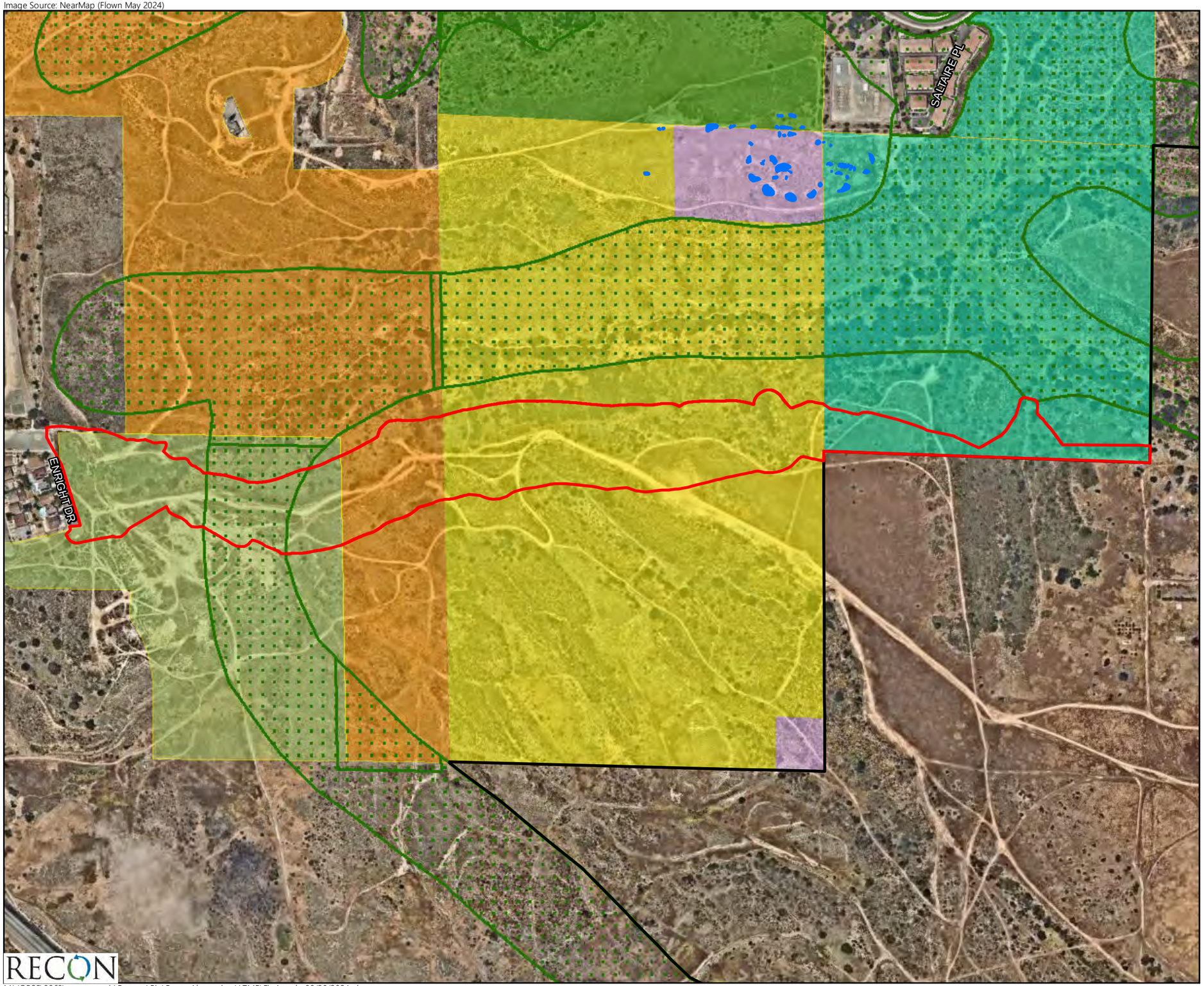
3. East of the Furby North preserve, the road would cross a privately-owned conserved parcel known as "West Otay A" which is protected by a Conservation Easement held by the California Department of Fish and Wildlife (former The Environmental Trust easement DOC#1997-0561037; APN 6450611000).

4. East of West Otay A is a City-owned parcel with a conservation easement held by the California Department of Fish and Wildlife known as "West Otay B." This parcel was previously owned by The Environmental Trust (DOC# 1997-561037, 1998-0131991, 19990672696; APN 6450610200).

The City's Multi-Habitat Planning Area (MHPA) occurs north of the proposed Beyer Boulevard extension and crosses the proposed extension along its west end. The project area is not within the City's coastal overlay zone and the closest coastal overlay zone is approximately 0.59 mile to the west.

Wildlife use within Moody Canyon, Spring Canyon, and canyon areas surrounding the Specific Plan area is extensive, with high use areas centered around canyons and drainage courses off the mesa. A Wildlife Tracking Survey for the area was prepared by the Wildlife Tracking Institute and is included as Attachment 2 of the Biological Resources Technical Report for the Southwest Village Specific Plan (RECON Environmental, Inc. 2024). As detailed in the Wildlife Tracking Study, wildlife movement occurs within the canyon networks surrounding the Specific Plan area with Moody Canyon and Spring Canyon supporting large mammals such as coyote and bobcat (Wildlife Tracking Institute 2020).

Image Source: NearMap (Flown May 2024)



- Specific Plan Boundary
- Beyer Boulevard Extension
- City of SD MHPA
- VPHCP Complex J32
- West Otay A (Private/CDFW Easement Holder)
- West Otay A (Caltrans)
- West Otay B (City of SD, CDFW Easement Holder)
- West Otay C (City of SD)
- County of San Diego Furby North Preserve
- City of San Diego Planned Beyer Park

0 Feet 400

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FIGURE 4
Proposed Beyer Boulevard Extension in Relation to MHPA and Conserved Lands

1.2 Proposed Wildlife Features

To offset potential impacts to habitat linkages, the design for Beyer Boulevard has incorporated a number of wildlife movement features including a wildlife overcrossing for large animals, three 6-foot diameter culvert under crossings (labeled as "critter crossings" on Figure 5) and wildlife fencing to direct animal movement toward crossing locations and prevent vehicular collisions and wildlife mortality (Figure 5). The purpose of these features is to maintain habitat connectivity for wildlife movement north of and within Moody Canyon and open space areas to the south. Details of each of these wildlife movement features are described below.

1.2.1 Wildlife Overcrossing

As detailed in Section 1.3.2.2 Roadway Improvements of the Biological Resources Technical Report for the Southwest Village Specific Plan (RECON Environmental, Inc. 2024), a 32-by-60-foot wildlife overcrossing is proposed over the Beyer Boulevard alignment. The overcrossing is sited and designed to mimic the existing topographic conditions and convey animals in the location of existing wildlife movement patterns at a high use drainage swale area. The wildlife overcrossing would be sited approximately 515 feet east of the development area as shown in Figure 5. Each end of the overcrossing is designed to include flared entrances to encourage wildlife entry. Surrounding slopes would be revegetated with native vegetation to match surrounding habitats.

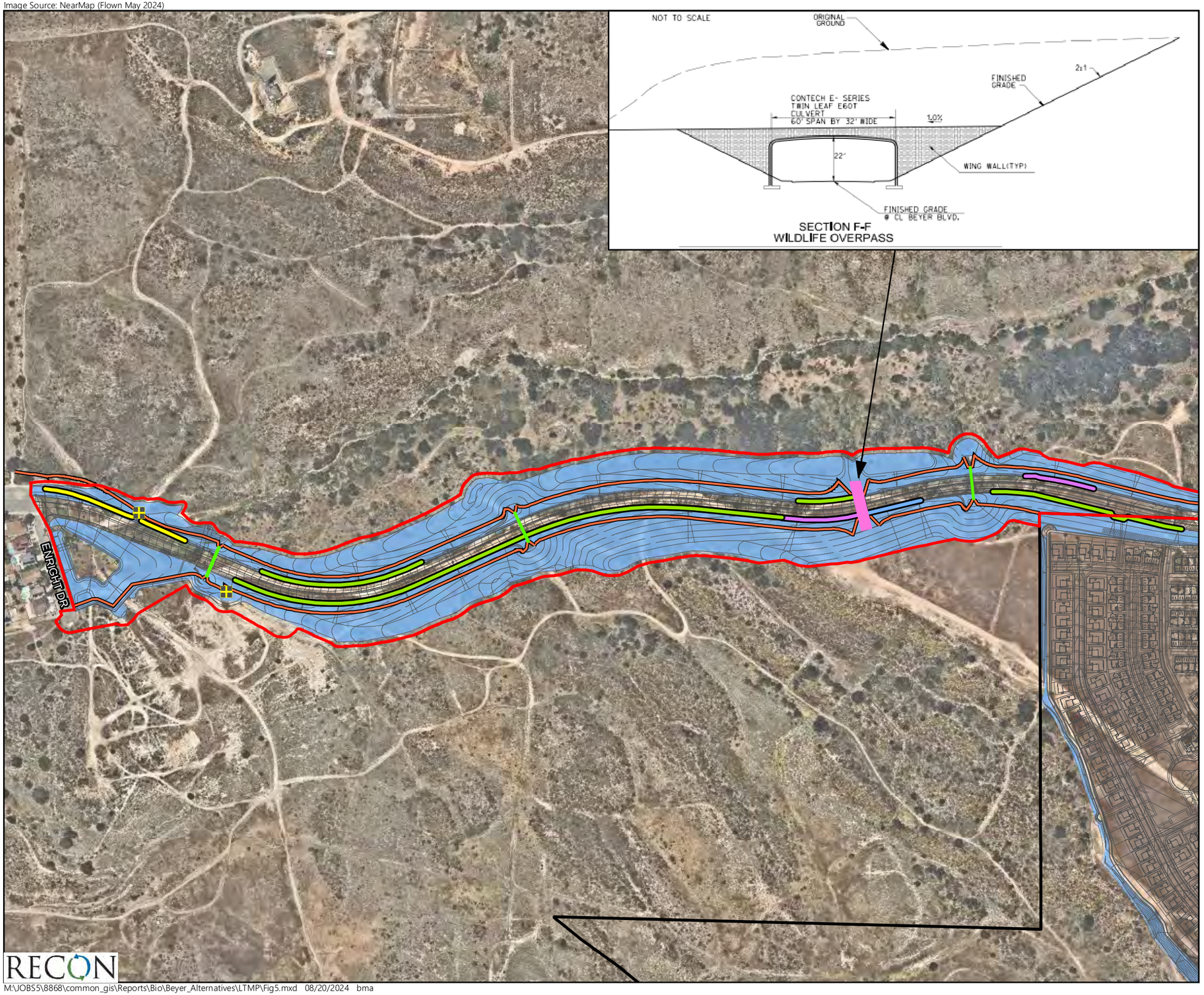
1.2.2 Wildlife Undercrossings/Culverts

In addition to the wildlife overcrossing, three additional small animal crossing opportunities have been designed as part of the Beyer Boulevard extension where it crosses conserved lands (see Figure 5). Three 6-foot-diameter culverts, ranging from 103 to 105 feet in length, would be installed to provide passage opportunities for small mammals between Moody Canyon and habitat areas to the south. These culvert undercrossings would provide multiple opportunities for small animal movement and incorporate wildlife passage into the roadway design. The culvert crossings would also be designed with a flare at the ends to encourage entry and would include contiguous wildlife fencing to prohibit crossing in other locations.

1.2.3 Wildlife Fencing

In order to direct wildlife to utilize one of three proposed undercrossings and the proposed wildlife overcrossing and avoid wildlife vehicular collisions, chain link fencing is proposed along the entire length of Beyer Boulevard on both the north and south sides of the road (see Figure 5). Wildlife fencing would also serve to preclude unwanted entry by pedestrians and domestic animals utilizing the sidewalk along Beyer Boulevard. Based on the height of the slope on the north side of the road, 6-foot-high fencing is proposed, which would be adequate to prevent animals from jumping over.

Image Source: NearMap (Flown May 2024)



Beyer Boulevard Extension
Specific Plan Boundary
4-foot Retaining Wall
6-foot Masonry Noise Wall
0 - 8-foot Retaining Wall
12-foot Retaining Wall
SDG&E Access Gate
Wildlife Fence
Critter Crossing Culvert (6' dia.)
Wildlife Overcrossing (32' wide by 60' long)
Site Plan
Manufactured Slopes to be Revegetated with Native Species

0 Feet 300

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FIGURE 5
Beyer Boulevard Wildlife Crossings, Wildlife Fencing, and Retaining Walls

The height of the fencing would be based on the slope aspect in relation to the fence, with fence heights being 6 feet up to 8 feet depending on the orientation of the slope. Fence heights vary with topographic conditions to ensure adequate control of wildlife movement away from the roadway. Where the fence is located mid-slope with wildlife usage area located above the fence line, the fence would need to be 8 feet tall. Where the fence is located at grade or with wildlife use area located downslope of the fence, a 6-foot fence height would be sufficient.

Fencing on both sides of the road would be fashioned with a fine mesh cover on the bottom 2-foot portion of the fence to prevent small animal movement through openings in the fence. The fencing would also be buried a minimum of six inches to prevent animals from burrowing under.

Fencing on the north side of Beyer Boulevard is estimated to be installed for an approximately 3,997-foot length, while fencing along the south side of Beyer Boulevard would extend approximately 3,112 feet. Along the west side of Beyer Boulevard, where vehicular access is needed for San Diego Gas and Electric, gates would be installed to allow for vehicular entry while also keeping wildlife from entering into the roadway.

1.2.4 Landscaping and Planting

The wildlife overcrossing surface shall be planted with native plants and native soil, approximately three feet deep. Soils for the overcrossing shall originate from the surface layer of surrounding native soils. Native bushes (such as lemonade berry [*Rhus integrifolia*]) found in the area that attain 6-to-8-foot heights should be placed along the sides of the overcrossing to screen the road and provide refugia. Micro-refugia (e.g., rock structures) shall be incorporated onto the overcrossing and undercrossing surface for small animal stopping points/shelters. Native plant landscaping on the southern slope at the wildlife overcrossing would be designed with vegetation that would grow in a dense manner to deter human views toward the overcrossing and deter human entry. Native cactus and other uninviting species shall be selected to deter human access.

A landscape palette has been defined for the wildlife crossing in addition to the manufactured slopes that would be adjacent to open space areas. The plant palettes and species for these areas are defined in the project's landscape plans as "Wildlife Overcrossing Plan Palette" and "MHPA Adjacent Lands and Brush Management Zone 2 Plant Palette." The species planned specifically for the wildlife crossing are shown below and would be planted concurrently with the manufactured slopes along Beyer Boulevard (Table 1). The MHPA adjacent lands plant palette contain species designed to mimic the surrounding maritime succulent scrub and Diegan coastal sage scrub habitats.

Table 1 Wildlife Overcrossing Plant Palette			
Scientific Name	Common Name	Height/Spread (feet)	Type
Shrubs (25% 5-gallon / 75% 1-gallon) such as:			
Cylindropuntia prolifera	coast cholla	10 x 4	Upright
Encelia californica	bush sunflower	4 x 6	Flowering
Malosma laurina	laurel sumac	10 x 10	Large Background
Opuntia littoralis	coast prickly pear	3 x 5	Succulent
Peritoma arborea	bladderpod	6 x 6	Mounding
Rhus integrifolia	lemonade berry	10 x 15	Large Background
Salvia mellifera	black sage	5 x 8	Mounding
Yucca schidigera	Mojave yucca	10 x 5	Succulent
Grasses (1-gallon minimum) such as:			
Stipa pulchra	purple needlegrass	3 x 1.5	Accent
Stipa lepida	small-flowered needlegrass	3 x 2	Accent

2.0 Responsible Parties

The parties involved in the implementation and long-term management of the wildlife movement features include Tri Pointe Homes ("Applicant") and the City Parks and Recreation Department (City).

The City or its designee would be responsible for implementing this LTMMP for the 10-year monitoring period, and ultimately the City would be responsible for maintenance of Beyer Boulevard and all associated wildlife movement features in perpetuity. The City is also responsible for the review and approval of this LTMMP, ensuring successful implementation of the proposed wildlife movement features, and for reviewing the annual monitoring reports.

2.1 Applicant

The Applicant would be responsible for the successful construction and implementation of the wildlife crossings and fencing concurrent with the construction of the Beyer Boulevard extension. Applicant responsibilities are summarized as follows:

- Establishment and funding of an endowment fund, to be dedicated to the City for purposes of management of this program;
- Installation of wildlife overcrossings, culverts, and wildlife fencing as detailed in Section 1.2 and as specified on the engineering plans.
- Installation of a successful revegetation effort along the Beyer Boulevard slopes to the satisfaction of the City consistent with the City's Landscape Regulations for slope revegetation (e.g., a 25-month maintenance period) (City of San Diego 2023; City of San Diego 2016).

2.2 Long-Term Manager

The City, or a third-party entity managed by the City would be responsible for implementation of the 10-year management and monitoring effort detailed in this LTMMP. The long-term manager would assume monitoring responsibilities after the Applicant has completed all applicant responsibilities detailed in Section 2.1. The responsibilities of the City are summarized below:

- The City would be responsible for implementation of the LTMMP, using funds provided by the endowment fund. This includes contracting qualified staff, storage of files, records, reports, and equipment.

- The City would hire or contract and maintain qualified staff for implementation of the LTMMP. Tracking surveys shall be conducted by a qualified person with demonstrated experience in the tracking profession including certification from a tracker training program such as Cybertracker (https://cybertracker.org/), as determined by the City.

- After the ten-year active management and monitoring period, the City would provide ongoing monitoring and management of the wildlife features as detailed in Section 5.0.

3.0 Funding

Funding would be provided by the Applicant sufficient to fund 10 years of active monitoring of the wildlife features. Funding may consist of an endowment or other mechanism acceptable to the City. At this time, the funding mechanism is anticipated to be a non-wasting endowment in an amount approved by the City based on a Property Analysis Record or similar cost estimation method. The amount of funding would be based on implementation of the tasks described in Section 4.0.

The Applicant, as the developer initiating the Specific Plan would be responsible for constructing Beyer Boulevard; however, cost sharing and reimbursements are expected due to the public roadway ultimately serving San Ysidro, Otay Mesa, and a variety of private landowners within the Specific Plan are. Since the wildlife features associated with the Beyer Boulevard extension are components of the public road, the estimated costs of long-term monitoring and maintenance would be incorporated as part of the overall cost of the public facility improvement that would be subject to certain facility reimbursements and cost sharing.

4.0 Long-Term Management and Monitoring Plan

The intent of this management and monitoring plan is to ensure that the City's MSCP Subarea Plan (1997) is implemented, including key policies related to wildlife movement. Specifically, the following management objectives under the City MSCP Subarea Plan Section 1.5.1, Management Goals and Objectives would be implemented:

- To enhance and restore, where feasible, the full range of native plant associations in strategic locations and functional wildlife connections to adjoining habitat in order to provide viable wildlife and sensitive species habitat.
- To facilitate monitoring of selected target species, habitats, and linkages in order to ensure long-term persistence of viable populations of priority plant and animal species and to ensure functional habitats and linkages.
- To provide for flexible management of the preserve that can adapt to changing circumstances to achieve the above objectives.

It is noted that the LTMMP would monitor and record all species, regardless of their status as a Covered Species under the MSCP. As wildlife migration patterns are interwoven with other species regardless of their status, records would be kept of any species determined to have passed through the wildlife crossings.

Long-term monitoring and maintenance requirements as part of this LTMMP are discussed below in detail.

4.1 Long-Term Monitoring Requirements

This LTMMP anticipates 10 years of active monitoring of the wildlife crossings to document wildlife usage of the wildlife movement features.

Following the 10-year period, in perpetuity maintenance and management would be required to ensure continued functionality of the wildlife fencing and crossings.

4.1.1 10-Year Monitoring Tasks

The monitoring tasks described in this section shall be conducted after completion of Beyer Boulevard construction and installation of all wildlife movement features and landscaping completion. Year 1 of implementation of the 10-year monitoring effort would begin concurrently with the roadway being open for public use. Table 2 outlines the general monitoring schedule for the 10-year monitoring period and defines the major tasks that would be conducted under the monitoring program.

Table 2 Monitoring Schedule		
Year	Frequency	Task
1	Quarterly	Track and Sign Surveys, Wildlife Cameras, Fencing Monitoring
2	Quarterly	Track and Sign Surveys, Wildlife Cameras, Fencing Monitoring
3	Quarterly	Track and Sign Surveys, Wildlife Cameras, Fencing Monitoring
4	Quarterly	Track and Sign Surveys, Wildlife Cameras, Fencing Monitoring
5	Twice annually in Spring and Fall	Track and Sign Surveys, Wildlife Cameras, Fencing Monitoring
6	Twice annually in Spring and Fall	Track and Sign Surveys, Wildlife Cameras, Fencing Monitoring
7	Twice annually in Spring and Fall	Track and Sign Surveys, Wildlife Cameras, Fencing Monitoring
8	Annually in Spring	Track and Sign Surveys, Wildlife Cameras, Fencing Monitoring
9	Annually in Spring	Track and Sign Surveys, Wildlife Cameras, Fencing Monitoring
10	Annually in Spring	Track and Sign Surveys, Wildlife Cameras, Fencing Monitoring

4.1.1.1 Wildlife Track and Sign Surveys

This LTMMP requires implementation of track and sign surveys over the course of the 10-year management and monitoring period. Track and sign surveys shall be completed within the three culvert undercrossings in addition to the wildlife overcrossing by a qualified wildlife tracker with appropriate certification.

To establish an accurate record of species types and travel patterns, monitoring shall be completed on a quarterly basis for the initial five years, reduced to twice annually for years 6 through 9, and then annually for years 9 through 10 as detailed in Table 2.

In the event the substrate across the wildlife crossing or culverts is found to not be conducive to the imprint of wildlife tracks, a layer of gypsum may be installed at both ends of the crossings to facilitate wildlife track identification.

4.1.1.2 Wildlife Cameras

Wildlife cameras would be installed at the wildlife overcrossing. Video monitoring of wildlife activity on the and usage of the wildlife crossing would be conducted according to the schedule outlined in Table 2. Each camera monitoring effort is anticipated to extend approximately six weeks within the appropriate season to capture a snapshot of the typical wildlife usage.

a. Equipment Type and Placement

It is recommended that two motion sensor cameras be placed at the 32-by-60-foot wildlife overcrossing. Cameras should be camouflaged within the crossing structure or within the habitat. Cameras would be directed to provide views of the crossing opening, either by placing the cameras at each end of the crossing or by placing them back-to-back at the center of the overcrossing facing each opening.

b. Equipment Maintenance and Security

Camera memory cards and batteries would be monitored to ensure continuous camera operation. Depending on the size of the memory card and life of the camera battery, the memory cards and battery cards changed at appropriate intervals (e.g., six weeks or as appropriate). Cameras would be camouflaged, placed in a theft proof security box and/or permanently affixed to the overcrossing structure to protect from vandalism, weather, and wildlife-caused interruptions. Lenses should be cleaned and checked for positioning at each maintenance visit.

c. Footage

Camera footage would be reviewed by qualified staff for wildlife species identification and wildlife usage and other observations recorded in a digital log at the end of each monitoring period. Footage should be kept on file for the entirety of the monitoring period and archived according to the City's file retention policy.

4.2 Long-Term Maintenance Tasks

General maintenance and monitoring shall be completed to ensure optimal functioning of the wildlife movement features. Concurrent with the monitoring activities detailed above, and consistent with the schedule in Table 2, any trash shall be removed from the vicinity of the wildlife features. If vandalism or evidence of trespassing is observed, these shall be documented, and steps taken to rectify any damage and prevent future occurrences. As needed, additional fencing or other physical barriers would be considered to deter human trespass and vandalism. At each site visit, the type and location of trespass and/or vandalism shall be recorded, and the management actions taken to rectify the issue shall be identified.

4.2.1 Wildlife Fencing

Wildlife fencing shall be inspected according to the schedule outlined in Table 2. Any observed damage shall be repaired in a timely manner to prevent wildlife casualties and pedestrian trespass. Chain link fencing should be routinely inspected for vandalism and breaks, leaning or sagging, rust and corrosion, or other damage. Any leaning poles or missing poles should be replaced, and fencing reattached properly to poles. The fine mesh cover on the bottom portion of the fence shall be inspected to ensure no damage or gaps are present that could allow small animals movement through. Replacement mesh shall be installed in the event damages occur.

4.2.2 Adaptive Management

As the monitoring and management tasks are conducted as detailed in Table 2, qualified staff would assess the effectiveness of the wildlife features and propose changes to vegetation/landscaping, fencing, or other features that would improve the usage of the crossings by wildlife and prevent vandalism or trespassing.

4.3 Reporting

The activities conducted as part of the wildlife management and monitoring effort and all results would be recorded and documented in an annual report. A final report would be generated at the end of the 10-year monitoring period.

5.0 Management in Perpetuity

After completion of the 10-year monitoring and management effort, ongoing management of the wildlife features in perpetuity would be required to ensure the wildlife features continue to function and to ensure any maintenance or repairs are implemented to ensure ongoing functionality of wildlife movement features. As the City would ultimately take over management of Beyer Boulevard and its slopes, ongoing maintenance and monitoring of the fencing and wildlife crossings would be implemented by the City associated with overall maintenance activities for the public roadway. The management actions recommended in perpetuity include the following:

- Twice annual inspection of the wildlife fencing, wildlife overcrossing and three culverts.
    - Check for any gaps in wildlife fencing and immediately repair any breaches.
    - Check for evidence of vandalism or trespassing in wildlife overcrossing or culverts. Implement corrective measures as needed to prevent ongoing trespass.
    - Remove any trash during each inspection.
- MSCP staff shall implement an educational program to provide information to City departments to ensure long-term knowledge of wildlife features and their management requirements are known. The purpose of this educational program is to ensure that the management requirements of the wildlife features remain known by all relevant parties including City departments such as the Fire, Parks and Engineering and Capital Projects Departments. The City would distribute educational information on an annual basis to applicable City departments. The information may include the preparation of and distribution of an educational pamphlet detailing the crossing locations, extent of fencing, maintenance requirements, and history of wildlife movement patterns.

6.0 References Cited

RECON Environmental, Inc. (RECON)

2024 Biological Resources Technical Report for the Southwest Village Specific Plan, San Diego, California.

San Diego, City of

2023 San Diego Municipal Code, Chapter 14, Article 2, Division 4 Landscape Regulations, May. https://docs.sandiego.gov/municode/MuniCodeChapter14/Ch14Art02Division04.pdf

2016 San Diego Municipal Code: Land Development Code – Landscape Standards, April. https://www.sandiego.gov/sites/default/files/dsdldc_landscapestandards_2016-04-05.pdf

1997 City of San Diego MSCP Subarea Plan. March.

ATTACHMENT 17

Vernal Pool and Quino Checkerspot Butterfly Habitat Management Plan for the Southwest Village Specific Plan Project

Vernal Pool and Quino Checkerspot Butterfly Habitat Management Plan for the Southwest Village Specific Plan San Diego, California Project No. 614791

Prepared for
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RECON Number 8868
October 15, 2024

Katy Chappaz, Restoration Project Manager

Jade Woll, Restoration Project Manager

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FIGURES

TABLES

Acronyms and Abbreviations

City	City of San Diego
HMP	Habitat Management Plan
MHPA	Multi-Habitat Planning Area
PAR	Property Analysis Record
project	Southwest Village Specific Plan project
Specific Plan	Southwest Village Specific Plan
VPHCP	Vernal Pool Habitat Conservation Plan
VPMMP	Vernal Pool Monitoring and Management Plan

1.0 Introduction

This Vernal Pool and Quino Checkerspot Butterfly Habitat Management Plan (HMP) provides guidance for the long-term management of two vernal pool mitigation sites that would be created as mitigation for impacts associated with development of portions of the Southwest Village Specific Plan project (project). Specifically, the mitigation sites are intended to mitigate impacts to vernal pool and Quino checkerspot butterfly (*Euphydryas editha quino*) habitat associated with development of the Tri Pointe Homes ownership areas within the Specific Plan. The project is in the community of Otay Mesa, within the city of San Diego (Figures 1 through 4). The project would include the adoption of the Specific Plan, which is a policy framework intended to guide the future development of residences; commercial and retail spaces; public facilities including an elementary school, parks, and trails; and open space and habitat conservation areas within a 490-acre area. Additionally, the project would include development of Phase 1 and 2 of the Specific Plan.

Mitigation for the project's impacts to existing vernal pools would follow the Vernal Pool and Quino Checkerspot Butterfly Mitigation Plan, which provides a program for implementation of the project's vernal pool mitigation sites and five years of maintenance and monitoring (RECON Environmental, Inc. 2023). The proposed vernal pool mitigation sites total 33.708 acres in size and would consist of established and enhanced vernal pools surrounded by upland areas that support Quino checkerspot butterfly and western burrowing owl (*Athene cunicularia hypugaea*). The mitigation program includes the following goals:

- Re-establishment of 3.86 acres of vernal pool basins;
- Enhancement of 0.05 acre of vernal pool basins (existing vernal pools);
- Restoration of 29.80 acres of vernal pool watershed and native upland habitat;
- Restoration of 0.93 acre and enhancement/preservation of 0.96 acre of Quino habitat; and
- Enhancement of western burrowing owl breeding and foraging habitat (0.27 acre of berm and buffer to support owl nesting and breeding, with the rest of the site supporting burrowing owl foraging).

The burrowing owl habitat improvements would be in the upland habitat and would consist of a berm with pilot holes to support burrowing owl. Additionally, barrel cactus (*Ferocactus viridescens*) would be salvaged from the project sites and would also be installed within the upland habitat. The remaining upland areas surrounding the vernal pools would be restored to maritime succulent scrub with patches of Quino host and nectar plant species. Figure 5 depicts the proposed vernal pool mitigation design.

After the implementation and five-year maintenance and monitoring program has been completed and deemed successful by the City of San Diego (City) and Wildlife Agencies (U.S. Fish and Wildlife Service and California Department of Fish and Wildlife), the vernal pool mitigation sites would be turned over to a selected long-term manager. This HMP would then be implemented by the selected long-term manager in perpetuity.

Project Location

RECON

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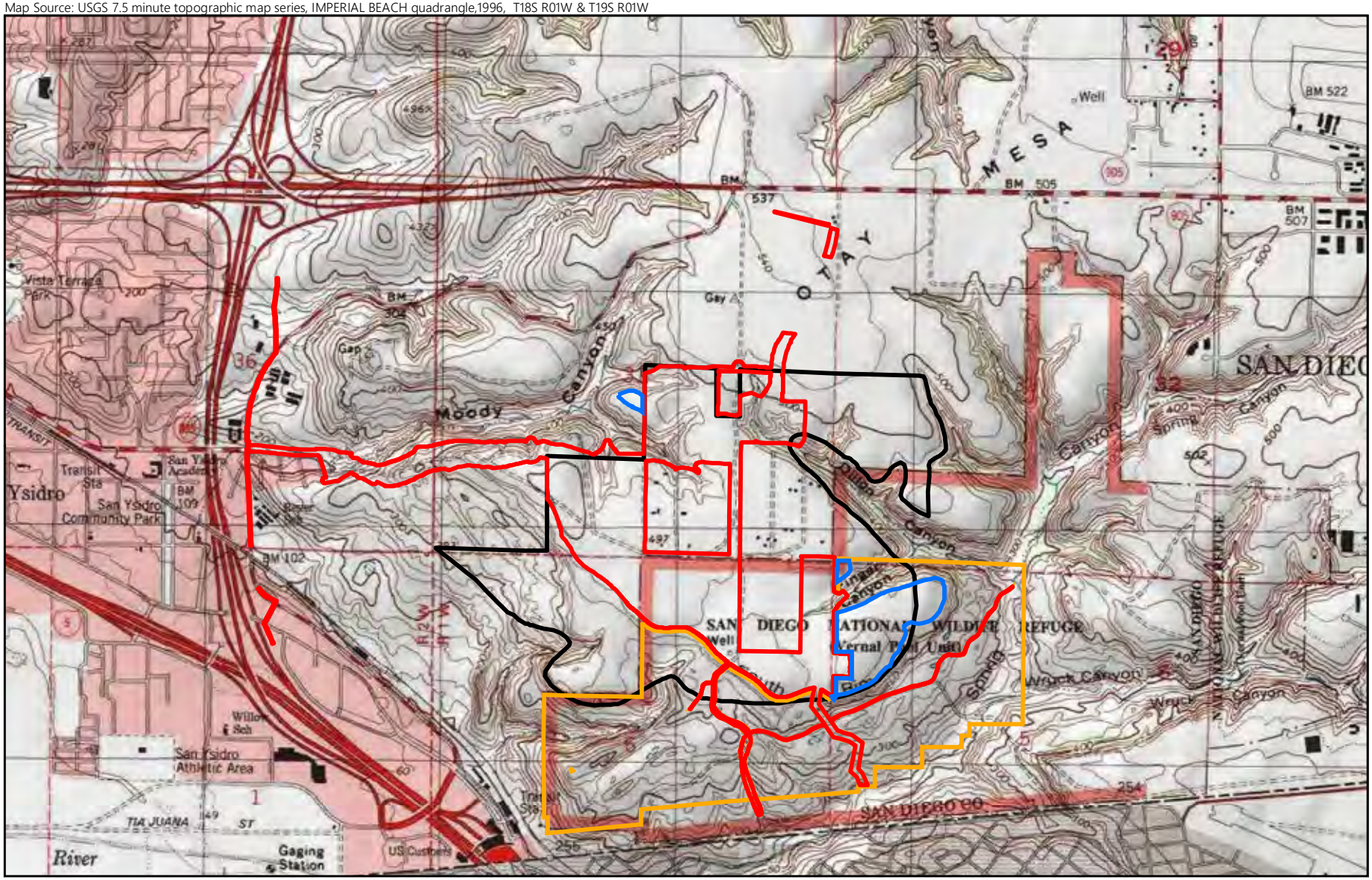
FIGURE 1
Regional Location

Map Source: USGS 7.5 minute topographic map series, IMPERIAL BEACH quadrangle,1996, T18S R01W & T19S R01W



Project-level Analysis Area

Specific Plan Boundary

Vernal Pool Mitigation Sites

Land to be Conserved and Managed by the City

RECON

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FIGURE 2

Vernal Pool Mitigation Sites on USGS Map

Map Source: City of San Diego, Engineering and Development Department, City 800' Maps, Number 138-1749 & 138-1761

Project-level Analysis Area
Vernal Pool Mitigation Sites
Land to be Conserved and Managed by the City
Specific Plan Boundary

0 Feet 800

RECON

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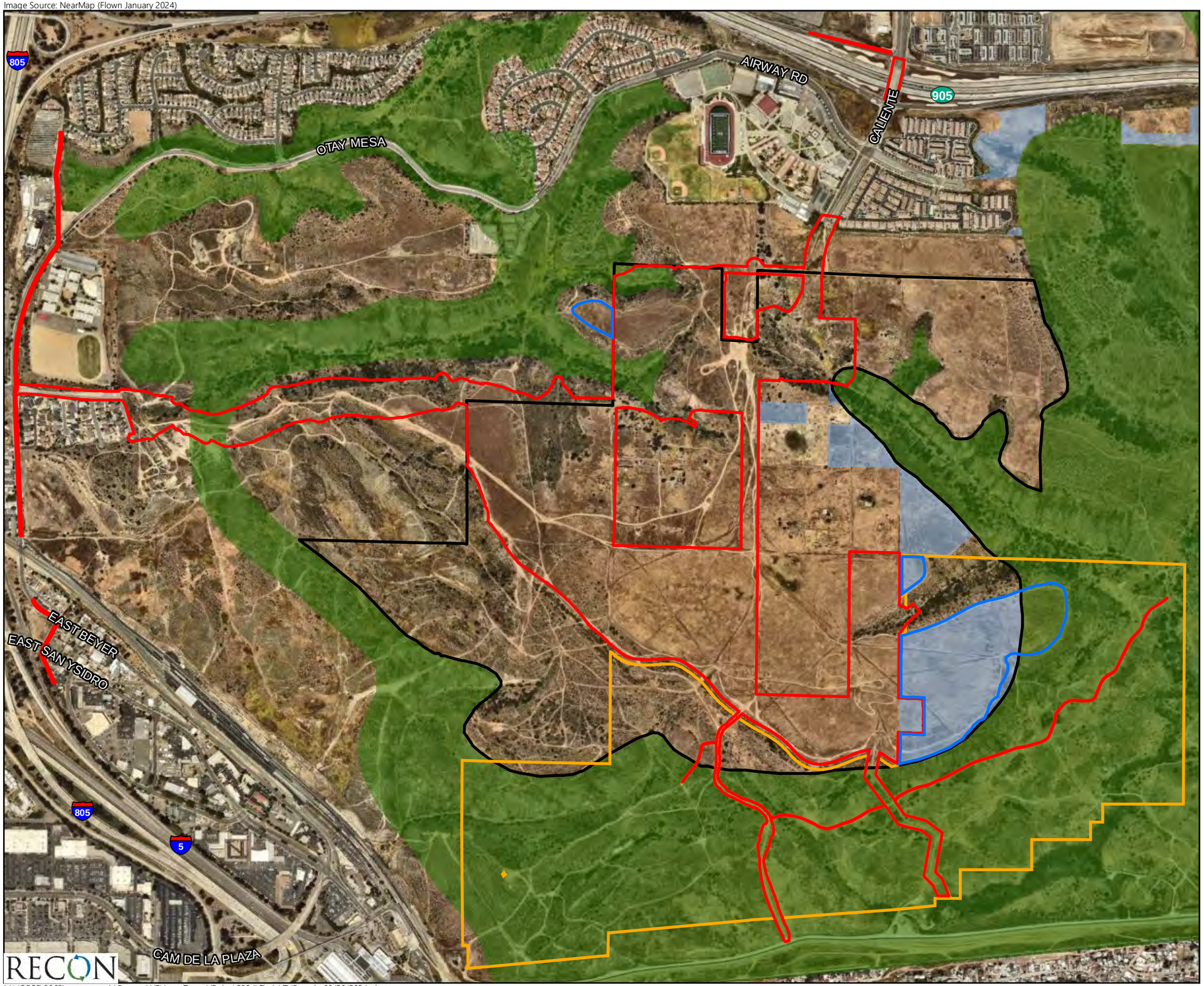
FIGURE 3
Vernal Pool Mitigation Sites on City 800' Map

Image Source: NearMap (Flown January 2024)



Project-level Analysis Area
Vernal Pool Mitigation Sites
Land to be Conserved and Managed by the City
Specific Plan Boundary
City of SD MHPA
VPHCP MHPA

0 Feet 800

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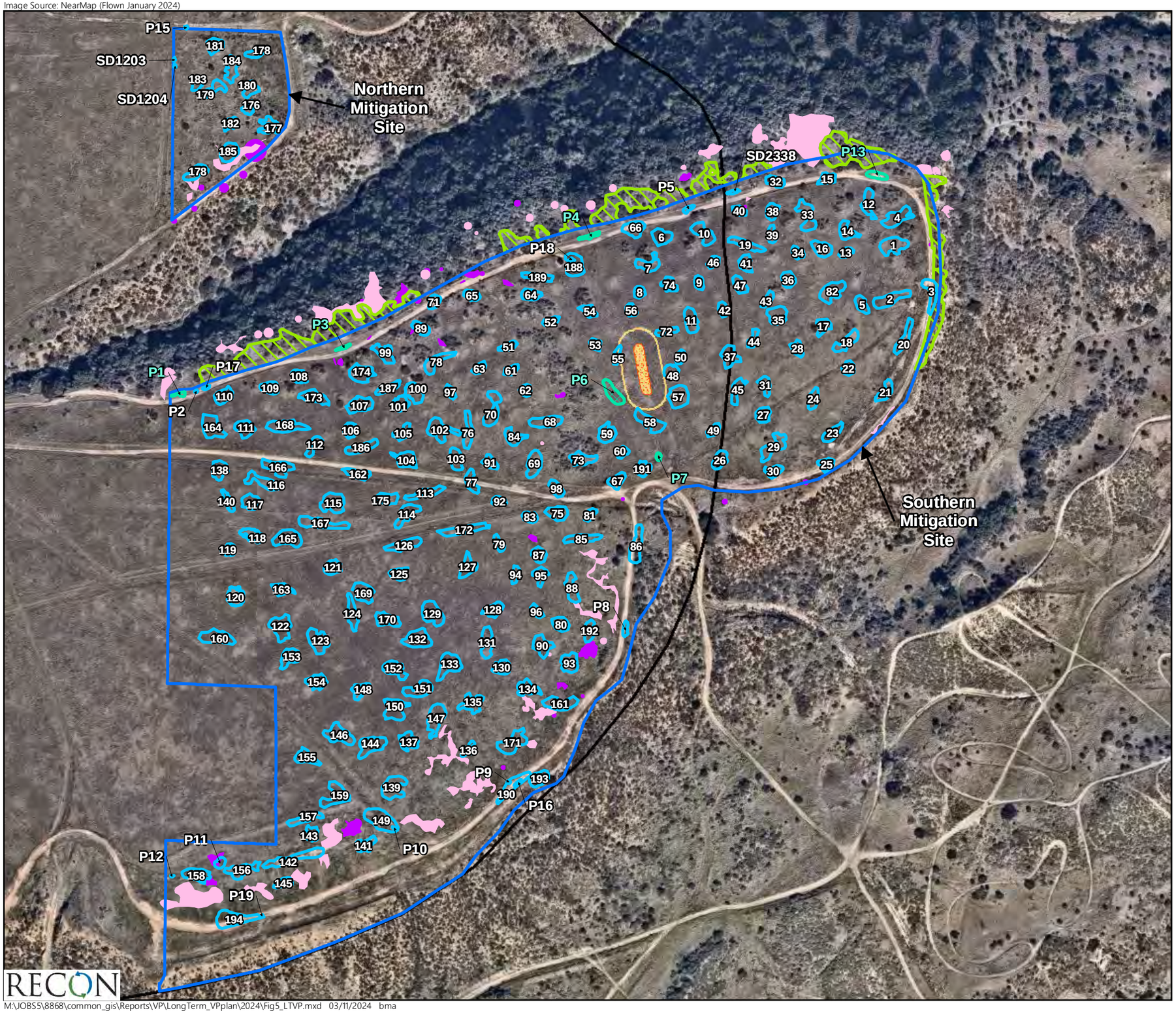
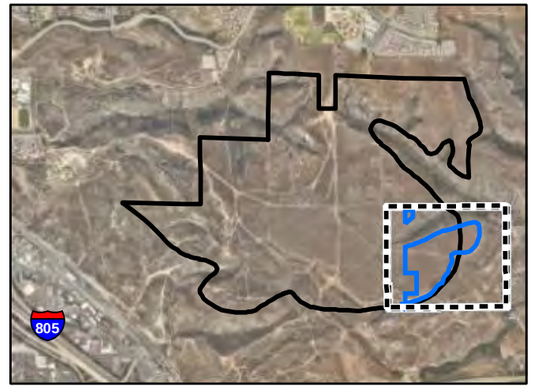
FIGURE 4
Vernal Pool Mitigation Sites
on Aerial Photograph

Image Source: NearMap (Flown January 2024)





- Enhancement Pools (0.047 acre)
- Re-establishment Pools (3.858 acre)
- Vernal Pool Mitigation Sites (33.708 acres)
- QCB Habitat Restoration (0.935 acres)
- Host Plant (0.132 acres)
- Nectar Plant (0.829 acres)
- Western Burrowing Owl Berm
- Western Burrowing Owl Buffer
- Specific Plan Boundary

0 Feet 200

FIGURE 5
Proposed Vernal Pool Mitigation Design

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Mitigation implementation would be phased with construction, where portions of the mitigation site would be installed as impacts occur. The project would be constructed in three phases. Accordingly, mitigation would be implemented in three phases, corresponding to the timing of development of each phase. This HMP would go into effect as each mitigation phase is signed off and turned over to the long-term manager so that there is no delay between mitigation sign-off and initiation of long-term management for any of the phases. This HMP is consistent with the City Vernal Pool Habitat Conservation Plan (VPHCP; City of San Diego 2019) and Vernal Pool Management and Monitoring Plan (VPMMP; City of San Diego 2020). The City's VPHCP is a conservation plan for vernal pools and seven threatened and endangered species that do not have federal coverage under the City's Multiple Species Conservation Program. The VPHCP expands the City's existing Multi-Habitat Planning Area (MHPA) to conserve additional lands with vernal pools containing vernal pool covered species. The City's VPMMP provides management guidance to meet the VPHCP objects and applies to vernal pools within the MHPA. The VPMMP uses a tiered, three-level approach to classify the management needs of individual vernal pool complexes. The vernal pool mitigation sites associated with this project are anticipated to be turned over to the long-term manager at Management Level 1, which is the highest quality level.

1.1 Location and Existing Conditions

The vernal pool mitigation sites are in the city of San Diego, on a mesa top adjacent to open space canyon areas west of Otay Mountain and approximately six miles east of the Pacific Ocean (see Figure 1). The areas surrounding the vernal pool mitigation sites are topographically varied, ranging from flat mesa tops to steep canyon slopes and drainage bottoms (see Figure 2). Elevations in the vicinity of the vernal pool mitigation sites range from 380 feet above mean sea level along the bottom of several drainages to 494 feet on the mesa top. The vernal pool mitigation sites are adjacent to additional land to be conserved and managed by the City as part of the project (see Figure 3). Both vernal pool mitigation sites are within and/or adjacent to the City MHPA and VPHCP MHPA (see Figure 4).

The vegetation within the vernal pool mitigation sites is mostly composed of annual non-native grassland with scattered patches of Diegan coastal sage scrub along the perimeter. Maritime succulent scrub occurs in the canyons to the east and south of the vernal pool mitigation sites. A few existing vernal pools were present within the mitigation sites prior to restoration activities. The following sensitive species have been observed within and adjacent to the proposed vernal pool mitigation sites: coastal California gnatcatcher (*Polioptila californica californica*), Quino checkerspot butterfly, San Diego fairy shrimp (*Branchinecta sandiegonensis*), Riverside fairy shrimp (*Streptocephalus woottoni*), western spadefoot (*Spea hammondii*), San Diego black-tailed jackrabbit (*Lepus californicus bennetti*), Cooper's hawk (*Accipiter cooperii*), and white-tailed kite (*Elanus leucurus*). Sensitive plant species also found within and adjacent to the proposed mitigation sites include San Diego button celery (*Eryngium aristulatum* var. *parishii)*, ashy spike moss (*Selaginella cinerascens*), bobtail barley (*Hordeum intercedens*), Palmer's grapplinghook (*Harpagonella palmeri*), cliff spurge (*Euphorbia misera*), golden-ray pentacheata (*Pentachaeta aurea* ssp. *aurea*), San Diego barrel cactus (*Ferocactus viridescens*), San Diego County viguiera (*Bahiopsis laciniata*), dwarf pepper grass (*Lepidium latipes*), San Diego County needle grass (*Stipa diegoensis*), seaside cistanthe (*Cistanthe maritima*), snake cholla (*Cylindropuntia californica* var. *californica*), variegated

dudleya (*Dudleya variegata*), and San Diego bursage (*Ambrosia chenopodifolia*; RECON Environmental, Inc. 2023).

2.0 Responsible Parties

Several parties are anticipated to be involved in the long-term management of the vernal pool mitigation sites, including Tri Pointe Homes, the City, Wildlife Agencies, and, if needed, a third-party long-term manager. The applicant would provide long-term funding; the amount of funding would be determined by a Property Analysis Record (PAR). The City Parks and Recreation Department is anticipated to take fee title to the parcel containing the vernal pool mitigation sites. Either the City or a third-party long-term manager would then assume the long-term management responsibilities. The City and the Wildlife Agencies are responsible for the review and approval of this vernal pool HMP and for reviewing the annual monitoring reports.

2.1 Owner

The Owner would be responsible for the successful completion of the vernal pool mitigation and for providing the funding source for the long-term maintenance and management of the vernal pool mitigation sites. Funding would be determined by a PAR prior to turnover to the long-term manager.

2.2 Long-term Manager

After the project is deemed successful by the City and Wildlife Agencies, a long-term manager would be responsible for the long-term management and monitoring tasks described herein. It is anticipated that the City would take fee title to the parcel containing the vernal pool mitigation sites. Should the City not take fee title or not take the long-term management responsibilities, or if a covenant of easement is not granted, a third party approved by the City may manage the mitigation sites with a long-term funding source. The long-term manager would assume monitoring responsibilities after the mitigation effort has been deemed successful by the Wildlife Agencies. This entity must be acceptable to the City and the Wildlife Agencies.

2.3 City of San Diego

The City and the Wildlife Agencies would be responsible for review and approval of the final vernal pool HMP. Should the City assume the role of long-term manager, it would also take on the management responsibilities described in Section 2.2.

2.4 Funding

Funding would be provided in perpetuity to pay for required management and monitoring. Funding may consist of an endowment or other mechanism acceptable to the City and the Wildlife Agencies. At this time, the funding mechanism is anticipated to be a non-wasting endowment in an amount approved by the City and Wildlife Agencies based on a PAR or similar cost estimation method. The

amount of funding would be determined by a company with experience in the long-term management and monitoring of vernal pool preserves.

3.0 Long-term Habitat Management Plan

The VPMMP proposes an adaptive management framework to guide vernal pool complex maintenance and monitoring. Adaptive management is a flexible, iterative approach to the long-term management of biological resources that is directed over time by the results of ongoing monitoring activities and direct observation of environmental stressors that are producing adverse results within the mitigation site. For the purposes of this HMP, it is assumed that each of the mitigation sites would be considered a complex. The VPMMP's adaptive management framework is based on the following standards for vernal pool complex management:

A. Annually identify threats (invasive species, trampling, off-highway vehicle activity, etc.) to all pools monitored, as well as to overall watershed integrity, and implement actions to prevent or reduce those threats.

B. Prevent an average decline of at least one cover class[1] of any covered plant species over three years for years having at least 55 percent average rainfall.

C. Prevent a 20 percent decline in the density of the covered shrimp species over three years (average within the complex).

D. At complexes with 10 percent or greater average total non-native species cover, prevent an increase in one cover class for non-native cover over three consecutive years, regardless of rainfall.

E. Maintain vernal pool watershed and hydrological network (i.e., inlet and outlet features) and water storage (maximum depth within +/-10 percent of the baseline) functions.

The VPMMP uses a tiered, three-level system to monitor these standards and inform adaptive management decisions. An individual vernal pool complex is assigned a management level based on habitat conditions and population status of covered species within the complex. The VPMMP describes the levels as follows:

- Level 1 – *maintain* existing habitat conditions and covered species populations within conserved complexes.

- Level 2 – *stabilize* covered species population status by enhancing habitat conditions to a level that can support existing populations to achieve the VPHCP habitat and species-specific objectives.

[1] Cover classes are based on the modified California Native Plant Society methodology used under the VPHCP. The estimated absolute percent cover of each covered plant species in a pool is grouped in the following classes to track changes in cover over time to inform management decisions: <10% 10-25%, 25-50%, 50%+.

- Level 3 – *restore* habitat conditions to a level that can increase covered species populations identified in the species-specific objectives.

The monitoring and maintenance actions required at each level are determined by achievement of the VPMMP standards. The VPMMP identifies specific triggers linked to the standards that could increase or decrease the management level and thus the maintenance effort required.

The vernal pool mitigation sites associated with this project are anticipated to be turned over to the long-term manager at Management Level 1. Level 1 complexes are deemed functioning at an acceptable to optimal condition. The required management actions are expected to result in maintenance of those conditions. In general, Level 1 management can be characterized as stewardship where little maintenance is needed to achieve the habitat and species-level VPHCP objectives.

3.1 Level 1 Monitoring and Reporting Requirements

Monitoring would be used to inform any maintenance activities needed to keep the vernal pool mitigation site within Management Level 1. Site conditions and maintenance activities within the vernal pool mitigation sites would be monitored and reported upon each year in perpetuity. Monitoring would include quantitative and qualitative assessments.

Table 1 lists the annual schedule of site visits for Level 1 monitoring anticipated for this project per Table 4-2 of the City's VPMMP (City of San Diego 2020).

Table 1
Long term Habitat Management Annual Schedule of Site Visits for
Level 1 Monitoring (Stewardship) of the Vernal Pool Mitigation Sites

Task	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Monitoring Level 1												
Qualitative Visit			X									
Quantitative Floral Surveys					X							
Quantitative Shrimp Surveys								X				
Ponding Verification	X	X	X									X
X = Anticipated month of occurrence												

3.1.1 Qualitative Monitoring

Qualitative monitoring includes documenting observations during annual site visits, as well as incidental observations during management activities. General site assessment information shall be collected, including current or potential threats (such as invasive plants, dumping, off-highway vehicle activity, and trampling), and recommendations for management shall be generated.

Following the City's VPMMP, the vernal pool mitigation sites/complexes shall be assessed for the following conditions and threats (City of San Diego 2020):

- Fencing and Signage: The conditions of fencing or other site protection measures shall be checked to verify that the complex is secured, and that appropriate signage is in place.

- Edge Effects: Each complex shall be inspected for edge effects from landscaping (irrigation runoff, invasive species, herbicide application, etc.), water drainage (water quality, increased ponding, etc.), dust production, dumping, and other issues within the complex or on adjacent properties.

- Fire and Fire Suppression: Evidence of fire or disturbance from fire suppression shall be evaluated for impacts to the site (loss of native habitat, weed invasion, erosion, etc.).

- Trespass: Each complex shall be inspected for signs of trespass or illegal off-highway vehicle activity.

- Topographic Disturbance: Each complex shall be evaluated for topographic disturbance or altered hydrology from vehicle damage, illegal trespass, or other landscape-damaging impacts. The qualitative assessment of topographic disturbance shall evaluate the following:

    - Pool integrity and hydrologic function
    - Shape and size of the disturbance and the overall pool
    - Depth and duration of ponding
    - Need for hand work or mechanical equipment repairs
    - Need for watershed analysis or microtopographic plans

- Invasive Species: A general assessment of non-native plant and animal invasion shall be made during each qualitative survey for the vernal pool and upland areas. Observations of invasive plant species and invasive wildlife shall be noted.

- Inundation: A visual check for pool inundation shall be performed; inundation of at least 1.5 inches in depth shall be noted.

- Other: Any additional observed disturbances that could affect habitat quality shall be noted.

Qualitative surveys shall also evaluate the presence of fairy shrimp (visual survey) and verification of fairy shrimp viability and reproduction (i.e., observation of gravid females).

3.1.2 Quantitative Monitoring

Quantitative monitoring would be performed annually and would include covered plant species monitoring. Covered shrimp species monitoring is only required at Level 1 if a notable change to hydrology or other vernal pool functions is observed that would trigger a Level 2 or 3 management response. At Management Level 1, covered plant monitoring shall be performed for a subset of the vernal pools containing covered plant species. Using the California Native Plant Society cover class system described in Section 3.0, 10 percent of the vernal pools with covered plant species shall be

assessed quantitatively. If a complex has less than 10 pools for a particular covered species, a survey shall take place for at least one pool where that covered species is known to occur. Only the covered species shall be assessed in each pool. Pools in each complex with more than one covered species shall be preferentially chosen to reduce the total number of pools required for sampling. These intentionally chosen pools are considered sentinel pools. If all covered plant species in a complex do not co-occur in the same pools, the remaining necessary pools shall be chosen randomly in each complex to meet the 10 percent criterion. The sentinel pools and the randomly chosen pools shall then be sampled every year to provide greater precision in changes observed in cover class estimates. While not random, the use of sentinel pools with multiple covered plant species, as well as the use of permanent sampling, shall increase the efficiency and precision of monitoring at Level 1.

3.1.3 Reporting

The long-term manager shall prepare an annual report (due by July 15 each year) summarizing the monitoring and maintenance activities conducted within the vernal pool mitigation sites during the preceding year and summarizing their compliance with all applicable vernal pool HMP conditions. The report would be provided to the City, who may forward it to other agencies and interested parties.

3.2 Management Level 1 Long-term Maintenance Requirements

After the 5-year mitigation program has been deemed successful and final sign-off has been received from the Wildlife Agencies and the City, long-term maintenance would begin. Long-term maintenance needs are assumed to be minimal; however, minor maintenance and monitoring activities may be required to control non-native vegetation, maintain barriers and fencing, monitor lighting and drainage, educate the public, and remove trash. These activities are outlined below. All maintenance requirements would be done in accordance with the VPHCP and VPMMP. Table 2 lists the annual schedule of site visits for Level 1 maintenance anticipated for this project per Table 4-2 of the City's VPMMP (City of San Diego 2020).

Table 2
Long term Habitat Management Annual Schedule of Site Visits for
Level 1 Maintenance (Stewardship) of the Vernal Pool Mitigation Sites

Task	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Access Control Patrol/Access Repair			X				X		X	X	X	
Trash and Debris Removal (if needed)			X				X				X	
Edge Effect Repair (if needed)			X				X				X	
General Weed Control Level 1		X		X								
Vernal Pool Weed Control Level 1				X		X						
Maintenance Oversight		X		X								
X = Anticipated month of occurrence												

3.2.1 Weed Control

Non-native vegetation removal within the vernal pool mitigation sites would be performed as recommended by the long-term manager, at least twice per spring. Weed control visits should be timed to eliminate as many weeds as possible before seed is set. To protect the vernal pool resources over the long term, weed cover within the mitigation sites should not exceed 10 percent cover. Should weed cover exceed ten percent total cover, weed control should increase in frequency to prevent an increase in one cover class of non-native cover over three consecutive years per the VPMMP management standards.

All weeding in the preserved and re-established vernal pools shall be done by hand. Line trimmers may be used at the vernal pool edges if care is taken to avoid soil disturbance. Maintenance personnel must be trained to distinguish non-native species from desirable native vegetation. Examples of non-native species to be controlled within the vernal pool basins include, but are not limited to, hyssop loosestrife (*Lythrum hyssopifolia*), Boccone's sand spurry (*Spergularia bocconi*), bent grass (*Agrostis* sp.), brome grasses (*Bromus* spp.), wild oats (*Avena* spp.), rabbitfoot grass (*Polypogon monspeliensis*), filaree (*Erodium* sp.), and Italian ryegrass (*Festuca perennis*). Of these, loosestrife, bent grass, filaree, and Italian ryegrass are significant competitors to native vernal pool species. Control would concentrate on these weed species.

Removal of non-native species in native maritime succulent scrub upland habitat would be accomplished by mechanical line trimmers or herbicide application. A glyphosate-based herbicide would be used, with ten-foot buffers around the vernal pools, and never prior to a rain event. No herbicide use would be permitted within the vernal pools themselves. Herbicide shall not be applied in windy conditions as overspray may potentially harm native plants. Glyphosate is approved for use in natural areas and must be applied under the direction of a qualified licensed applicator.

In addition to weed control, areas within a radius of 30 feet around the owl berm should be maintained so that they do not exceed 50 percent vegetation cover. The area around the owl berm should consist of low-growing vegetation to ensure proper foraging habitat is present.

To avoid potential direct impacts to Quino checkerspot butterfly and the occupied habitat within the vernal pool restoration areas because of the restoration activities, avoidance measures including, but not limited to the following, would occur:

- Only locations with dense non-native plant cover and no Quino checkerspot butterfly host or nectar plants would be sprayed with a glyphosate-based herbicide. A field crew trained in habitat restoration would spray weeds in areas where Quino checkerspot butterfly and its host plants have not been documented (see Figure 5).

- Herbicide application would not occur within the 10-foot buffers of the Quino checkerspot butterfly host plant patches, nectar plant patches, and Quino restoration areas (see Figure 5). Buffers would be used to prohibit restoration activities from occurring or personnel from entering areas where Quino checkerspot butterfly larvae have potential to traverse between host plant patches, and to ensure only target species are treated with herbicide. The field

crew would not enter occupied Quino checkerspot butterfly areas or areas where host plants are present.

- Herbicide would not be applied when wind speed and direction may cause herbicide drift to areas with host plants, nectar plants or Quino restoration areas. Marker dye would be added to the herbicide mixture so the restoration field crew can see any drift.

- The California Invasive Plant Council Best Management Practices for wildland stewardship, including covering host plant patches and nectar plant patches with tarps during herbicide applications, would be adhered to (California Invasive Plant Council 2015).

To avoid potential direct impacts to western burrowing owl during restoration activities, avoidance measures including, but not limited to the following, would occur.

Restoration activities are anticipated to be necessary during western burrowing owl breeding season (February 1 through August 31) because breeding season coincides with growing season, and the owl berm and surrounding 30-foot area are required to be maintained with low cover and low-growing vegetation. Vegetation removal may occur on and around the owl berm during breeding season; however, when burrowing owls are present, maintenance personnel should minimize the number of disturbances by working through the area swiftly and entering it only once.

3.2.2 Barriers/Fencing

The mitigation sites would be permanently fenced or have some other appropriate barrier installed, at strategic locations, to prevent unauthorized entry and to minimize the chance of vandalism. Protection of the mitigation sites from human disturbance is essential for the long-term sustainability of the re-established and enhanced vernal pools. Of particular importance is protection of the mitigation sites from pedestrians, off-road vehicles, and domestic pets. Any permanent fencing would be installed in consultation with the project owner and the City Parks and Recreation Department. Fencing would be designed to ensure that native wildlife movement would still be possible.

3.2.3 Lighting

No lighting would be installed within the mitigation sites. Lighting on adjacent lots within the developed area would be shielded and directed away from the mitigation sites.

3.2.4 Drainage

Grading of areas adjacent to the mitigation sites would be done in a manner to ensure that no runoff from the development enters the restored and preserved pools. To remain in compliance with the City's VPHCP, grading adjacent to the preserved vernal pools would be conducted such that project runoff would drain away from the vernal pools and their associated watersheds. These adjacent areas would be landscaped with native species compatible with the vernal pool habitat. Near the edge of the mitigation sites, adjacent to the development, vernal pool watersheds would be mapped and staked to ensure they are avoided during construction.

Qualitative assessments of topographic or hydrologic disturbance would include recommendations for repair measures. If damage occurs during the wet season, it may be necessary to postpone repair measures until the site is dry. Minor topographic damage, such as footprints or small tire ruts, shall be repaired with hand tools.

3.2.5 Signage/Public Information and Education

While the first phase of construction would not include development adjacent to vernal pools, Tri Pointe Homes would prepare and distribute information to homebuyers describing the importance of the vernal pools and explaining how they should not be disturbed. This information would be included in buyer disclosures and other Homeowners Association materials. This informational literature would provide Tri Pointe Homes contact information for questions or reports of disturbance during their time of management, and once the land ownership transfers and the long-term land manager takes over, the new contact's information.

As future phases of the Specific Plan get developed including land adjacent to vernal pool preserve areas, educational materials would also be provided for owners of lots adjacent to the mitigation sites specifying the following requirements:

- Development within 100 feet of the vernal pool mitigation sites shall not plant invasive non-native plants. A list of compatible plantings is provided in Appendix A.4 of the Specific Plan.

- Irrigation shall be minimized to avoid runoff into the vernal pool preserve. All drainage must be retained on-site, and no runoff shall extend outside of the lot.

- Lighting shall be shielded and directed away from the vernal pool preserve area.

Where a Homeowners Association is established, these requirements shall be included in the Covenant Conditions and Restrictions.

3.2.6 Trespass Damage Repair

Any signs of trespass would be assessed for damage. Unauthorized trails would be closed, and signage installed, where appropriate. Damage that alters hydrology would be assessed and measures would be implemented to resolve the problem.

3.2.7 Trash Removal

Trash would be removed from the area covered by this vernal pool HMP, as needed. Care would be taken not to trample any plants or alter the micro-topography of each enhanced or re-established vernal pool.

3.2.8 Fire and Fire Suppression Damage Repair

If a complex is affected by fire, quantitative data should be evaluated to identify impacts, including invasion by non-native species. Any damage resulting from fire suppression such as fencing damage, vehicle damage, and contamination from fire suppressant chemicals would be addressed immediately.

4.0 Prohibitions

The following activities are prohibited within and immediately adjacent to the mitigation sites:

a) Unseasonal watering, use of herbicides (without City approval), rodenticides, pesticides, incompatible fire protection activities and all other uses which may adversely affect conservation of watersheds.

b) Use of off-road vehicles.

c) Grazing, or surface entry for exploration or extraction of minerals.

d) Erecting of any building, billboard, or sign (except informational signs associated with the mitigation sites).

e) Depositing of soil, trash, ashes, garbage, waste, bio-solids, or any other material is prohibited; soil deposition in association with an approved restoration program is allowed.

f) Excavating, dredging, or removing of loam, gravel, soil, rock, sand, or other material is prohibited; excavation or moving of soil, gravel, loam, rock, sand, or other material in association with an approved restoration program is allowed. The exception to this prohibition is the area of the pump station proposed to be located near the western margin of the mitigation sites.

g) Otherwise altering the general topography of the area covered by this vernal pool HMP, including the building of roads; and

h) Removing, destroying, or cutting of trees, shrubs, or other vegetation other than the weeding activities discussed in Section 3.2.1 above. Alterations in association with an approved restoration program are allowed.

5.0 References Cited

California Invasive Plant Council

2015 Best Management Practices (BMPs) for Wildland Stewardship: Protecting Wildlife When Using Herbicides for Invasive Plant Management. Cal-IPC Publication 2015-1. California Invasive Plant Council, Berkeley, CA. Available: www.cal-ipc.org

RECON Environmental, Inc. (RECON)

2024 Vernal Pool and Quino Checkerspot Butterfly Mitigation Plan for the Southwest Village Specific Plan, San Diego, California.

San Diego, City of

2019 Final City of San Diego Vernal Pool Habitat Conservation Plan. October.

2020 Final Vernal Pool Habitat Conservation Plan Vernal Pool Management and Monitoring Plan. January.