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Otay Mesa Energy Center
(99-AFC-5C)

Data Response Set 1
(Responses to Data Requests BIO-1 through -3 and CUL-1 and -2)

Submitted to
California Energy Commission

Prepared by
Otay Mesa Energy Center, LLC

with technical assistance from

JACOBS

February 2022

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Acronyms

ACR	Annual Compliance Report
AMM	Applicant's Mitigation Measure
BO	Biological Opinion
BRMIMP	Biological Resources Mitigation Implementation and Monitoring Plan
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
COC	Condition of Certification
CPM	Compliance Project Manager
DR	Data Response
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
MCR	Monthly Compliance Report
OMEC	Otay Mesa Energy Center
USFWS	US Fish and Wildlife Service
SAA	Streambed Alteration Agreement
SDG&E	San Diego Gas & Electric
USACE	US Army Corps of Engineers
WEAP	Worker Environmental Awareness Program

Introduction

Attached are Otay Mesa Energy Center, LLC's (Project Owner) responses to the California Energy Commission (CEC) Staff Data Requests, Set 1, regarding the Otay Mesa Energy Center (OMEC) (99-AFC-05C) Petition for Post-Certification Change for relocation of the fuel gas supply pipeline.

The responses are grouped by individual discipline or topic area. Within each discipline area, the responses are presented in the same order as the CEC presented them and are keyed to the Data Request numbers.

New or revised graphics or tables are numbered in reference to the Data Request number. For example, the first table used in response to Data Request 28 would be numbered Table DR28-1. The first figure used in response to Data Request 28 would be Figure DR28-1, and so on.

Additional tables, figures, or documents submitted in response to a data request (for example, supporting data, stand-alone documents such as plans, folding graphics, etc.) are found at the end of each discipline-specific section and are not sequentially page-numbered consistently with the remainder of the document, though they may have their own internal page numbering system.

Biological Resources (1-3)

Data Requests

1) *Confirm that when project owner states in the petition that the Biological AMMs for the Otay Mesa East LPOE/SR-11 project are detailed in the EIR/EIS, the reference is to the avoidance and minimization requirements discussed in Chapter 3.19 and listed in Appendix N of the SR-11/Otay Mesa East LPOE Tier II EIR/EIS.*

   Response: Correct. Appendix N, Environmental Commitments Records State Route 11/Otay Mesa East Port of Entry Project (TIER II) provides the Biological AMMs detailed in the EIR/EIS.

2) *Provide clarification on how the project owner would comply with each of the COCs during implementation of the proposed activity (BIO-1 through BIO-9 and BIO-12). For each COC, list whether the project owner proposes to implement an AMM and/or a COC to achieve compliance and who would be responsible for implementation and reporting.*

   a) *Provide details how the project owner would be responsible for implementing each of the AMMs listed in Appendix N under Natural Communities, as applicable, in lieu of or in addition to any mitigation measures included in BIO-1 (e.g., for Items 1 and 2 under Natural Communities: General, who would be installing temporary fencing and silt barriers and how would compliance be reported in the Monthly Compliance Report (MCR)?; how would CEC staff receive the final plans for initial clearing and grubbing of sensitive habitat and project construction that is required to be submitted to the U.S. Fish and Wildlife Service (USFWS) and U.S. Army Corps of Engineers (USACE) for approval, at least 30 days prior to initiating project impacts?, etc.).*

   Response: Table DR-2a details implementation, responsible parties, and submittal process for BIO-1 through BIO-5, BIO-9, and BIO-12. Conditions of Certifications BIO-6 through BIO-8 are discussed in Data Request 2(d).

Table DR-2a Condition of Certification Implementation, Timing, and Responsible Parties for Relocation of Natural Gas Pipeline

Condition of Certification	Implementation	Responsible Party	Submittal for Review/Approval
BIO -1 – Incorporation and Implementation of Mitigation Measures within BRMIMP	• A BRMIMP Addendum will be prepared specific to the gas line reroute. The Addendum will incorporate any applicable AMMs that are not within the existing plan. • BRMIMP Addendum to include initial clearing and grubbing plans previously submitted to USFWS & USACE. • AMM's to be incorporated into the BRMIMP Addendum include: Sensitive habitat temporary fencing, identification of grading/construction limits (included in clearing and grubbing plans), monitoring of clearing/grubbing activities, and temporary stabilization activities after grading.	• Project Owner to prepare BRMIMP Addendum. • Caltrans to prepare clearing & grubbing plans and provide to Project Owner. • Implementation of AMMs (i.e., fencing, construction limits fencing) to be conducted by Caltrans Qualified Biologist/Monitoring Biologist and/or Designated Biologist.	• BRMIMP Addendum provided to CPM/CEC for review and approval 60 days prior to the start of ground disturbance relating to the fuel supply pipeline relocation. • Project Owner to include clearing and grubbing plans within BRMIMP Addendum for CPM records.
BIO-2 – Designated Biologist Resume & Qualifications	• Project Owner will submit the resume of a professional biologist meeting the qualifications of Condition BIO-2 for Designated Biologist to the CEC for CPM approval. • A qualified biologist and monitoring biologist are required by Caltrans per AMM G-3. As construction has already begun on the Otay Mesa East LPOE, qualified staff for these roles have been approved by the USFWS, USACE, and CDFW.	• Caltrans to provide resume and qualifications of USFWS- and USACE-approved biologists to Project Owner. • Project Owner to submit resumes of Caltrans approved biologists.	• Project Owner to submit resume and qualifications of USFWS/USACE/CDFW approved biologists 60 days prior to start of ground disturbance relating to the fuel supply pipeline relocation for review and approval.
BIO-3 – Designated Biologist Responsibilities	• The Project Owner Designated Biologist will support biological resources construction monitoring and the completion of the preconstruction surveys, and restoration activities within the pipeline relocation project area, as required under the Avoidance and Mitigation Measures stipulated in the EIR/EIS and Commission Decision. • The Designated Biologist will prepare the Biological Resources Monthly Compliance Reports. • The Designated Biologist will prepare the Biological Resources Annual Compliance Report.	• Project Owner Designated Biologist to ensure compliance with AMMs, and COCs as well as submittal of MCRs and ACR. • Project Owner Environmental Compliance Manager (see DR-2b)	• Project Owner Designated Biologist to prepare Biological Resources information for incorporation into MCR and ACRs. • Project Owner Environmental Compliance Manager to compile MCR/ACRs for submittal.
BIO-4 – Biological Resources – Compliance with COCs or AMMs	• In the event of noncompliance with COCs or AMMs, or halt of construction, the Project Owner Designated Biologist will contact Project Owner's Environmental Compliance Manager (see DR-2b), to halt work if necessary and identify any corrective actions needed • Project Owner Environmental Compliance Manager to notify CPM of noncompliance and corrective actions	• Project Owner Designated Biologist • Environmental Compliance Manager	• Project Owner Environmental Compliance Manager to contact CEC within 2 days of Designated Biologist notification. • If corrective action required, determination if action is approved to be made by the CPM and provided to Project Owner Environmental Compliance Manager within 5 days of receipt

Table DR-2a Condition of Certification Implementation, Timing, and Responsible Parties for Relocation of Natural Gas Pipeline

Condition of Certification	Implementation	Responsible Party	Submittal for Review/Approval
BIO-5 – Worker Environmental Awareness Program	• Project Owner contractors to participate in mandatory Caltrans Environmental Compliance Training. • Project Owner Environmental Compliance Manager to maintain record of attendees for inclusion into MCR.	• Caltrans Contractor/Designated Biologist to perform mandatory Caltrans training. • Project Owner Environmental Compliance Manager to maintain records of attendees.	• Copy of Caltrans Environmental Compliance Training provided to CPM 60 days prior to start of rough grading for gas line relocation. • Project Owner Environmental Compliance Manager to provide records of training in MCR.
BIO-9 – BRMIMP (see BIO-1)	• BRMIMP Addendum to be prepared specific to the gas line reroute. Supplement will incorporate any applicable AMMs that are not within the existing plan. • BRMIMP Addendum to include initial clearing and grubbing plans previously submitted to USFWS & USACE. • AMMs to be incorporated into the BRMIMP Addendum include: Sensitive habitat temporary fencing, identification of grading/construction limits (included in clearing and grubbing plans), monitoring of clearing/grubbing activities, temporary stabilization activities post grading.	• Project Owner to prepare BRMIMP Addendum. • Caltrans to prepare clearing & grubbing plans and provide to Project Owner for incorporation into BRMIMP Addendum.	• BRMIMP Addendum provided to CPM/CEC for review and approval 60 days prior to ground disturbance relating to the gas line relocation. • Project Owner to include clearing and grubbing plans within BRMIMP Addendum for CPM records.
BIO-12 – Facility Closure	• Project Owner Environmental Compliance Manager will incorporate into the planned permanent or unexpected permanent closure plan measures that address local biological resources, including any new/different information from the pipeline relocation..	• Project Owner Environmental Compliance Manager	• The Biological Resources Element of the Facility Closure Plan will incorporate a complete discussion of local biological resources.

b) *Provide clarification on how the CPM-approved Designated Biologist would be involved in the proposed activities in order to comply with BIO-2 to BIO-4. Who would coordinate with the monitoring biologist provided by Caltrans? Who is proposed to conduct the pre-construction surveys? Staff would need to be provided the results of any pre-construction surveys, construction monitoring, restoration activities, and other monitoring reports etc. as they relate to the gas pipeline installation. These would also need to be reported in the MCR.*

Response: The Project Owner will appoint an environmental compliance manager to track environmental requirements stemming from the Commission Decision and EIR/EIS Avoidance and Mitigation Measures. The environmental compliance manager will monitor progress in fulfillment of the requirements, including COCs BIO-2 to BIO-4, and will coordinate with the Designated Biologist and Staff to document compliance with the COCs.

The Project Owner will submit the resume of a professional biologist meeting the qualifications of Condition BIO-2 for Designated Biologist to the CEC for CPM approval at least 60 days before ground disturbance, per BIO-2. The Designated Biologist will direct biological resources construction monitoring and the completion of the preconstruction surveys and restoration activities within the pipeline relocation project area, as required under the Avoidance and Mitigation Measures stipulated in the EIR/EIS and Commission Decision.

The Project Owner's environmental compliance manager and Designated Biologist will provide the preconstruction survey, restoration, and other biological resources reports for the pipeline relocation area to Staff. The Designated Biologist will direct the preparation of monitoring reports and prepare the biological resources information for the MCRs, per Conditions BIO-2, to BIO-4.

c) *Provide clarification on compliance with the requirement to participate in the training/awareness program described in the AMM Item 6 in Appendix N under Natural Communities. Would Calpine employees and contractors participate in this training in addition to the BIO-5 WEAP training?*

Response: Project Owner employees and contractors will be required to participate in the mandatory Caltrans Environmental Compliance Training, which is the equivalent of the BIO-5 WEAP training. The training will address the purpose for resource protection, a description of protected species and their habitat, a review of the permit conditions, mitigation measures to be implemented, project features to be put in place to reduce impacts, penalties for violating the permit requirements, and a fact sheet with photographs and descriptions of the listed species.

d) *Provide confirmation that compliance with BIO-6, BIO-7, and BIO-8 would be achieved for the proposed construction activities within the easement area because the easement area is covered by the USFWS Section 7 Biological Opinion, California Department of Fish and Wildlife Streambed Alteration Agreement, USACE Section 404 Nationwide Permit, and State Clean Water Act 401 Certification issued to the FWHA and/or Caltrans for SR-11/Otay Mesa East LPOE project. Provide how many acres of San Diego fairy shrimp critical habitat and non-native grassland would be impacted by this activity. Provide any terms and conditions from these permits that would need to be implemented by Calpine for this project activity. These will need to be added to the BRMIMP as an addendum, per BIO-9.*

Response: Correct. Compliance with BIO-6, -7, and -8 will be achieved as the 50' easement area for the gas line relocation is included within the USFWS Section 7 BO, CDFW SAA, USACE Section 404 Nationwide Permit, and State Clean Water Act 401 Certification issued to the FWHA and/or Caltrans for SR-11/Otay Mesa East LPOE project. As shown in Figure DR-2d, Impacted Acreage, approximately 2 acres of non-native grassland and 1.3 acres of San Diego fairy shrimp critical habitat will be impacted. In addition, these impacts have been mitigated as described within the BO.

Specific terms and conditions for these permits will be included within the BRMIMP Addendum if not previously incorporated. These terms and conditions may include:

- BO-12, SAA – 2.2: Installation of temporary fencing (with silt barriers) at the limits of project impacts (including construction staging areas and access routes) to prevent

additional sensitive habitat impacts and to prevent the spread of silt from the construction zone into adjacent habitats to be avoided. Fencing will be installed in a manner that does not impact habitats to be avoided.

- BO-12, SAA – 2.2: Plans for clearing and grubbing of sensitive habitat for project construction will be provided to USFWS, USACE, and CDFW for approval and incorporated into the BRMIMP Addendum.
- BO-12, SAA – 2.2: If work occurs beyond the fenced or demarcated limits of impact, all work will cease until the problem has been remedied to the satisfaction of the USFWS and USACE. The project proponents will provide additional conservation at a minimum 5:1 ratio for any habitat impacts that occur beyond the approved fence.
- BO-12, SAA – 2.2: Temporary construction fencing will be removed upon project completion.
- BO-13, SAA-1.6: An approved monitoring biologist will be on the project site during clearing and grubbing of habitat that occurs within 200 feet of the grading limits and conduct site visits during rough grading to ensure that the grading limits have been observed.
- BO-14: The monitoring biologist will periodically monitor adjacent habitats for excessive dust and will recommend remedial measures for dust control if necessary.
- BO-14, SAA-1.6: The monitoring biologist will implement a contractor training program to ensure compliance with permit conditions. Any non-compliance issues will be reported to the USFWS and USACE within 24 hours.
- BO-16: Contractors will strictly limit their activities, vehicles, equipment, and construction materials to locations within the fenced project footprint.
- BO-17: All equipment maintenance, staging, and dispensing of fuel, oil, coolant, or any other such activities will occur in designated areas.
- BO-18: A pre-construction meeting will be conducted with the monitoring biologist, vernal pool restoration biologist, and construction supervisors prior to all earthwork. The USFWS and USACE will be invited to the pre-construction meeting with 14 days advance notice.
- BO-18, SAA-1.7: The contractors will be informed that the fenced areas are “no-entry” areas for the duration of construction.
- BO-18, SAA-1.7: Each employee (including temporary, contractors, and subcontractors) will participate in a training/awareness program that will be presented by the vernal pool restoration and monitoring biologist(s), prior to working on the proposed project. At a minimum, the program will include the following topics:
    - The purpose for resource protection;
    - A description of Quino checkerspot butterfly, San Diego fairy shrimp, Riverside fairy shrimp, and their habitats;
    - The conditions of the permits and the conservation measures described in the Service’s biological opinion that should be implemented during project construction to conserve Quino checkerspot butterflies, San Diego fairy shrimp, and Riverside fairy shrimp including strictly limiting activities, 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 on the project site by fencing);
    - Project features designed to reduce impacts to these species and promote their persistence/survival within the project area;
    - The protocol to resolve conflicts that may arise at any time during the construction process;
    - The general provisions of the Endangered Species Act (Act), the need to adhere to the provisions of the Act, and the penalties associated with violating the Act; and

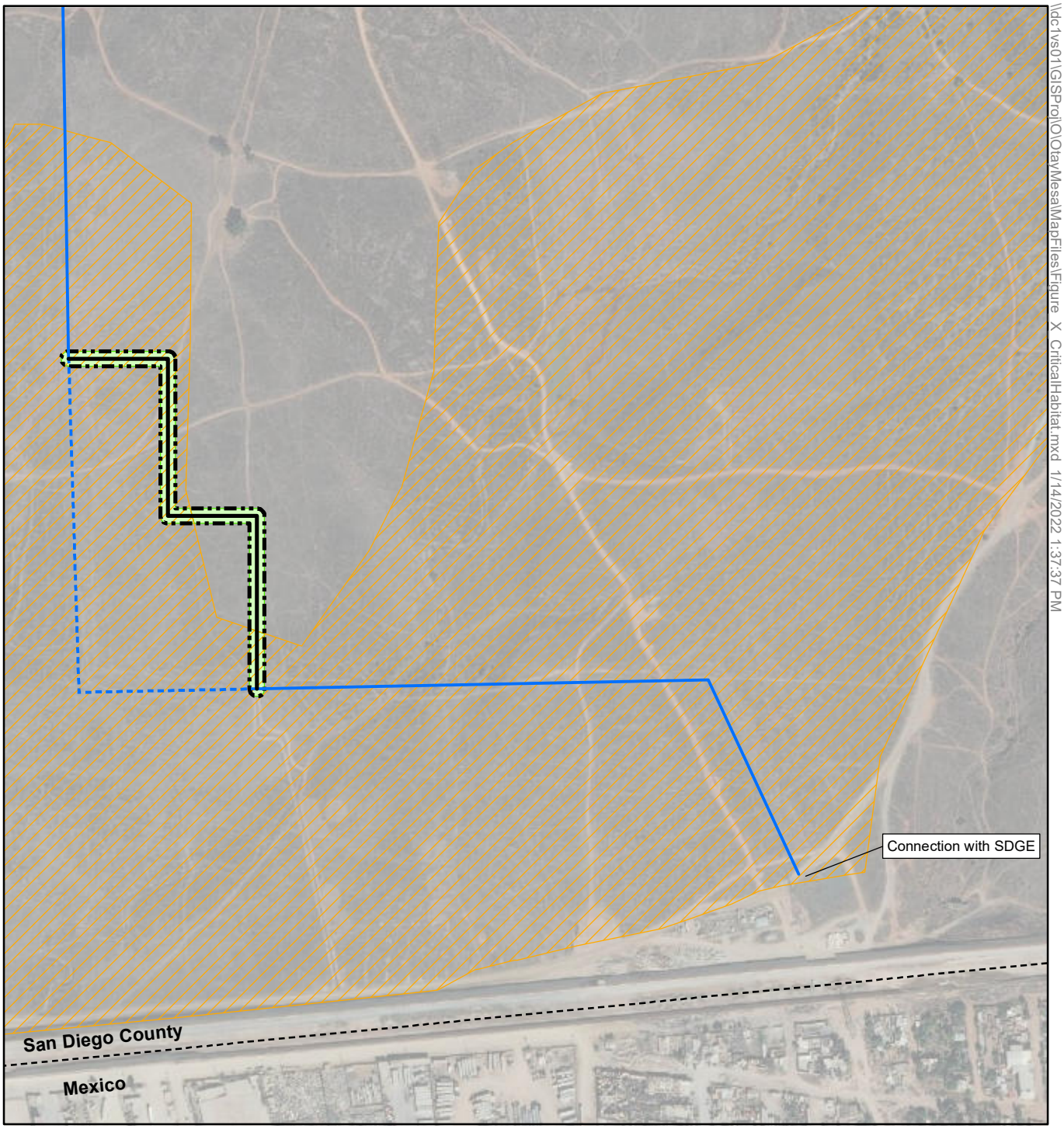
- A fact sheet that includes color photographs of the listed species, which will be shown to the employees. Following the education program, the fact sheet will be posted in the contractor and Resident Engineer's office, where they will remain through the duration of the project. The project proponents and the biologist(s) will be responsible for ensuring that employees are aware of the listed species.

- SAA-1.1: A copy of the Streambed Alteration Agreement (SAA), related notification materials, and CEQA documents will be available at the project site at all times.
- SAA – 1.8: Domestic dogs and animals are prohibited from the project site and site access routes during project activities and development of the project.
- SAA – 2.1: Preconstruction surveys shall be conducted within 500' of the edge of the proposed impact area(s). If active nests are found, temporary fence will be installed a minimum of 300 feet from the nest site. Habitat removal or work within this area will not occur until the young have fledged. Buffers are not required where vegetation removal has already occurred, and construction has commenced and is continuous.
- SAA – 2.4: Qualified biologist will monitor project site immediately prior to and during construction to identify the presence of invasive weeds and recommend measures to avoid inadvertent spread.
- SAA – 2.5: Only erosion and sediment control measures such as fiber rolls and erosion control blankets that use biodegradable materials, such as jute, with no plastic mesh will be used.

Data Requests

3) *Provide a copy of the Burrowing Owl Mitigation Plan referenced in text.*

Response: The Burrowing Owl Mitigation Plan is incorporated into the Lone Star Ridge West Restoration Plan which is provided as Attachment BIO-3.



Legend

- Relocated Natural Gas Line
- Existing Natural Gas Line
- Existing Line - Abandoned in Place
- 50 foot buffer
- fairy shrimp Critical Habitat (1.3 acre)
- Non-native Grassland (2.0 acres)

0 250 500
Feet

N

Source:U.S. Fish and Wildlife Service
Publication Date:June 14, 2019

Figure DR 2d
Habitat Impacts
Natural Gas Pipeline Relocation for the
Otay Mesa Energy Center, 99-AFC-05C
Otay Mesa Energy Center, LLC

Jacobs

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Cultural Resources (1-2)

Data Requests

1) *Will the project owner provide the personnel to fulfill CEC cultural resources conditions of certification (see COC CUL-1 through CUL-16) or will Caltrans supply these personnel?*

   Response: The Project Owner will submit the resume of a professional cultural resources specialist meeting the qualifications of Condition CUL-1 to CPM for approval at least 60 days before project-related vegetation clearance or ground disturbance, per CUL-1. This person may also be associated with the Caltrans/FHWA Otay Mesa East Land Port of Entry and State Route 11 project. The designated Cultural Resources Specialist will fulfill the cultural resources COCs (COC CUL-1 through -16).

2) *If Caltrans will supply the cultural resources personnel, then how will the project owner ensure that Caltrans implements CEC cultural resources COC CUL-1 through CUL-16?*

   Response: The Project Owner will appoint an environmental compliance manager to track environmental requirements stemming from the Commission Decision and EIR/EIS Avoidance and Mitigation Measures. The environmental compliance manager will maintain a list of the requirements, including COCs CUL-1 through -16 and will coordinate with the designated Cultural Resources Specialist for the pipeline relocation project and Staff to document compliance with the COCs.

Attachment BIO-3 Lone Star Ridge West Restoration Plan

LONESTAR RIDGE WEST HABITAT RESTORATION PLAN

Project ID 1100000752 / EA 2E0500

California Department of Transportation
District 11
4050 Taylor Street
San Diego, CA 92110

Prepared By:_____Date:_____
Michael Galloway, District Biologist
Office of Environmental Stewardship and Ecological Studies
San Diego / District 11
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FEBRUARY 2012

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CHAPTER 1.0
GENERAL CONDITIONS

1.1 PROJECT BACKGROUND

1.1.1 Introduction

The California Department of Transportation (Caltrans), in cooperation with the Federal Highway Administration (FHWA), proposes the Lonestar Ridge West Habitat Restoration Plan (restoration plan) as mitigation for impacts occurring from the State Route SR-11 (SR-11) and Otay Mesa East Port of Entry (POE). The components of the SR-11 and Otay Mesa East POE Project include construction of the following facilities in San Diego County: the new Otay Mesa East POE; a new four-lane highway with two interchanges with local roadways at Siempre Viva Road and Enrico Fermi Drive, SR-11; and a Commercial Vehicle Enforcement Facility (CVEF).

The SR-11 and Otay Mesa East POE Project is located in East Otay Mesa, southern San Diego County, California. The project area encompasses a swath of land occurring mostly south of Otay Mesa Road, and extending from State Route 905 at Britannia Boulevard (32º33'53.43"N / 116º58'47.21"W) eastward past Alta Road (32º34'2.85"N / 116º55'8.74"W), and then south to the U.S. Mexico border (32º33'11.98"N / 116º54'8.11"W) (Figures 1 and 2). The project location is within the U.S. Geological Survey (USGS) Otay Mesa Quadrangle (7.5-minute series) The SR-11 and Otay Mesa East POE Project will result in impacts to approximately 0.2 acre of native grassland, 171.9 acres of nonnative grassland, and 3.2 acres of grassland restoration habitat. Impacts to other communities include 0.08 acre of tamarisk scrub, 0.2 acre of non-native vegetation, 28.6 acre of disturbed habitat, and 8.0 acre of developed habitat. Impacts to federal and state jurisdictional waters, including 0.42 acre of mulefat scrub and 0.32 acre of streambed, will be mitigated offsite at Johnson Canyon. The SR-11 and Otay Mesa East POE Project is anticipated to begin in the summer of 2013.

The restoration plan addresses impacts to Quino checkerspot butterfly (Quino) (*Euphydryas editha quino*), burrowing owl (*Athene cunicularia*), golden eagle (*Aquila chrysaetos*), and designated critical habitat for San Diego fairy shrimp (*Branchinecta sandiegonensis*) resulting from the SR-11 and the Otay Mesa East POE Project. Refer to the Tier II Natural Environment Study for State Route 11 and the Otay Mesa East POE (HELIX Environmental Planning, Inc. [HELIX] 2010) and the Addendum to the Tier II Natural Environment Study for the State Route 11 and the Otay Mesa East POE (HELIX 2011) for more detailed descriptions of existing

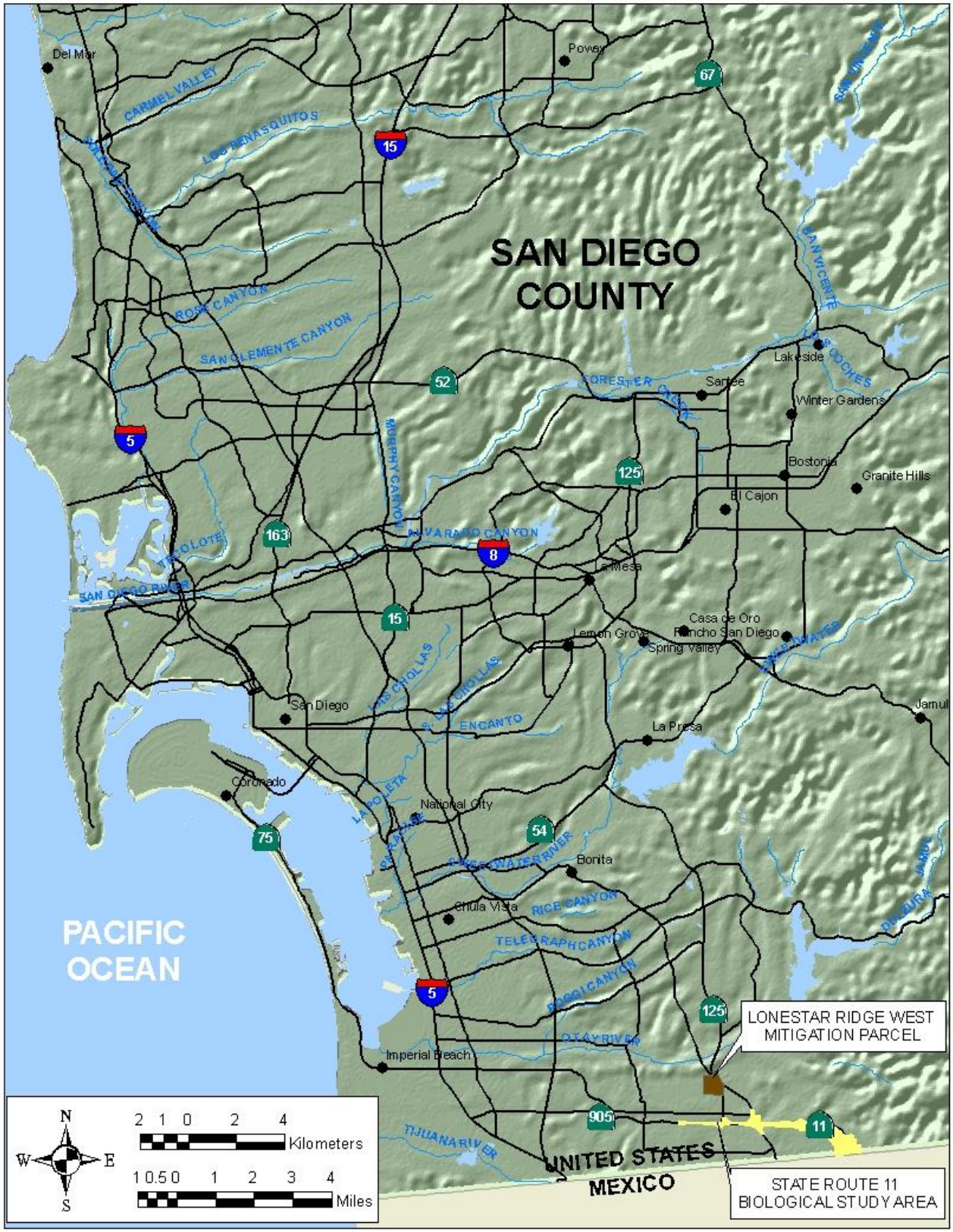

Figure 1. Regional Location Map.

Figure 2. Project Vicinity Map.

biological conditions for the preferred alternative and the three previously proposed project alternatives.

Vernal pools are considered sensitive by the U.S. Fish and Wildlife Service (USFWS), the California Department of Fish and Game (CDFG), the Regional Water Quality Control Board (RWQCB) (State Water Resources Control Board 2001), the City of San Diego (2001), and the County of San Diego (1997) because they support sensitive species, are limited in distribution, and are declining in extent (Bauder 1990; USFWS 1998). The RWQCB regulates impacts to vernal pools under the Porter-Cologne Act, via the 401-certification program. Although the SR-11 and the Otay Mesa East POE Project will avoid vernal pools and associated watersheds that contain the federally endangered San Diego fairy shrimp, federally endangered Riverside fairy shrimp (*Streptocephalus woottoni*), federally endangered San Diego button-celery (*Eryngium aristalatum* var. *parishii*), and federally threatened spreading navarretia (*Navarretia fossalis*); the project will impact approximately 89.1 acres of designated critical habitat for the San Diego fairy shrimp. San Diego fairy shrimp were listed as endangered in 1997 (USFWS 1997a) and Riverside fairy shrimp were listed as endangered in 1993 (USFWS 1993).

The USFWS listed the Quino as endangered on January 16, 1997 (USFWS 1997b). The SR-11 and the Otay Mesa East POE Project directly impacts three locations where the Quino was observed.

This restoration plan details the restoration and management measures essential for successful creation of vernal pool and Quino habitat. Measures specified in this plan pertain to the restoration of vernal pool and Quino habitat within the 164 acre Lonestar Ridge West mitigation site. Following successful completion of the restoration (including 5-year monitoring), the Lonestar Ridge West restoration site will be managed in perpetuity by a Preserve Owner/Manager (POM). In the event that a POM is not found after the 5-year monitoring period, Caltrans would manage Lonestar Ridge West until it is transferred to an appropriate POM to manage and preserve the wildlife habitat in perpetuity. This would be done through deeds with restrictive covenants to protect and maintain the present and future uses of the parcels. These restrictive covenants would include a list of prohibitive uses that are inconsistent with the conservation purposes of the parcels.

1.1.2 Responsible Parties

As the lead federal agency for SR-11 and the Otay Mesa East POE Project, the FHWA is responsible for meeting the vernal pool and Quino mitigation requirements as ultimately approved by the USFWS. Caltrans will be responsible for preparation of the vernal pool and

Quino habitat restoration and long-term management plan, implementation of the restoration plan, and coordination with a responsible party for long-term management of the site.

The following represents the contact information for the permit holders:

State of California Department of Transportation, District 11
Contact: Ted Thurston and Michael Galloway
Office of Environmental Stewardship and Ecological Studies, Mail Station 242
4050 Taylor Street, San Diego, CA 92110
Telephone: Ted: (619) 688-0173, Michael: (619) 688-0189
E-mail: ted.thurston@dot.ca.gov, michael.galloway@dot.ca.gov
Facsimile: (619) 688-4258

1.3 Site Location

Mitigation for permanent impacts to critical habitat for San Diego fairy shrimp within the SR-11 and the Otay Mesa East POE Project include the preservation, enhancement, restoration, and creation of vernal pool habitat on an existing 164-acre Caltrans-owned parcel, which contains 155 acres of designated critical habitat for San Diego fairy shrimp. The Lonestar Ridge West Parcel is located in the Otay Mesa area of the City of San Diego, northwest of the SR-11 Study Corridor at La Media Road, north of Otay Mesa Road and the Brown Field Airport (Figure 2), and contains both vernal pools and habitat for San Diego fairy shrimp and the Quino, as well as coastal sage scrub and nonnative grassland.

1.1.4 Project Impacts

The Lonestar Ridge West restoration site is proposed by Caltrans to provide the required mitigation for impacts to critical habitat within the SR-11 and Otay Mesa East POE right-of-way (ROW). Mitigation for these impacts includes the preservation, enhancement, and restoration of the vernal pool complexes on the 164-acre existing vernal pool habitat on the Lonestar Ridge West Parcel. Impacts as a result of the SR-11 and Otay Mesa East POE Project and the proposed mitigation at Lonestar Ridge West are listed in Table 1.

Table 1. Impacts and Proposed Mitigation for the SR-11 and Otay Mesa POE Project[1]

Natural Community	Total Impacted Acreage[2]	Mitigation Ratio	Proposed Mitigation Acreage at Lonestar Ridge West[3]
Vernal Pool	0.0	--	--
Vernal Pool Watershed	0.0	--	--
Basin with Fairy Shrimp	0.0	--	--
Diegan Coastal Sage Scrub	0.0	--	--
Native Grassland	0.2	2:1	0.4
Non-native Grassland	171.9	1:1	159.2[4]
Non-native Grassland-Disturbed	0.0	--	--
Grassland Restoration	3.2	1:1	3.2
TOTAL	**176.1**	**--**	**162.8**

1. Table 1 includes impacts that will be mitigated on the Lonestar parcels. Impacts to federal and state jurisdictional waters will be mitigated offsite at Johnson Canyon.
2. Total Impacted Acreage includes both permanent and temporary impacts. Temporary impacts will be considered as permanent impacts and will be mitigated offsite.
3. Mitigation at Lonestar includes preservation of native vegetation and enhancement of the site by removing exotic vegetation and installing native vegetation
4. The additional 12.7 acres of non-native grassland impacts not mitigated at Lonestar Ridge West will be mitigated by the preservation and protection in place of two parcels with upland habitat within the Lonestar Property owned by Caltrans: Lonestar North parcel (8.5 acres: 4.1 acres of valley and foothill grassland and 4.4 acres of coastal sage scrub) and Lonestar South parcel (11.8 acres: 11.3 acres of valley and foothill grassland and 0.5 acre of coastal sage scrub).

1.1.5 Vernal Pool Habitat

The vernal pools of Otay Mesa historically supported a rich flora and covered much of the mesa in several complexes, with flora varied among vernal pools and pool complexes. Plant species observed in pools within the SR-11 Biological Study Area, but outside of the project footprint, include native (San Diego button-celery, spreading navarretia, common pygmy-weed [*Crassula aquatica*], alkali-mallow [*Malvella leprosa*], pale spike-rush [*Eleocharis macrostachya*]), and nonnative (prickly lettuce [*Lactuca serriola*], Russian thistle [*Salsola tragus*], ryegrass [*Lolium* sp.]) vegetation (HELIX 2010).

Vernal pools also support a number of invertebrate species, which are a food source for many vertebrate and invertebrate species. Among the invertebrate fauna found in vernal pools are the federally endangered San Diego fairy shrimp and Riverside fairy shrimp. Two native amphibians are commonly observed in vernal pools: Pacific tree frog (*Hylla regilla*) and western spadefoot (*Spea hammondii*). Many snakes, such as the two-striped garter snake (*Thomnophis couchi hammondi*), prey on the amphibian and other vertebrate species found around vernal pools. As a

food and water source, vernal pools also attract many waterfowl and other bird species. Zedler (1987) noted 27 bird species using vernal pools in San Diego County. Several species of mammals opportunistically use vernal pools during all seasons of the year, especially native rodents, which will use the open dried cracks in the vernal pool basins as temporary burrows.

Vernal pools are highly sensitive to both large and small disturbances and changes. Minor changes, such as those affecting the watershed quality, can often have effects on water quality within vernal pools. Larger changes such as grading or clearing can eliminate a pool entirely. Changes can also occur over a long period of time due to accumulated localized disturbances. Motorcycle and recreational off-highway vehicle use has had major cumulative effects on the historic vernal pools and the associated topography of Otay Mesa.

No direct or indirect impacts on vernal pools or basins containing San Diego fairy shrimp or their associated watersheds will occur from the SR-11 and Otay Mesa East POE Project. However, approximately 89.1 acres of San Diego fairy shrimp critical habitat would be directly impacted by the preferred alternative. The critical habitat impacted lacks two primary constituent elements essential for the primary biological needs of fairy shrimp, such as vernal pool basins and their associated watersheds, but contain soils (e.g., Huerhuero loam) with an underlying claypan or hardpan layer that restricts water drainage necessary for the formation of vernal pools.

1.1.6 Quino Checkerspot Butterfly

The Quino is a medium-sized butterfly in the brush-footed family (Nymphalidae), with a wingspan of approximately 1 inch. The historic range of this species extends from the Santa Monica Mountains in California south into northwestern Baja California, Mexico. Quino experts believe that there are two metapopulations (core populations) known within the United States and one metapopulation in Baja California, Mexico. The two metapopulations in the United States are located in southern San Diego County and southwestern Riverside County (Brown et al. 1992).

The Quino inhabits open grassland and ecotone areas between grasslands and coastal sage scrub and chaparral. Many of the known Quino populations are located on relatively thin soils and contain dwarf plantain (*Plantago erecta*) and other native annual plant species. Optimal habitat contains little or no invasive exotic vegetation, and a well-developed crytogramic crust.

Adult Quino are often found on rounded hilltops and ridgelines looking for mates. The adults fly from late January to late April. Once the females are gravid, they lay their eggs on or near a population of plantain, where they hatch in about 10 days. The larvae begin to feed immediately

on the foodplant, which is usually plantain, but can feed on other species such as owl's clover (*Castilleja exerta*) (Mattoni et al. 1995).

The Quino may have been one of the most abundant butterflies in coastal southern California until the 1980s. Habitat loss and habitat degradation have resulted in a significant decline in abundance of butterflies. This decline is also a result of the displacement of the larvae foodplants and adult nectar sources by invasive exotic vegetation, inappropriate levels of grazing, predation by exotic invertebrates, poorly planned fire management practices, and off-road vehicles (Mattoni et al., 1995). Due to these threats, the Quino was listed as endangered by the USFWS on January 16, 1997 (USFWS 1997b).

The Quino has been observed on Otay Mesa in a few locations in recent years, including three sightings within the SR-11 Biological Study Area (BSA, the footprint of the project area and a 300-foot buffer) prior to 2006. No Quino were observed during protocol surveys conducted of the BSA in 2006 and 2009. Quino have been detected at three locations during protocol surveys conducted at the Lonestar Ridge West restoration site in 2003 and 2004, but no Quino were detected in the area during protocol surveys conducted in 2005, 2006, and 2007 (HELIX 2008). Quino were not detected during field surveys conducted by Caltrans biologists in 2010.

1.2 RESTORATION GOALS

The goals for preservation and restoration of the Lonestar Ridge West restoration site are based on the restoration plan for Dennery Canyon, which addressed impacts and mitigation goals similar to this project. The following goals and objectives will guide the restoration activities aimed at promoting vernal pool and Quino habitat.

1.2.1 Vernal Pools and Vernal Pool Watershed

- Preservation: Preserve or salvage stands of native flora, including the federally endangered San Diego button-celery, as indicated by the Restoration Ecologist.
- Restoration: Decompact soils within the restoration area to the appropriate habitat type (vernal pool, mima mound, or native grassland). Establish surrounding watershed topography and upland vegetation from salvaged material and commercially available seed and plants.
- Preservation and Restoration: Collect and distribute soil from impact basins in the restored and created vernal pool habitat to establish additional populations of San Diego fairy shrimp and Riverside fairy shrimp.

- Restoration and Creation: As estimated in this plan, a total of 14 vernal pool basins (0.6 acre) will be enhanced and 111 vernal pool basins (3.6 acres) will be created/restored. These basins will be surrounded by approximately 27.3 acres of watershed (an average ratio of approximately 6.5 acres of watershed for every acre of vernal pool). Caltrans proposes no less than 4.2 acres of vernal pool basins will be created/restored with at least 27.3 acres of associated vernal pool watershed and upland that will be restored to support the vernal pool basins. The above vernal pool basin calculations result from an evaluation of properly functioning vernal pool habitats adjacent to the site, and an evaluation of the biological integrity of the restoration site. The created/restored vernal pool habitat will be inoculated with vernal pool indicator plant and animal species (San Diego fairy shrimp cysts will be inoculated in twenty-five of the 100 created shallower vernal pools and Riverside fairy shrimp cysts will be inoculated in three of the 11 created deeper vernal pools). Creation/restoration pertains to grading vernal pool basins in areas that may have contained vernal pool basins in the recent past. The pools not inoculated will be surveyed during the monitoring period to assess whether natural recruitment of fairy shrimp has occurred.
- Management: Provide an adaptive monitoring and management program that promotes the vernal pools and surrounding watershed and can change based on the most recent information regarding vernal pools.

1.2.2 Quino Checkerspot Butterfly

- Preservation: Preserve or salvage stands of native flora important to Quino (host plants including dwarf plantain and purple owl's clover and adult nectar sources including goldfields [*Lasthenia californica*]) as indicated by the Restoration Ecologist. Approximately 17 existing stands of host plants and nectar plants were identified at Lonestar Ridge West by Caltrans biologists during surveys conducted in 2010 and 2011. Approximately 87 acres of designated critical habitat for Quino occurs within Lonestar Ridge West.
- Preservation and Restoration: Maintain or reestablish a seed bank of plantain and adult nectar sources of sufficient density that would provide long-term persistence of host populations supporting a Quino population. Control nonnative plant species growth and reproduction so that nonnative species do not outcompete native flora.
- Management: Promote microclimates to extend the host plant life cycle and to support the Quino at their various life stages. Provide an adaptive monitoring and management program that promotes Quino reproduction and can change based on the most recent information regarding Quino.

1.2.3 Burrowing Owl

- Preservation and Restoration: Maintain or reestablish native grassland habitat that would provide foraging habitat supporting a burrowing owl population. Control nonnative plant species growth and reproduction so that nonnative species do not outcompete native flora.
- Creation: Creating mima mounds and providing artificial burrows onsite that would provide burrowing owl nesting opportunities.
- Management: Provide an adaptive monitoring and management program that promotes long-term establishment of mima mounds and surrounding native grassland habitat and can change based on the most recent information regarding burrowing owls.

1.2.4 Golden Eagle

- Preservation and Restoration: Maintain or reestablish native grassland habitat that would provide foraging habitat supporting a golden eagle population. Control nonnative plant species growth and reproduction so that nonnative species do not outcompete native flora.
- Management: Provide an adaptive monitoring and management program that promotes the long-term establishment of native grassland habitat and can change based on the most recent information regarding golden eagles.

1.3 IMPLEMENTATION RESPONSIBILITIES

For proper implementation of the restoration as outlined in this plan, specific qualifications and experience are required. This section outlines the specific qualifications recommended for the implementation team. The restoration effort will be led by the Contract Manager, who will manage the work of the implementation team.

The Restoration Ecologist and implementation team will provide direction, technical expertise, and coordination for successful implementation of this plan. The implementation team will include a Project Biologist, and Biological Monitors. In addition to the restoration of vernal pools, the Restoration Ecologist and implementation team will be responsible for the implementation of the Quino habitat and burrowing owl restoration component of the plan. The Restoration Ecologist will have extensive experience with the identification of southern California flora and specific experience with the Otay Mesa area.

The Restoration Ecologist and at least one of the biologists on the implementation team will have the following minimum qualifications:

- Bachelor's degree in biology, ecology, botany, or an acceptable related field
- Three (3) years of previous experience with implementing successful upland and wetland mitigation projects with an emphasis on coastal sage scrub, native perennial grassland, and vernal pool restoration
- Five (5) years of local field experience with vernal pool vegetation, hydrology, and soils
- Documentation of at least one vernal pool restoration implementation project that has been successful after at least a 5-year monitoring period and accepted by the resource agencies
- USFWS authorization (either Section 10(a)1(A) take permit, or authorized through Section 7 of this project) and documented experience to collect inoculum containing such listed species as San Diego button-celery (*Eryngium aristulatum* ssp. *parishii*), Otay tarplant (*Deinandra conjugens*), California Orcutt grass (*Orcuttia californica*), Otay mesa mint (*Pogogyne nudiuscula*), and spreading navarretia (*Navarretia fossalis*), or equivalent
- Current CDFG sensitive species collection permit or Incidental Take Permit (Section 2081) for San Diego button-celery, Otay tarplant, California Orcutt grass, and Otay mesa mint, or equivalent
- Current USFWS Section 10(a) 1(A) take permit for San Diego fairy shrimp and Riverside fairy shrimp
- Current USFWS Section 10(a) 1(A) take permit for Quino checkerspot butterfly

The implementation team will include a Prime Contractor holding a valid general contractor's license and/or a California C-27 landscape contractor's license. The Contractor will have specific documented experience with the installation and maintenance of multiple upland and vernal pool projects in San Diego County. The implementation team will include qualified surveyors (Caltrans survey crews), personnel working under the Restoration Ecologist with experience or immediate training in identifying native and exotic species, and personnel with prior experience with microtopographic manipulation, preferably with vernal pool grading restoration projects. The Caltrans survey crews will perform work necessary for establishing grade control, construction, staking, and other survey work necessary to construct the project. The Restoration Ecologist or staff under his direct supervision will be present on the Lonestar Ridge West restoration site during all survey operations and will direct the grading of the vernal pool and mima mound locations.

Contract growing and seed supply for the upland watershed restoration will be conducted by an experienced native plant nursery or seed company. No substitutions will be accepted without the prior approval of the Restoration Ecologist.

A preconstruction meeting will be held with all applicable individuals to establish relative authority and responsibilities regarding protection and restoration of biological resources. The Contract Manager in consultation with the Restoration Ecologist and Project Biologist will hold the authority to make field changes that affect the scope of work of the project and to issue stop work orders. A schedule identifying proposed construction activities, work area boundaries, off-limit areas and activities, and applicable permits will be coordinated with all appropriate parties prior to commencing construction.

1.4 RESTORATION SCHEDULE

Table 2. Restoration Schedule

Task	Anticipated Start Time
Mobilization	Summer 2010[1]
Install Site Protection Measures (e.g., signs, fencing, etc.)	Summer-2010[1]
Import of Additional Clay Soil	Summer 2010[2]
Onsite Seed Collection	Summer 2011[2]
Onsite Salvaging	Summer 2011[2]
Offsite Seed Collection	Summer 2011[2]
Offsite Salvaging	Summer 2011[2]
Nonnative Vegetation (Mowing) and Seed Removal (Dethatch)	Summer 2011[2]
Vernal Pool Clearing	Summer 2011[2]
Additional Site Protection Measures (e.g., signs, fencing, etc.)	Summer 2011[2]
Removal of Existing Trash and Debris	Summer 2011[2]
Grading and Maintenance of Construction/Maintenance Path	Summer 2011[2]
Installation of Temporary Water Line	Spring 2012
Vernal Pool / Mima Mound Grading	Summer / Fall 2012
Collection and Dispersal of Existing Native Rock Cobble	Summer 2012
Seeding and Planting of Uplands (application of salvage materials)	Fall 2012
Hydrological Monitoring	Fall / Winter 2012
Distribution of Vernal Pool Inoculum	Fall / Winter 2012
Live Species Salvaging	Fall / Winter 2012
Fairy Shrimp Sampling	Fall / Winter 2012
5-year Maintenance and Monitoring Period	Spring 2013
Qualitative Sampling and Floral Species Inventory	Spring 2013
Exotic Species Removal (pool basins and uplands)	November 2013

1. Completed
2. In progress

Implementation of vernal pool restoration is expected to follow the schedule indicated in Table 2 above, based on construction schedules. The work at the Lonestar Ridge West restoration site began in the summer of 2010.

1.5 ACCESS RESTRICTIONS

1.5.1 Construction Access

Heavy equipment and construction activities will be limited to the existing developed and disturbed areas as determined by the Restoration Ecologist. Vehicles will be required to remain on construction and maintenance paths, unless otherwise noted on the drawings. The staging areas will be located near the gated entrances to minimize soil compaction and reduce impacts to sensitive resources during the implementation effort. Grading will occur during the dry season prior to winter rains with a bulldozer or bobcat small enough to maneuver within the site. Vehicle and personnel access will be restricted to the construction and maintenance paths and temporary access as directed by the Restoration Ecologist.

The south boundary adjacent to Brown Field Airport and the east boundary at La Media Road each have a 12 foot wide locked gate and 45 foot long rock construction entrance. Each access point will facilitate the movement of people, equipment, and supplies throughout the site. The access areas were surveyed for sensitive biological materials, and any existing sensitive resources were avoided and delineated with Environmentally Sensitive Area staking and lathe flagging. After the five-year monitoring period, or when vehicle access is no longer needed or possible, the temporary vehicle access will be restored through decompaction of the soil and reseeding with native grassland seed mixes.

Gates at the north and northeast corner of the site were installed to provide access along the perimeter of the site for the U.S. Border Patrol.

1.5.2 Monitoring and Maintenance Access

Monitoring and maintenance access will be by vehicle or on foot through the same access provisions as construction access or as agreed upon by the Contract Manager. Most maintenance activities will be performed manually. Vehicle access will restricted to the construction and maintenance paths and will only be provided off the paths for remediation activities, as directed by the Contract Manager.

CHAPTER 2.0
SITE PREPARATION AND GRADING

Proper site preparation and grading requires a number of steps to be implemented to realize successful restoration of the vernal pools and protect any viable Quino, burrowing owl, and golden eagle habitat present onsite. Baseline data collected prior to the restoration activity were used to provide qualitative data to assist in the monitoring of the site (Figure 3). In addition to using baseline data for preservation and monitoring purposes, plants will be identified and flagged in the field for preservation and, in the case of the federally endangered San Diego button-celery, seed collection activity. Site preparation will be completed, including a survey to delineate the vernal pool boundaries and the limits of grading at the Lonestar Ridge West restoration site. Prior to grading, salvage of existing sensitive biota and their underlying top soil will be conducted. Site contouring and grading, under the direction of the Restoration Ecologist and implementation team, will then be completed. Finally, hydrological testing and remedial measures, if necessary, will be conducted. This chapter provides details on these activities.

2.1 SIGNAGE AND MAINTENANCE OF FENCING

2.1.1 Signage

Steel reflecting signs with black reflective paint on a white background with the inscriptions shown below were mounted on the eastern and southern fence of the Lonestar Ridge West restoration site along La Media Road. The signs were posted at least four feet high on the fence.

STATE PROPERTY
NO DUMPING
NO PARKING
NO TRESPASSING
VIOLATORS WILL BE PROSECUTED
PENAL CODE SEC. 374.3, 602-m; VEHICLE CODE 22523, 22659

Two of the above signs were placed on the eastern fence just north and approximately 540 feet south of the eastern gate entrance.

HABITAT
RESTORATION
IN PROGRESS

Five of the above signs were placed on the eastern fence at the northeast corner of the fence, just south of the eastern gate, and approximately 750 feet, 960 feet, and 1,240 feet south of the eastern gate entrance. Five signs were also placed on the southern fence approximately 5 feet west, 510 feet west, 1,040 feet west, 610 feet east, and 1,300 feet east of the southern gate entrance.

2.1.2 Maintenance of Fencing

The Lonestar Ridge West restoration site is already protected by a strong and secure fence system installed in August 2010. The Contractor will be responsible for fixing any damage to the fence incurred during the installation phase, as well as any damage caused by trespassing or off-road activities during the 5-year monitoring period.

2.2 VEGETATION COVER

Vegetation cover data were collected at the site prior to site preparation and grading between March and April 2011. The purpose is to estimate percent cover to create a baseline data set for restoration and monitoring, to record any existing sensitive resources, and to gain qualitative data to measure against success standards to evaluate restoration success during the 5-year monitoring period. Approximately 154 acres of the 164 acres of nonnative vegetation will be cleared for the mitigation project.

Approximately 90.4% of Lonestar Ridge West consists of nonnative vegetation. Nonnative grasses, including wild oat (*Avena* sp.), rye grass (*Lolium multiflorum*), Mediterranean barley (*Hordeum marinum*), common ripgut grass (*Bromus diandrus*), and red foxtail brome (*Bromus madritensis* ssp. *rubens*), comprise 85.5% of the site (Table 3, Figure 4). Approximately 6.6% of the site consists of native vegetation, mainly coastal sage scrub vegetation found on the relatively undisturbed northern mesa top. Approximately 3.0% of the site consists of bare ground from previously existing access roads and concrete foundations for a structure at the western end of the site and for fence posts found throughout the site.

Table 3. Percentage Composition of Vegetation Observed at Lonestar Ridge West

Scientific Name	Common Name		Percent Composition	Estimated Acreage
Avena sp.	Wild Oat	Nonnative	54.2%	83.50
Lolium multiflorum	Rye Grass	Nonnative	13.5%	20.80
Hordeum marinum	Mediterranean Barley	Nonnative	8.7%	13.45
Bromus diandrus	Common Ripgut Grass	Nonnative	5.5%	8.40
Bromus madritensis ssp. *rubens*	Red Foxtail Brome	Nonnative	3.6%	5.54
Hirschfeldia incana	Perennial Mustard	Nonnative	1.4%	2.11
Salsola tragus	Russian Thistle	Nonnative	1.3%	2.00
Erodium sp.	Filaree	Nonnative	1.1%	1.66
Eucalyptus sp.	Eucalyptus	Nonnative	0.5%	0.70
Foeniculum vulgare	Fennel	Nonnative	0.3%	0.46
Hedypnois cretica	Crete Weed	Nonnative	0.3%	0.43
Tamarix sp.	Tamarisk	Nonnative	0.1%	0.16
		NONNATIVE VEGETATION TOTAL	**90.4%**	**139.22**
Eremocarpus setigerus	Dove Weed	Native	1.2%	1.77
Artemisia californica	California Sagebrush	Native	1.0%	1.47
Rhus integrifolia	Lemonade Berry	Native	0.9%	1.40
Sisyrinchium bellum	Blue-eyed Grass	Native	0.8%	1.27
Eriogonum fasciculatum	California Buckwheat	Native	0.7%	1.09
Plantago erecta	Dwarf Plantain	Native	0.5%	0.80
Chlorogalum sp.	Soap Plant	Native	0.3%	0.47
Opuntia sp.	Cholla	Native	0.3%	0.40
Grindelia robusta	Gum Plant	Native	0.2%	0.35
Allium sp.	Wild Onion	Native	0.2%	0.29
Ranunculus californicus	California Buttercup	Native	0.2%	0.25
Eryngium aristulatum[1, 2]	San Diego Button-Celery	Native	0.1%	0.23
Plagiobothrys sp.[2]	Popcorn Flower	Native	0.1%	0.17
Isocoma menziesii	Goldenbush	Native	0.1%	0.16
		NATIVE VEGETATION TOTAL	**6.6%**	**10.12**

1. Federal and State Endangered Plant Species
2. Vernal Pool Endemic Species

For purposes of monitoring or sampling, a vernal pool is defined as the area within the topographic line that delimits the high water elevation when the basin contains its maximum volume. Plant coverage was estimated for the 55 vernal pools of approximately 0.85 acre, 4 basins with fairy shrimp of approximately 0.10 acre, and a 0.25 acre cattle stock pond delineated by HELIX biologists between 2000 and 2007. As with overall vegetation coverage, the majority of plants observed in pooled areas was nonnative (63.6%), with the primary plants being Mediterranean barley, rye grass, and wild oat. Approximately 5.3% of the pool composition was

native plants and 31.1% was bare ground or ponded (Table 4, Figure 5). Appendix A lists the data collected at each pool by HELIX in 2008 and 2009 and by Caltrans in 2010 and 2011.

Table 4. Percentage Composition of Vegetation Observed at Existing Pool Locations at Lonestar Ridge West

Scientific Name	Common Name		Wetland Indicator Status[1]	Percent Composition	Estimated Square Feet
Hordeum marinum	Mediterranean Barley	Nonnative	FAC+	22.9%	11,562.80
Lolium multiflorum	Rye Grass	Nonnative	FAC*	22.2%	11,177.65
Avena sp.	Wild Oat	Nonnative	UPL	10.6%	5,333.70
Bromus diandrus	Common Ripgut Grass	Nonnative	UPL	3.6%	1,817.80
Bromus madritensis ssp. *rubens*	Red Foxtail Brome	Nonnative	UPL	2.9%	1,458.50
Erodium sp.	Filaree	Nonnative	UPL	1.0%	506.95
Salsola tragus	Russian Thistle	Nonnative	UPL	0.2%	122.45
Sonchus sp.	Sow Thistle	Nonnative	FAC	0.2%	104.45
Hypochaeris glabra	Smooth Cat's-ear	Nonnative	UPL	<0.1%	5.08
NONNATIVE VEGETATION TOTAL				**63.6%**	**32,089.38**
Eryngium aristulatum[2, 3]	San Diego Button-Celery	Native	OBL	1.3%	672.61
Sisyrinchium bellum	Blue-eyed Grass	Native	FAC+	1.3%	636.84
Eremocarpus setigerus	Dove Weed	Native	UPL	0.9%	446.85
Psilocarphus brevissimus[2]	Woolly marbles	Native	OBL	0.5%	258.00
Eleocharis macrostachya[2]	Pale Spike-Rush	Native	OBL	0.4%	199.85
Allium sp.	Wild Onion	Native	UPL	0.4%	190.30
Chlorogalum sp.	Soap Plant	Native	UPL	0.2%	100.00
Plagiobothrys sp.[2]	Popcorn Flower	Native	FACW	0.2%	81.50
Lasthenia californica	Goldenfields	Native	UPL	0.1%	39.00
Grindelia robusta	Gum Plant	Native	FACW	<0.1%	24.25
Castilleja exserta	Purple Owl's Clover	Native	UPL	<0.1%	7.80
Plantago erecta	Dwarf plantain	Native	UPL	<0.1%	7.62
NATIVE VEGETATION TOTAL				**5.3%**	**2,664.62**

1. Wetland Indicator Status: OBL-Obligate Wetland Plants that occur almost always (99%) in wetlands; FACW-Facultative Wetland Plants that occur usually (67-99%) in wetlands; FAC-Facultative Plants with a similar likelihood (33-67%) of occurring in both wetlands and nonwetlands; UPL-Obligate Upland Plants that occur rarely (1%) in wetlands
2. Vernal Pool Endemic Species
3. Federal and State Endangered Plant Species

In addition to estimating vegetation cover, the site will be surveyed by the Project Biologist and the Restoration Ecologist to identify stands of native vegetation to be salvaged or preserved. The Restoration Ecologist will tag native vegetation for onsite preservation.

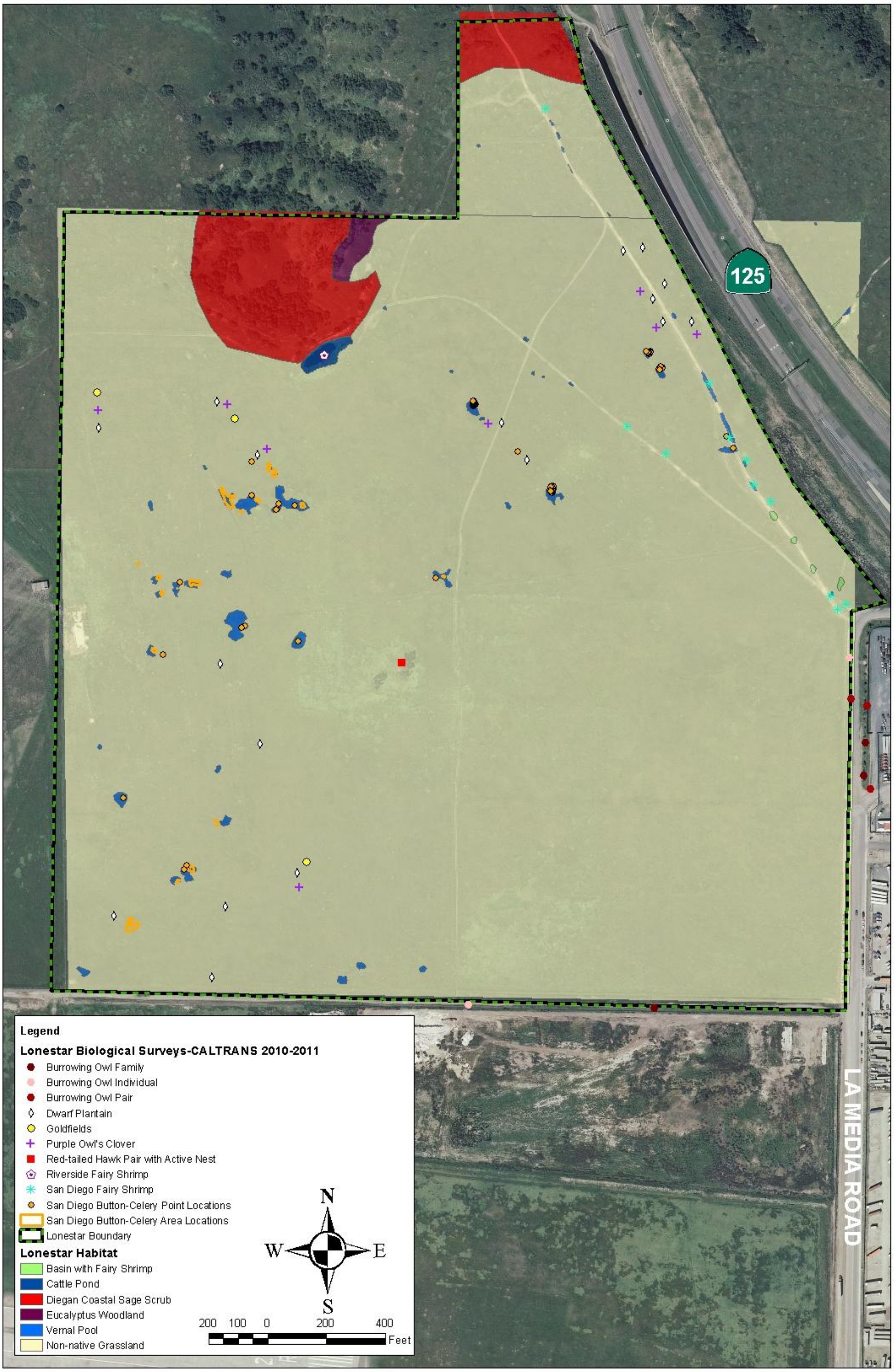

Figure 3. Aerial of Lonestar Ridge West Showing Biological Surveys Conducted by Caltrans, 2010-2011

View from eastern gate looking south.

View from eastern gate looking west.

View from northern end looking west.

View from southeastern end looking north.

View from southwestern end looking northeast.

View from western end looking east.

Figure 4. Ground Photos of Lonestar Ridge West, Pre-Restoration Work

Photos taken on March 18 and March 30, 2011.

Figure 5. Ground Photos of Existing Pooled Areas at Lonestar Ridge West

Photos taken on March 18, 2011.

2.3 EXISTING NATIVE PLANT SALVAGING

Onsite salvage of native plants occurred in the summer of 2011 before weeding and dethatching the site. In addition to salvage onsite, salvage will be conducted within the proposed ROW for the SR-11 and Otay Mesa East POE Project prior to construction. This salvage will be conducted in the areas of the ROW for the SR-11 and Otay Mesa East POE Project that have been mapped as nonnative grassland (NNG) (Figure 6). Table 5 lists the potential plants to be salvaged onsite and within the ROW for the SR-11 and Otay Mesa East POE Project. Figure 6 shows known sensitive species populations that will be goals/targets for salvage and seed collection. Proposed collection from 80 percent impacted individuals is proposed in the Natural Environment Study for State Route 11 and the Otay Mesa East Port of Entry (HELIX 2010).

Plants will be salvaged intact using machinery blades, hand spades, or shovels dug deep enough to incorporate the entire plant's root mass. The plants will be placed in temporary containers and transported along with collected seed and bulbs to the AECOM facility in National City or at a suitable location approved by the Restoration Ecologist for storage, propagation, and redistribution to the site. The plants and bulbs will be stored at conditions conducive to preserving the viability of the collection.

Table 5. Potential Onsite and SR-11 and Otay Mesa East POE ROW Salvage of Native Plants

SCIENTIFIC NAME	COMMNON NAME	INSTALLATION TYPE
SENSITIVE PLANTS SALVAGED FROM STATE ROUTE 11 PROJECT		
*Dudleya variegata**	Variegated dudleya	Salvaged corms from 80% impacted individuals
*Ferocactus viridescens**	San Diego barrel cactus	Whole plant salvage from 80% impacted individuals

* Sensitive plant species (as identified by the CNPS and/or MSCP)

2.4 SEED COLLECTION

Seeds from desirable vernal pool and upland watershed plants will be collected from the Lonestar Ridge West restoration site during the appropriate season prior to restoration. Desirable plants include all native vernal pool indicator or upland watershed species and all sensitive species. Collection will be performed by seed collectors with documented collection experience (e.g., S&S Seed, or equivalent) when seeds are ripe and prior to seed shedding. Seed will be collected manually or by using hand-vacuums. All collected seed will be kept at the AECOM facility in National City or at a suitable location approved by the Restoration Ecologist for seed bulking for use on the Lonestar Ridge West restoration site. Seed will be documented according to voucher number, weighted, and stored at conditions conducive to preserving the viability of

the collection. Table 6 lists the species for seed collection that have been identified either onsite or in the ROW. If native plant species (no cultivars) cannot be obtained within Otay Mesa, an alternate site will be used only upon approval by the USFWS. The source and proof of the local origin of all plant material and seed will be provided to the USFWS.

The seed of San Diego button-celery at Lonestar Ridge West will be collected before grading in the summer of 2012. The collected seed would be broadcast in enhanced and created vernal pools throughout the mitigation site. During the vegetation cover surveys conducted between March and June, 2011, up to 25 locations of San Diego button-celery were identified containing a total of 955 individuals (Figure 3). The locations were delineated as environmentally sensitive areas with stakes and orange lathe flagging to prevent San Diego button-celery from being impacted by weeding activities that occurred starting in the summer of 2011.

Table 6. Potential Onsite and SR-11 and Otay Mesa East POE ROW Salvage of Native Plant Seed

SCIENTIFIC NAME	COMMNON NAME	INSTALLATION TYPE
SENSITIVE PLANTS SALVAGED FROM STATE ROUTE 11 PROJECT		
Allium haematochiton	Red-skin onion	Seed collected onsite
Brodiaea jojoensis	Mesa brodiaea	Seed collected onsite
Chlorogalum parviflorum	Small-flowered soap plant	Seed collected onsite
Convolvulus simulans[1]	Small-flowered morning glory	Seed from 80% impacted individuals at SR-11
Dodecatheon clevelandii	Padre's shooting star	Seed collected onsite
Eryngium aristulatum var. parishii[2]	San Diego button-celery	Seed collected onsite and at approved offsite locations
Isocoma menziesii var. decumbens[1]	Decumbent goldenbush	Seed collected onsite and SR-11
Lessingia filaginifolia	California aster	Seed collected onsite
Muilla maritima	Common muilla	Seed collected onsite
Nasella pulchra	Purple needlegrass	Seed collected onsite and SR-11
Plantago erecta	Dwarf plantain	Seed collected onsite

1. Sensitive plant species (as identified by the CNPS and/or MSCP)
2. Federally endangered / State endangered plant species

It is important to note that the seed of most of the target vernal pool species (sensitive and nonsensitive) is not available from commercial growers. If species like Otay Mesa mint and spreading navarretia are to be introduced into the Lonestar Ridge West restoration pools, then the seed will need to be collected from existing vernal pools on Otay Mesa.

To bring the seed of these species into the Lonestar Ridge West restoration site, seed will either be collected from the State Route 125 Vernal Pool Restoration Site or the Dennery Canyon Vernal Pool Restoration Site. Other possible options would be vernal pools adjacent to the SR-11 ROW; vernal pools scattered throughout the Otay Mesa area, some of which are still on private property; or the CalTerraces vernal pool preserve. The populations of all target vernal pool species are much larger and more stable at the State Route 125 Vernal Pool Restoration Site, Dennery Canyon Vernal Pool Restoration Site, and the CalTerraces preserve, than even the best natural pools remaining on Otay Mesa. In an effort to minimize impacts to the natural pools, vernal pool seed will be brought in from the State Route 125 Vernal Pool Restoration Site and Dennery Canyon Vernal Pool Restoration Site to maintain the appropriate genetics.

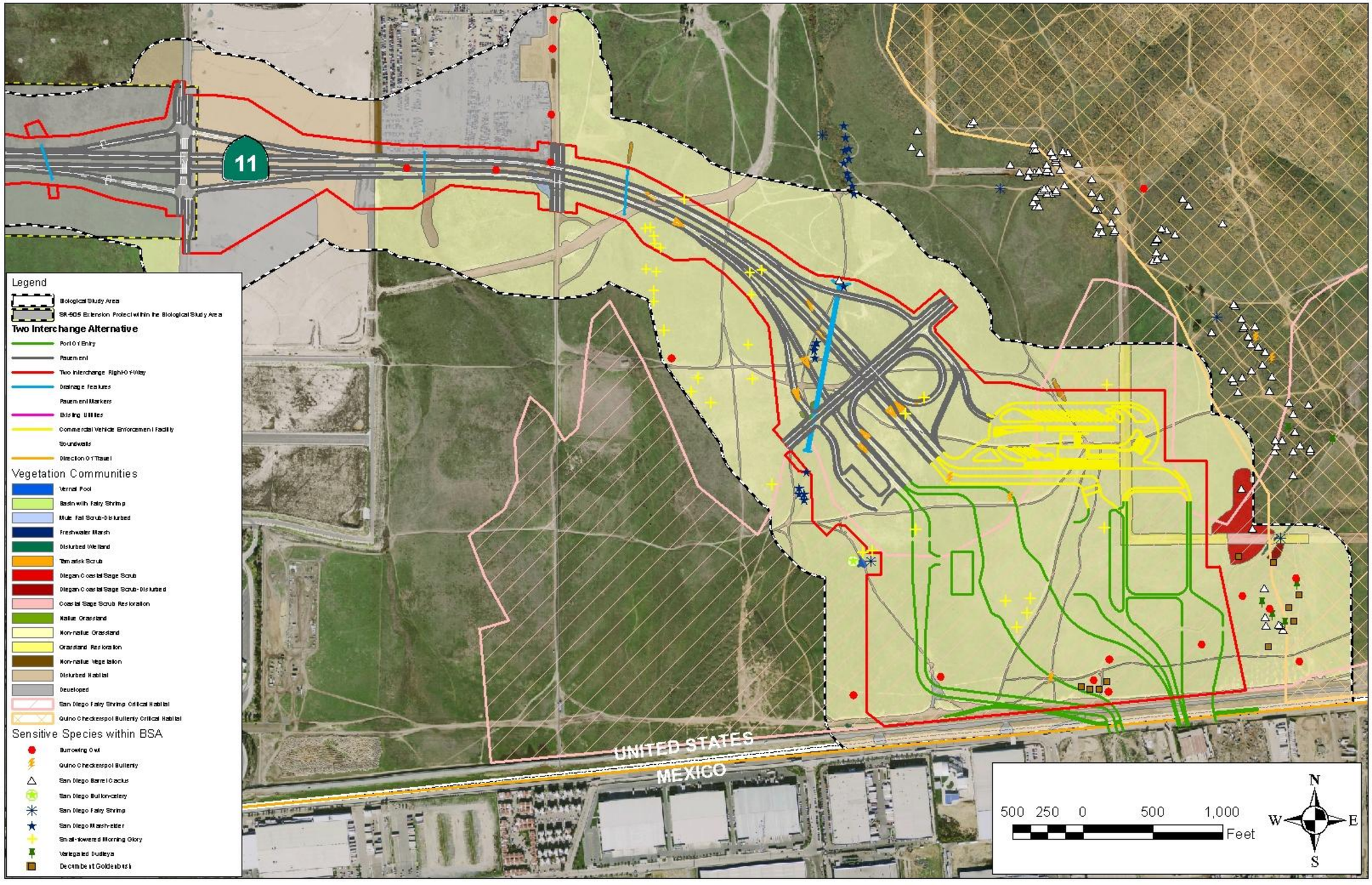

Figure 6. Sensitive Plant Locations within the State Route 11 and Otay Mesa East Port of Entry Project

2.5 EXOTIC SPECIES REMOVAL

Prior to grading, the entire Lonestar Ridge West restoration site was mowed and dethatched starting in the summer of 2011 to remove exotic weed materials (thatch and seeds). After mowing nonnative vegetation, dispersed seed will be gathered by systematically blowing or vacuuming seed. All seed heads and plant debris will be removed from the Lonestar Ridge West restoration site immediately and will be legally disposed offsite.

Mowing can be accomplished with either a high deck mower, or with line trimmers (weed eaters). All nonnative plants will be mowed to a height of no more than 1 inch. Dethatching involves raking up the dead thatch that has built up in areas that are dominated by weeds, but also in and around areas that still support viable habitat. The dethatching not only removes the nonnative organics from the site, but also much of the seed.

Herbicide application will occur after mowing and dethatching and outside of the wet season to help remove nonnative plant species in preparation for the site grading work. Refer to Section 2.9.1 for herbicide application methods.

2.6 PREGRADING SHRIMP CYST SOIL COLLECTION

Prior to the start of grading activities on the Lonestar Ridge West restoration site, soil will be collected from all of the basins to be recontoured to collect the shrimp cyst bank. This vernal pool soil (inoculum) will be collected when dry to avoid damaging or destroying fairy shrimp cysts. A hand trowel or similar instrument will be used to collect the inoculum. Whenever possible, the soil will be collected in chunks, rather than loosening the soil by raking and shoveling.

The soil from each basin will be stored individually in labeled boxes that are adequately ventilated and kept out of direct sunlight to prevent the occurrence of fungus or excessive heating of the soil. The boxes will be stored off-site at an appropriate facility for vernal pool inoculum. Soil will not be collected from any basins without approval by the USFWS.

Following grading activities (see below), shrimp cyst soil will be placed back into the basins from which it was removed. Twenty-five of the 100 shallower pools will be inoculated with onsite San Diego fairy shrimp cysts and three of the 11 deeper pools will be inoculated with Riverside fairy shrimp cysts from the cattle stockpond onsite to establish additional populations. Soil will be placed in dry pools only, preferably before the first rains of the fall-winter season. Soil will not be placed into basins that are already ponding, as the shock of instant cyst inundation may reduce the success of the cyst hatch.

2.7 PREGRADING QUINO SURVEYS

Quino checkerspot butterfly have not been detected at Lonestar Ridge West since surveys conducted in 2004. The following conservation measures will be implemented at the Lonestar Ridge West restoration site for Quino checkerspot butterfly:

- Beginning the first spring following restoration implementation and occurring each consecutive year during the 5-year monitoring period, protocol level surveys for adult Quino will be conducted on the mesa fingers at the Lonestar Ridge West restoration site.

If Quino adults are observed at Lonestar Ridge West during the restoration monitoring period, the following measures will be implemented:

- Beginning the first spring following restoration implementation and occurring each consecutive year during the 5-year monitoring period, cluster webbing surveys for pre-diapause Quino larvae will be conducted at both the Quino and vernal pool restoration areas 4 weeks after the first reported adult is observed (per the USFWS website for Quino protocol level surveying). These pre-diapause surveys will be conducted once a week for four weeks. Areas where webbing is detected will be flagged and only hand weeding will occur with 30 feet of the flagging.

- Beginning the first spring following restoration implementation and occurring each consecutive year during the 5-year monitoring period, the Lonestar Ridge West restoration site will be monitored for post-diapause Quino caterpillars by an experienced USFWS-approved biologist. The monitoring will occur at the initiation of weeding during the post-diapause season. If Quino caterpillars are detected, the biologist will assist weed control crews with caterpillar detection. Crews will look for Quino while weeding and will avoid trampling caterpillars or dot-seed plantain plants. Areas where caterpillars are detected will be flagged and only hand weeding will occur within 100 feet of the flagging.

- In areas where caterpillars or larval cluster webbing is not detected, mechanical weeding may occur.

- All personnel who will conduct restoration activities will be trained by a qualified biologist to recognize Quino caterpillars. A qualified biologist will be onsite during all weeding operations to assist weed control crew with Quino caterpillar identification.

- Flagging installed to denote areas where Quino larvae have been observed will be left in place until deemed ready for removal by the approved biologist in coordination with the USFWS. All flagging installed to denote Quino larval stages will be marked with permanent

markers with the following information: date of placement, type of Quino larvae detected, and the last name of the person marking the flagging. Flagging will provide direction for all weed control activities.

2.8 SITE CONTOURING AND GRADING

Grading of vernal pools and mima mounds will be accomplished during the dry season with a bulldozer or bobcat small enough to access and maneuver within the site.

- Grading will 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 inches, grading will 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;

- Grading will commence only when no rain is forecast during the anticipated grading period;

- 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;

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

- Grading will be done in a manner to prevent run-off from entering extant vernal pools.

Only the limit of work will be graded as indicated on the grading plan. The Pool/Mound Layout & Planting Plan (Appendix B) is considered a rough guideline of final micrograde. The final grade will be accomplished according to directions given by the Restoration Ecologist. Some vernal pools, particularly around preservation and restoration pools, will be manipulated by hand (using shovels). Care will be taken to avoid harming the underlying hard/clay pan layer. Soil manipulation will be limited to areas adjacent to the existing pool and will be the minimum area necessary to accomplish pool enhancement. Topsoil will only be salvaged from the portions of the pools subject to soil movement. The areas of existing habitat, which are to remain unaffected by enhancement activities, will be designated as environmentally sensitive areas (ESAs) on the project plans or protected by temporary barriers (e.g., ESA fencing) prior to implementation.

A final pregrading field visit will be conducted by the Restoration Ecologist to delineate areas of cut and fill using pin flagging. No spray paint will be used. A complete set of preconstruction

photographs will also be taken at this time. The grading operator will be familiarized with the site and issues involved during a preconstruction site visit with the Restoration Ecologist. Areas to be manipulated with grading equipment or hand tools will be graded before the saturation of soils.

Creation and restoration of vernal pools and mima mounds will include all or some of the following methods, as directed by the Restoration Ecologist:

- excavation/creation of new basins and contouring of new mounds using a small bulldozer or bobcat in historical mima mound fields;
- decompaction and recontouring of vernal pools in dirt trails using small bulldozer, bobcat, or hand tools; or
- recontouring to remove vehicle tracks and other disturbances using small bulldozer, bobcat, or hand tools.

2.8.1 Grading Monitor

The Restoration Ecologist will be onsite to direct grading and scraping activities. The Restoration Ecologist will check the pool depths and mound heights. Minor modifications to the final grading plan may be required in the field to properly prepare the site for planting, as determined by the Contract Manager and Restoration Ecologist. Vernal pool site grading is a delicate operation that attempts to manipulate topography at a microtopographic scale; therefore, establishment of the final grade may require hand tools only.

2.8.2 Final Grade

The Contract Manager and Restoration Ecologist will inspect the creation/restoration areas following initial grading and verify that basin depths and mound heights are acceptable. Finish grading will be measured at the top surface of surface materials and will be at the final water-compacted and settled surface grades (within plus/minus 1 inch at spot elevations).

Cobblestone from stockpiles (cryptogrammic moss side up) will be reapplied to graded vernal pool basins and mima mounds as directed by the Contract Manager and Restoration Ecologist.

Established site drainage will be maintained by the Contractor during all phases of landscape construction. Final grades will be acceptable to the Restoration Ecologist before planting/biota redistribution will be allowed to begin.

The site will be free of weeds, debris, trash, or erosion prior to planting. Erosion control measures such as silt fences and sandbags will be applied by the Contractor, as deemed necessary.

Restored and reference pools will be identified and marked (i.e., 24-inch rebar stakes with stenciled plastic identification caps or aluminum tags [Appendix B, Details D-2]).

2.9 SITE PREPARATION FOLLOWING GRADING

2.9.1 Weed Control

If weeds (such as rye grass [*Lolium* spp.], wild oats [*Avena* spp.], Russian thistle [*Salsola tragus*], mustard [*Brassica* spp.], and storksbill [*Erodium* spp.]) have not been completely removed from the restoration and creation area after grading, or if weeds have reemerged prior to planting, weeding of exotics will be performed where necessary. No preemergents will be applied, but herbicide will be used along with hand weeding and line trimmers, based on the direction of the Restoration Ecologist. The herbicide Glyphosate will be applied by a Contractor holding a valid license for herbicide application. Herbicide will not be sprayed in the vicinity of the vernal pools, but may be applied along the margins of the pools using herbicide gloves. This technique utilizes absorbent-type gloves that are soaked in herbicide, which is then applied to weed species by hand. When carefully done, this method allows for very effective weed control along the margins of the pools, with a low risk of affecting the native flora and fauna because the gloves allow for very accurate placement of the herbicide. When this technique is used, the water solvent herbicide Aquamaster will be used. Herbicide will only be applied around the edges of pools under the direct supervision of the Restoration Ecologist.

Manual weed eradication may also be conducted in areas with saturating soils or when weeds are mixed in with substantial populations of sensitive plant species.

2.9.2 Cobblestone Application

Cobblestone of 3 to 12 inches in size will be applied randomly (cryptogrammic moss side up) to all restored vernal pool basins to mimic conditions of adjacent natural vernal pools. This will include cobbles salvaged and stockpiled onsite. Any cobble piles identified within the ROW will be collected prior to project construction and will be brought to the restoration area for distribution in the restored vernal pools.

2.9.3 Installation of Artificial Burrows for Burrowing Owls

Otay Mesa is one of the few coastal areas remaining in San Diego County where burrowing owls (*Athene cunicularia*) are still present. Recent bird surveys for the San Diego Bird Atlas indicate that the Otay Mesa populations continue to decline and are now in danger of being extirpated (Unitt 2005). The SR-11 and Otay Mesa East POE Project will directly impact up to nine active burrows used by burrowing owls. The restoration of the Lonestar Ridge West property offers an excellent opportunity to provide restored habitat for this species.

During 2011 site surveys, Caltrans biologists detected up to thirteen owls (two families with burrow complexes and two pairs in burrows) utilizing a berm to the east of the site across from the dirt road going north from La Media Road and up to eighteen owls (two families with burrow complexes) were observed just south of the site on the other side of the perimeter fence (Figure 3). During the summer of 2011, the Burrowing Owl Partnership, composed of researchers from the San Diego Zoo's Institute for Conservation Research and San Diego State University, translocated California ground squirrels (*Spermophilus beecheyi*) to four research plots within Lonestar Ridge West and manipulated habitat within the plots by installing artificial burrows and mowing non-native vegetation. California ground squirrels are considered a "keystone species" that helps engineer California grassland ecosystems and provides critical resources for burrowing owls. The majority of translocated squirrels left the site; however, burrowing owls have utilized the artificial burrows that were installed.

Two earthen berms will be installed at the southern perimeter of the site in early 2012 (Appendix B, Pool/Mound Layout & Planting Plan L-1 and L-2). The berms will be approximately 5 feet high and measure 34 feet wide at the base and 4 feet wide at the top with a 3:1 slope. The berms are at a similar height and slope to the roadside berm north of La Media Road and adjacent to Lonestar Ridge West that currently provides habitat for California ground squirrels and burrowing owls. The berms should provide potential for squirrels and owls to become established at the site and should result in the potential use of mima mounds that will be installed on the site beginning in the late summer of 2012.

During grading of the site, and prior to planting and seeding, approximately 154 mima mounds and 50 artificial burrows for burrowing owls will be installed on the site. The artificial burrows will be installed for immediate site occupation. The locations of the artificial burrows were randomly selected and are shown in the Pool/Mound Layout & Planting Plan (Appendix B, L1-L9). Twenty-five artificial burrows composed of wood boxes with wood tunnels and twenty five artificial burrows composed of standard irrigation boxes with 4-inch corrugated plastic drainage pipe as the burrow tunnels and outer 6-inch diameter, 3 foot long anti-predator patio pipe will be

installed (Appendix B, Details D-1). The boxes and tunnels will be buried and covered with at least 12 inches of soil to provide long-term cover and sound insulation. Each artificial owl nest box will be installed with a one inch-diameter observation tube for future research purpose (Appendix B, Details D-1). The entrance of each tunnel will be reinforced with a concrete block to provide a more stable entrance for the owls. The long-term management of the artificial burrows will include inspection and cleaning of debris from the burrows twice a year, if necessary, until such time as the Lonestar Ridge West is determined to be fully functioning to support burrowing owls that are not dependent on artificial burrows.

Twenty five other mounds were randomly selected for the installation of a 4-inch diameter perforated drain pipe of 5 feet in length buried approximately 3.5 feet deep to allow for soil settlement to create an earthen tunnel then removal of the pipe to provide "starter burrows" for owls.

The 75 mima mound locations containing artificial burrows and starter burrows will be planted and seeded with only very low growing species (such as goldenfields, dwarf plantain, purple owl's clover, small flowered morning glory, variegated dudleya, and San Diego barrel cactus) to provide optimal habitat for burrowing owls. Cobblestones of approximately 3 to 8 inches in height will be placed adjacent to burrow clusters to provide short perch areas for the owls.

The remaining 129 natural mima mounds, composed of vegetated matter covered with soil, will provide potential habitat for California ground squirrels, which have been observed in the parcel during 2010 and 2011 site surveys, to create burrows in the mounds that may be occupied by burrowing owls in the future.

The artificial burrows and starter burrows will help establish shelter for the owls to colonize the site voluntarily. The artificial burrows and starter burrows are dispersed randomly throughout the site as shown in the Pool/Mound Layout & Planting Plan in Appendix B. Tentative locations of the burrows and mounds have been mapped (Appendix B, Pool/Mound Layout & Planting Plan) and will be approved by Caltrans and CDFG prior to installation.

During construction, all pipes stockpiled onsite will remain capped on both ends until installation to prevent burrowing owls from nesting in materials used for construction.

CHAPTER 3.0
SALVAGE AND PLANTING OF BIOLOGICAL MATERIALS

3.1 TOPSOIL REAPPLICATION

The Lonestar Ridge West restoration site consists of intact topsoil on the mounds and in the vernal pools. The site has been heavily disturbed by grazing, ranching, off-road activities, and other disturbance factors; however, the soil has not been substantially altered by these disturbances. Topsoil removed from graded areas will be placed back on top of the final grade or will be used elsewhere on the Lonestar Ridge West restoration site. Additional native clay topsoil will be salvaged from the nearby State Route 905 Extension Project when needed for creation of additional mima mounds.

3.2 PLANTING

Final planting of all plants salvaged and propagated from the ROW, salvaged from the site, and obtained commercially, including all cacti, will be performed during or immediately prior to the winter rainy period to maximize success of the translocation effort (October to January, and no later than March 1).

Ideally, salvaged plants should be immediately planted onsite. The transport and translocation of plants will be restricted to periods of cool cloudy weather to increase plant survivorship. If this is not possible, plants will be watered immediately before and after translocation. Plants will be inspected by the Restoration Ecologist and specimens not deemed viable will be rejected. Plants will be free of Argentine ants (*Linepithema humile*), fire ants (*Solenopsis invicta*), and other insect pests. The Restoration Ecologist will lay out planting locations to mimic the plant composition and structure of natural coastal sage scrub and grassland habitats in the area. The Restoration Ecologist will flag the desired plant locations and direct the transplanting effort. Table 5 and Table 6 list the plant species that will be targeted for salvage from both onsite and the ROW.

3.2.1 Container Plant Specifications

The amount of container stock contracted will need to be identified based upon the amount of salvaged plants to avoid overplanting the site. The Contract Manager will verify that container plants are from a qualified nursery. Overplanting may result in plant densities that would preclude appropriate ecosystem functions with regard to microorganisms, insects, reptiles, and

all species that are adapted to bare areas within the vernal pool watershed vegetation communities.

Some container plants may be propagated from propagules gathered from the site or the SR-11 and the Otay Mesa East POE ROW. Plants must be certified by the nursery and checked by the Restoration Ecologist to be free of Argentine ants, fire ants, and other insect pests prior to delivery onsite.

The Contract Manager will confirm plants are delivered to the site in a healthy and vigorous condition before being installed. The Contract Manager will inspect all container plants and reject plants that are dead, rootbound, stunted, pest-infested, diseased, or unacceptable for other reasons. Larger container sizes are not recommended, as they require much more disturbance of the site when planting and can be more difficult to install. The Restoration Ecologist will oversee plant layout before installation. Container plants will be installed in a manner that mimics natural plant distribution (e.g., random and/or aggregate distributions rather than uniform rows).

3.2.2 Installation Steps

1. Dig a hole sufficient to receive the rootball. Break up soil clods and avoid a smooth-sided "bathtub" effect in the hole. Fill the planting hole with water and allow to drain completely into the soil.
2. Partially backfill the hole with native soil to allow planting at the proper depth. Moisten and gently tamp the backfill into place. Remove the plant from its container and place on top of the moistened backfill so the plant collar is approximately 1 inch above finish grade. Backfill the remaining hole with native soil.
3. Specified planting and seeding will be considered complete for individual revegetation areas when approved by the Contract Manager.

3.3 UPLAND SEEDING

3.3.1 Seeding Concept

The plant species composition, growth pattern, and density will follow as closely as possible the typical assemblage of naturally occurring coastal sage scrub and native, perennial grassland vegetation found in the adjacent areas. Seeds will be hand broadcasted (dry-spread seeded). As much viable seed collected from the ROW as possible will be applied. Supplemental seeds will be acquired in advance by a qualified commercial grower with documented experience with native

plants for restoration purposes. The Contract Manager will supervise the plant placement and dry-spread seeding during implementation of the upland restoration.

Typical samples of plant materials, three each of all varieties and sizes, will be submitted to the Contract Manager for approval a minimum of 3 days prior to planting. Approved samples will remain onsite and will be maintained by the Contractor as standards of comparison for plant materials to be furnished. Samples will be incorporated into the work.

3.3.2 Upland Species Compositions

Coastal sage scrub/native grassland associated species to be planted within the mitigation area will be composed of coastal sage scrub and native, perennial grassland species commonly found within adjacent undisturbed areas. Table 7 lists the recommended plant species for the vernal pool watershed areas (mima mounds).

3.3.3 Timing of Seed Application

The initial application of salvaged and commercial seed will occur within a 45-day period, following the onset of the winter rains. Seeding should be completed before March 1. If the Contractor washes a significant amount of seed off of the restoration areas by overwatering, the Contractor will reseed the area even if that area shows some growth. If seed has been pretreated, the Contractor is responsible for ensuring the seed is in a proper state before seeding. All bags of seed not identified by the supplier and by date of scarification will be rejected as recommended by the Contract Manager. Any areas seeded with improperly stored or handled seed will be reseeded.

3.3.4 Upland Temporary Irrigation

The Restoration Ecologist will ensure that sufficient water for plant establishment is applied to the restoration area. Care will be taken not to disturb newly applied soils and planted vegetation.

A temporary irrigation system will be installed to germinate and establish native annual seeds and to maintain installed container plants, when necessary. The system will be installed to irrigate mima mounds and coastal sage scrub areas and will not be directed to inter-depression areas, including vernal pool basins.

The irrigation system will use buried main lines extending across the Lonestar Ridge West restoration site along the temporary construction and maintenance paths. These main lines will

connect to above grade PVC lateral lines with quick couplers that can be used for a variety of irrigation methods. The irrigation will be done by hand with hoses attached at different points along the main lines. This will allow for irrigation of only the plants and areas that need water, but not the areas that are establishing on their own. Irrigation will only be used to supplement the natural rainfall, not replace it. Plants that are successfully established with low to moderate levels of irrigation usually have a much higher survivorship in the long term. Plants that have established under constant moderate to heavy irrigation can often have substantial mortality after the irrigation has been removed at the end of the project.

The point of water connection will be located at an existing fire hydrant, which is the property of the Otay Water District near Brown Field. The irrigation will be applied at a low irrigation rate to avoid runoff into vernal pool basins. No irrigation will be employed during windy conditions to avoid overspray into vernal pool basins.

The irrigation schedule will be determined seasonally and upon water demand by the Restoration Ecologist, in coordination with the Contract Manager and Contractor. The application of water will be keyed to the water requirements of each stage of seed germination and seed establishment. Irrigation will be used to maximize container plant survival while minimizing nonnative species growth and seed production. Irrigation will be adapted to natural water supply patterns and will only be used for the establishment of seeded and container-planted vegetation. In the fall of each year, the upland vegetation should show signs of natural water stress and dormancy; irrigation will not be applied during this time as this could provoke water-related plant stress (e.g., root rot). Irrigation will be suspended in anticipation of rain events. System operations will be resumed upon a site inspection to determine soil moisture levels. During seed germination and plant establishment, soil should be moist to the upper 2 to 4 inches, but never saturated. As the winter season progresses, moisture will penetrate into deeper soil horizons.

Irrigation frequency should be reduced to weekly, biweekly, and monthly intervals as the season transitions from spring to summer. Once plants are established, the entire system will be shut off for the remainder of summer, but no later than May of each year while the irrigation system is in operation. The above grade irrigation system will be removed from the Lonestar Ridge West restoration site once irrigation is no longer needed for habitat establishment, and no later than 2 years prior to the completion of the 5-year monitoring period. Care will be taken to remove the irrigation system while minimizing disturbance to the vegetation.

Soil moisture conditions will be monitored following planting. Irrigation will be applied to encourage deep root growth (periodic deep irrigation to a depth of at least 12 inches versus frequent light irrigation). As discussed above, care will be taken to ensure excess irrigation water does not cause artificial filling of the vernal pools onsite.

3.4 HYDROLOGICAL TESTING

Vernal pool hydrology will be tested by the Restoration Ecologist for ultimate function prior to the application of vernal pool inoculum to ensure optimal conditions for inoculum germination. Ideally, hydrological testing will be conducted when pools fill naturally from precipitation during winter rains. A ruler (metric) will be fixed to rebar stakes at the deepest part of the vernal pool basin (Appendix B, Details D-2). Water levels will be determined within 24 hours of a heavy storm (prone to inundate pools), and then every 2 days thereafter for a period of 1 week. If the pools drain rapidly (e.g., losing 2 to 4 inches of water per day), they might be leaking through a permeation of the underlying hard/clay pan, or draining through inappropriate surface contours. Inadequate ponding must be repaired through recontouring as determined by the Restoration Ecologist. Pools receiving Riverside fairy shrimp and San Diego button-celery must retain water for a minimum of 60 days. Pools will be inoculated with sensitive species after hydrological tests have been completed and it has been determined that the pools function satisfactorily.

3.5 INTRODUCTION OF VERNAL POOL SPECIES TO THE LONESTAR RIDGE WEST SITE

Vernal pool inoculum collected from the pools onsite before grading will be reapplied following one full winter season of hydrological and biota monitoring, but no later than February 1. Reapplication inoculum will be performed under the direction of the Restoration Ecologist. This will potentially include seeds of San Diego button-celery, woolly marbles, and little mousetail as well as San Diego fairy shrimp and Riverside fairy shrimp cysts. Vernal pool inoculum will not be applied if the Restoration Ecologist deems that vernal pool hydrology is inadequate. Inadequate hydrology is characterized by pools not holding water or draining faster or slower than their natural counterparts (reference pools) within the same or similar system.

Collection of vernal pool inocula will ideally take place between July and September with the softening of fairy shrimp cysts that come with the onset of the rainy season. Vernal pool soils will be stored indoors in marked boxes in a cool, dry place free of contaminants and rodents. Restoration pools will only be inoculated with inoculum collected onsite. The inoculum will be collected before grading and distributed to the pools were the shrimp were previously surveyed as well as 25 of 100 shallower created/enhanced vernal pools for San Diego fairy shrimp and 3 of 11 deeper created/enhanced pools for Riverside fairy shrimp to establish additional populations. The pools receiving inoculum were randomly selected and are shown in the Pool/Mound Layout & Planting Plan (Appendix B, L1-L9). Inoculum will not be introduced into the restored or enhanced pools until after they have been demonstrated to retain water for the

appropriate amount of time to support SDFS (at least 12 to 30 days) or RFS (at least 30 to 60 days) and LFS are not detected in the pools. Vernal pool soil and plant inoculum will be introduced after the first full winter season at the earliest.

If deemed necessary by the Project Biologist and Restoration Ecologist, it is possible to transplant vernal pool animals during the wet season. Wildlife species such as spadefoot toads and San Diego fairy shrimp will be translocated by collecting tadpoles and adult/juvenile fairy shrimp in donor pools and translocating them immediately to identified receiver pools that do not already have tadpoles and fairy shrimp. The animals will be transported in buckets with water and released slowly under the direction of the Restoration Ecologist to avoid creating any turbidity in the vernal pool.

3.5.1 Off-Site Vernal Pool Seed Collection

Table 7 lists the target vernal pool species for introduction into the restoration pools. As seen in Table 7, not all of the species are known to occur onsite or within the State Route 11 and Otay Mesa East POE ROW impact areas (e.g., Otay mesa mint). In addition, some of the species known from onsite and within the State Route 11 and Otay Mesa East POE ROW have very small population numbers and distribution. Because of this, it is likely that to establish populations of all vernal pool species listed in Table 7, additional off-site seed sources will be utilized.

3.5.2 Donor Pool Identification

Vernal pool plant seeds will be collected by the Restoration Ecologist from selected, high-quality vernal pools within the SR-125 Vernal Pool Restoration Site and the Dennery Canyon Vernal Pool Restoration Site where the seed source came from vernal pools found within the J29-J30 Genetic Complex on Otay Mesa. Identification of vernal pool inoculum donor sites needs concurrence with the USFWS, CDFG, and the owner or leaseholder of the property or preserve that functions as the donor site. Criteria for donor site selection will be:

- The site needs to be relatively undisturbed and low in weed infestation.
- The site needs to contain functional vernal pools and associated watersheds.
- The site will contain species including, but not limited to, mesa brodiaea (*Brodiaea jojonensis*), pygmy crassula (*Crassula aquatica*), annual hairgrass (*Deschampsia danthonioides*), waterwort (*Elatine* sp.), San Diego button-celery, little mousetail, spreading navarretia, Otay mesa mint, California Orcutt grass, and woolly marbles.

Donor site identification will be performed during March through June for plants. If biological resources data are not available for donor pools, data will be collected by the Restoration Ecologist. Table 7 lists the plant species that will most likely need to be collected from an off-site source collected from Otay Mesa.

The Biological Assessment for the State Route 11 and the Otay Mesa East POE Project (Caltrans 2011) includes the collection and use of seed of San Diego button-celery, spreading navarretia, California Orcutt grass, Otay mesa mint, and Otay tarplant on the Lonestar Ridge West restoration site. The Biological Opinion for the State Route 11/Otay Mesa East Port of Entry, Otay Crossings Commerce Park, and Otay Business Park Projects, San Diego County, California (USFWS 2011) specifies the procedures for collection and use of the seed, as follows:

- Seed of San Diego button-celery, spreading navarretia, California Orcutt grass, Otay mesa mint, and Otay tarplant will be collected from adjacent or nearby populations and distributed throughout the vernal pools and/or uplands as part of the restoration activities on the Lonestar Ridge West restoration site in accordance with the following USFWS guidelines:

    a. Seed will be collected from areas where at least 20 individuals of each target species occur as a subpopulation.

    b. No more than 5 percent of the projected annual seed production of any individual plant or discrete population of plants will be collected.

    c. Collections will be made in a manner that captures the majority of the genetic variation found in the sampled populations. Different genotypes will not be intermingled during conservation activities.

    d. All seed collected will be placed in brown paper bags and stored off-site at an appropriate seed storage facility.

    e. Collection of seed will be conducted in a manner that will not significantly harm the reproductive potential of the population for that year.

Collection of vernal pool seed from offsite sources will ideally take place between July and September, after vernal pool plants have set seed, but before seed germination. Vernal pool seed will be stored indoors in marked bags in a cool, dry place free of contaminants and rodents.

Table 7. Native Plants Obtained from an Approved Nursery Proposed for Installation at Lonestar Ridge West

SCIENTIFIC NAME	COMMNON NAME	INSTALLATION TYPE
PLANTS INSTALLED AT MIMA MOUND LOCATIONS		
Allium haematochiton	Red-skin onion	Seed
Ambrosia chenopodifolia	San Diego bursage	Container
Artemisia californica	California sagebrush	Seed and Container
Bothriochloa barbinoidis	Plumed beardgrass	Container
Castilleja exserta[1]	Purple owl's clover	Seed
Chlorogalum parviflorum	Small-flowered soap plant	Seed
Convolvulus simulans	Small-flowered morning glory	Seed
Cordylanthus orcuttianus	Orcutt's bird's-beak	Seed
Deinandra conjugens[2,3]	Otay tarplant	Seed from seed collected at approved offsite locations
Deinandra fasciculata	Clustered tarweed	Seed
Dichelostema capitatum	Blue dicks	Seed
Dodecatheon clevelandii	Padre's shooting star	Seed
Dudleya edulis	Lady fingers	Container
Dudleya variegata	Variegated dudleya	Container
Encelia californica	California encelia	Seed
Eriogonum fasciculatum	Flat-top buckwheat	Seed
Euphorbia misera	Cliff spurge	Container
Ferocactus viridescens	Sand Diego barrel cactus	Container
Grindelia camporum	Gumplant	Seed
Isomeris arborea	Bladderpod	Container
Lasthenia californica[4]	California goldfields	Seed
Lessingia filaginifolia	California aster	Seed
Linanthus dianthiflorus	Ground pink	Seed
Mirabilis californica	Wishbone bush	Container
Muilla maritime	Common muilla	Seed and Container
Nasella pulchra	Purple needlegrass	Container
Opuntia littoralis	Coast prickly pear	Container
Plantago erecta	Dwarf plantain	Seed
Simmondsia chinensis	Jojoba	Container
Sisyrinchium bellum	Blue eyed grass	Seed and Container
Sporobolus airoides	Dropseed grass	Container
Viguiera laciniata	San Diego sunflower	Seed and Container

SCIENTIFIC NAME	COMMNON NAME	INSTALLATION TYPE
PLANTS INSTALLED AT VERNAL POOL LOCATIONS		
Brodiaea jolonensis	Mesa brodiaea	Container
Callitriche marginata	Long-stalk water starwort	Seed
Crassula aquatica	Pygmy crassula	Seed
Deschampsia danthonioides	Annual hairgrass	Seed and Container
Eleocharis macrostachya	Pale spikerush	Container
Eryngium aristulatum var. parishii[3,5]	San Diego button-celery	Seed collected at approved offsite locations
Lilaea scilloides	Flowering quillwort	Seed
Marsilea vestita	Hairy cloverfern	Container
Myosurus minimus	Little mousetail	Seed and Container
Navaretia fossalis[2]	Spreading navarretia	Seed and Container from seed collected at approved offsite locations
Orcuttia californica[3,5]	California Orcutt grass	Container from seed collected at approved offsite locations
Pogogyne nudiuscula[3,5]	Otay Mesa mint	Seed and Container from seed collected at approved offsite locations
Psilocarphus brevissimus	Woolly marbles	Seed
PLANTS INSTALLED AT GRASSLAND LOCATIONS		
Bothiochloa barbinoidis	Plumed beardgrass	Seed
Castilleja exserta[1]	Purple owl's clover	Seed
Deinandra fasciculata	Clustered tarweed	Seed
Dichelostema capitatum	Blue dicks	Seed
Distichlis spicata	Coastal saltgrass	Seed
Dodecatheon clevelandii	Padre's shooting star	Seed
Grindelia camporum	San Diego gumplant	Seed
Lasthenia californica[4]	California goldfields	Seed
Lessingia filaginifolia	California aster	Seed
Melica frutescens	Tall melic	Seed
Muhlenbergia microsperma	Littleseed muhly	Seed
Muilla maritime	Common muilla	Seed
Nasella lepida	Foothill needlegrass	Seed
Nasella pulchra	Purple needlegrass	Seed
Plantago erecta[1]	Dwarf plantain	Seed
Sisyrinchium bellum	Blue eyed grass	Seed

1. Host plant for Quino checkerspot butterfly
2. Federally threatened plant species
3. State endangered plant species
4. Nectar plant for Quino checkerspot butterfly
5. Federally endangered plant species

Reapplication of vernal pool seed will ideally be conducted after the first rains and will be performed under the direction of the Restoration Ecologist. Pools will be seeded between rains to avoid seeding into inundated basins and washing the seeds to the basin edges. Seeding is best done when the pool basins are moist, however, to minimize the loss of loose seed to the wind. Biological material will be raked into the soil after application. No supplemental irrigation of the vernal pools is required or desired.

As discussed in Chapter 2, the Restoration Ecologist will be responsible for determining if vernal pool plant seed is applied directly into the restoration pools, or taken to the AECOM facility in National City or another suitable location approved by the Restoration Ecologist to be used for propagation. For some species (e.g., San Diego button-celery), seeding into the restoration pools will be adequate, as long as enough seed can be acquired. But other species (e.g., spreading navarretia) will require propagation to develop enough seed for direct seeding. Plants that are used for propagation may be planted into the restoration pools if the timing and conditions are appropriate.

CHAPTER 4.0
POST GRADING REMEDIATION PLAN

4.1 VERNAL POOL REMEDIATION

Hydrological adjustments, such as regrading the vernal pools, may have to be made if the pools hold an inappropriate amount of water. If the pools are not holding water, the cause for the problem needs to be identified and remediated.

4.1.1 Upland Watershed and Quino Habitat Remediation

Should the plant and seed salvaging effort fail or if germination rates are below success thresholds, the upland watershed planting will be supplemented using seed mixes and container plants, as specified previously, under the direction of the Contract Manager, Restoration Ecologist, and Project Biologist.

4.2 REMEDIATION METHODS

Remediation methods for the 120-day establishment period are not the same as those for the entire 5-year project. Remediation measures required for the entire life of the project are discussed in Chapter 6.

The remediation planting will occur during a 45-day period following the onset of winter rains. Weed eradication will be completed prior to planting. Remediation will follow the same guidelines as provided in the vernal pool and upland planting and seeding specifications (Chapter 3). Other remediation will also be performed if determined necessary, such as erosion control, soil decompaction, and soil removal.

Plants determined by the Restoration Ecologist to be dead or diseased will be replaced up to 120 days after installation and then as required by the success standards. Unless substitutions are recommended by the Contract Manager and Project Biologist, replacement plants will be of the same size and species as originally specified.

CHAPTER 5.0
5-YEAR MONITORING AND MAINTENANCE

5.1 MONITORING AND MAINTENANCE SCHEDULE

Table 8 outlines the schedule for monitoring and maintenance for the Lonestar Ridge West restoration site. The 5-year monitoring and maintenance period commences after the completion of the planting.

Table 8. Monitoring and Maintenance Schedule

TASK	COMPLETED BY
Begin 5-year Maintenance and Monitoring Period	Fall 2012
Trash and Weed Removal (as needed)	All year
Hydrological Monitoring (each year)	After rain events
Replacement Planting of Uplands (each year, as needed)	Winter
Subsequent Inoculation of Basins (as needed)	Winter
Fairy Shrimp Sampling (each year)	Winter / Spring
Quino Checkerspot Butterfly Surveys (each year)	Winter / Spring
Quantitative and Qualitative Monitoring (each year)	Spring / Summer
Annual Report	January (Starting 2014)
Fifth Year Wildlife Surveys (Quino checkerspot and fairy shrimp)	Winter 2016 / Spring 2017
Fifth Year Report	January 2018
Completion Meeting/End 5-year Maintenance Period	Spring 2018

5.2 VERNAL POOL AND UPLAND MAINTENANCE

The intent of this program is to ensure the success of all created habitat in accordance with the proposed mitigation plan and associated success standards. Maintenance of the vernal pool site will be provided as needed (but at least five times per year) throughout the 5-year maintenance monitoring period for the Lonestar Ridge West restoration site, as directed by the Contract Manager and Project Biologist. The goal of this plan is to create functioning, self-sufficient habitats that fulfill specified performance criteria during and after the monitoring period.

Natural litter and organic matter will be retained onsite unless removal is specifically required by the fire marshal. Dead wood and leaf litter from native shrubs and trees will not be removed from the Lonestar Ridge West restoration site as they provide valuable microhabitats for invertebrates, reptiles, small mammals, and birds. In addition, decomposition of deadwood and leaf litter is essential for replenishment of the soil's nutrients and minerals.

Trash and pulled weeds will be removed from the site mechanically and by hand on a monthly schedule, unless otherwise directed by the Contract Manager. Trash consists of any and all man-made materials, equipment, or debris dumped, thrown, or left within the mitigation site.

Invasive plant species will be controlled within the Lonestar Ridge West restoration site throughout the duration of the 5-year monitoring period. The goals of the weed eradication program are to: (1) comply with project and permit conditions; (2) ensure early achievement of habitat creation/enhancement performance standards; (3) encourage native plant recruitment and native wildlife use; and (4) reduce maintenance costs. At a minimum, the following weed removal methods will be included in the implementation specifications:

- Some weed removal will be performed by hand pulling or with hand tools, particularly in areas with sensitive species (e.g., pools with fairy shrimp or San Diego button-celery), but the primary methods of weed control will be mechanized weed control and herbicide use.

- Mechanized weed control will be conducted using either a high-deck mower and/or weed eaters. A high-deck mower may be used where large, flat areas have heavy weed cover and little or no native growth. The mowers can be set at different heights in order to target weed inflorescences (flower stalks), but leave native inflorescenses unmowed. In addition to a mower, weed eaters (line trimmers) will be used throughout the site, including the vernal pools, upland watershed areas, and Quino habitat areas. Weed eaters are especially useful in areas that are too mixed with native species to use a mower, or that are isolated in patches throughout the site. Both weed eaters and mowers may be applied to the weed problem areas multiple times during the weed control portion of the year (November through June) to continue to restrict the flowering and seed set of nonnative species.

- Herbicide will be used under direction by the Contract Manager, using the herbicide Glyphosate. All other herbicides will be approved by the Contract Manager prior to use on the Lonestar Ridge West restoration sites. All herbicides will be applied by a licensed applicator following all protocols for herbicide application.

- Herbicides will not be sprayed within 6 feet of the vernal pools, but instead will be applied along the margins of the pools using herbicide gloves. Herbicide will only be applied around the edges of pools under the direction of the Contract Manager.

- Target exotic species to be removed in the pools include Russian thistle (*Salsola tragus*), ryegrass (*Lolium multiflorum*), Mediterranean barley (*Hordeum marinum*), African brass-buttons (*Cotula coronopifolia*), and curly dock (*Rumex crispus*).

- Solarization will not be used as a weed eradication method during the maintenance monitoring periods within the restoration area. Although solarization can be an effective method of weed control, the process also kills native plant and animal species found in the soil.

- Weed seedlings and sprouts within the creation area will be continually removed (by hand, mechanical, or herbicide method) before they attain 6 inches in height or before they produce seed, whichever is first.

- Ongoing weed removal that takes place between February 1 and August 31 will be supervised by the Project Biologist to prevent disturbance to or removal of any active bird nests. Of particular concern will be the use of mechanized weed control measure (mowing, weed eating), which can disturb wildlife in and around the area of work. Mechanized methods will be kept away from any nesting areas identified by the monitoring biologist.

- The Contract Manager and Project Biologist will monitor weed eradication and exotic species removal at all times of the year, regardless of the methods being used.

- Upland restoration plants will be maintained on a regular schedule, including (1) supplemental watering where needed, (2) weeding of exotic species, and (3) installing replacement plantings and additional seeding where needed.

- Since most of the habitat at the Lonestar Ridge West restoration site is in stable condition, erosion problems are not expected. If erosion is a problem, erosion control measures will be installed and maintained on an ongoing basis, as determined by the Contract Manager.

- Select basins will undergo subsequent recontouring if initial grading failed to restore natural vernal pool hydrology necessary to support the vernal pool ecosystem.

- Seeds, corms, cysts, topsoil, or soil amendments collected nearby will be applied repeatedly to select pools, as deemed necessary by the Contract Manager and Project Biologist.

5.3 VERNAL POOL MONITORING

Monitoring of restored and reference pool habitat is essential to provide baseline data against which to judge the variability of plant and animal populations over time, to identify the need for corrective measures in restored pools, and to gauge the success of specific management actions. The Project Biologist will be responsible for overseeing the vernal pool monitoring, as described in this section. The type, intensity, timing, and frequency of monitoring must be tied to these objectives. The reference and restored pools were chosen to represent a range of types (i.e.,

depth, fill and drain characteristics, area, and species composition) and to be sufficient in number for valid comparisons to be made. The following sections describe the methods for monitoring success of the restoration throughout the 5-year monitoring and maintenance period.

Monitoring must extend for a minimum of 5 years after completion of the restoration actions and the establishment period, or until the success criteria are met, whichever comes first. The yearly monitoring results will indicate the need for major or minor remedial measures (see Chapter 5). Major corrective measures will extend the monitoring and maintenance period until the success criteria are met. A clearer picture of restoration success will be obtained when the pools have passed through enough hydrological years to represent a range of variation in yearly rainfall levels.

5.3.1 Identification of Reference Pools

Reference pools will be chosen to represent a range of types (i.e., depth, area watershed characteristics, species composition) and to be sufficient in number for valid comparisons to be made. Reference pools will be natural in origin, have little or no disturbance, be within reasonable proximity to restoration pools, and be of the same or similar soil types as restoration pools. The reference pools will be approved by USFWS and CDFG. Qualitative data collected on restored or enhanced pools at Lonestar Ridge West will be expected to fall within the range of qualitative data obtained from reference pools after the five year monitoring period. The reference sites will be identified by the Project Biologist based on the following criteria:

- The site shall be relatively undisturbed and low in weed infestation.
- The site shall contain functional vernal pools and associated watershed.
- The combination of reference sites will contain at least the following species: Mesa brodiaea, pygmy crassula, annual hairgrass, waterwort, San Diego button-celery, little mousetail, spreading navarretia, Otay mesa mint, California Orcutt grass, and woolly marbles.
- The pools at the reference site shall contain San Diego fairy shrimp.

To meet the above requirements for reference pools, it is proposed that the reference site include twelve control pools located two miles east of Lonestar Ridge West on the Upham Parcel. This parcel was previously being managed as a habitat preserve by The Environmental Trust. The pools on this site are within the J-26 complex on Otay Mesa at the eastern end of Otay Valley. While not actively managed, the J-26 pools are protected from grazing and off-highway vehicle (OHV) impacts by a barbed wire fence, making it a reliable control site. Only non-disturbed

Figure 7. Location of Control Vernal Pools in J26 Vernal Pool Complex

pools within this complex will be used as control pools. Pools that become damaged or disturbed during the monitoring period will be removed from the list of control pools. If the Upham site does not provide adequate control pools, another site such as the J-23 complex adjacent to Johnson Canyon will be proposed for approval by USFWS, CDFG, and RWQCB before the first year of monitoring. Data collection in the control pools will be coordinated between this project and the project proponents from the Otay Crossings Commerce Park project and the Otay Business Park project such that methods are the same and impacts to pools caused by monitoring will be minimized. A table detailing basin size, average depth, ponding duration, native cover, nonnative cover, and the presence of listed species for the control pools will be incorporated into the annual reports during the 5-year maintenance and monitoring period.

5.3.2 Monitoring Access

Fairy shrimp sampling and hydrological monitoring, which occur while the pools hold water, can impact vernal pool basin edges. It is recommended that personnel conducting fairy shrimp sampling and hydrological monitoring place a 2-foot by 2-foot square piece of plywood at the pool edge, before sampling, to distribute their body weight over a greater surface area to avoid leaving deep footprints in the moist soil. The square piece of plywood or cobbles oriented within the restored vernal pools to serve as stepping stones will be used for all sampling and monitoring events for all restored and control pools.

5.3.3 Monitoring Methods and Success Criteria

Restored areas must be similar in species composition and ecosystem function to the reference habitat to be considered completed and successful at the end of the monitoring period. In general, this means that data collected on restored or enhanced pools must fall within the range of data obtained from reference pools. The specific parameters that must fall within the range of reference pools include the following: level and duration of water inundation; percent vegetative cover for native plants; plant species frequencies for obligate vernal pool species; and crustacean species richness. Vernal pools vary considerably from one to another and between years in each of these parameters; thus, the standards for determining success are dependent on the range exhibited by natural reference pools during a given year. The most important factor is to have reasonable stability under a wide variety of hydrological years, rather than to meet preset values. The range is determined each year by analyzing the hydrology parameters, percent vegetative cover, and plant species frequencies data for the reference pools that year. Upon completion of the annual monitoring period, restored pools that do not demonstrate improvement in the variables monitored may then require remedial actions. Similarities between restored and

reference pools will be identified using appropriate statistical methods. The Project Biologist will be responsible for oversight of the monitoring.

Hydrology

The hydrological parameters are to be used in assessing success of the recontouring of pool basins. The following parameters for restored pools will fall within the range of parameters found for reference pools:

- Total number of days inundated at the deepest point
- Maximum number of days continuously inundated at deepest point
- Coefficient of variation of water depth at deepest point
- Mean water depth at deepest point
- Number of times drained completely during the wet season
- Water quality (pH, temperature, dissolved solids, and salinity)

The following monitoring activities will be conducted for reference pools and restored pools each year for the entire 5-year monitoring program.

- Placement of a rain gauge at the site and recording of precipitation after every major rainfall event (Appendix B, Details D-2). A major rainfall event is defined as being greater than 0.5 inch of continuous rain. The rain gauge will be installed and used for the entire 5-year monitoring period to more accurately track precipitation and its correlation to the yearly fluctuations in the vegetation and faunal data. Rainfall totals onsite will be compared to the rainfall accumulation recorded at Brown Field adjacent to Lonestar Ridge West.

- Measurement of maximum water depth in each pool undergoing major recontouring. Water depth will be measured and recorded in a database after each major rainfall event and once every 2 weeks thereafter until dry. The schedule begins again after the next major rainfall event. Each monitored pool will have a depth gauge installed prior to the start of the rainy season at the lowest elevation, situated so that the depth can be read using binoculars from the edge of the pool (Appendix B, Details D-2). A smaller amount of precipitation is not likely to result in ponding unless soils are already saturated from previous rain. In the interest of collecting data most efficiently, smaller rainfall events will not be measured. These data will be collected for the entire 5-year monitoring period.

The data collected will be used to calculate mean depth, the coefficient of variation of water depth, average total number of days inundated, average maximum number of days inundated, and number of times pools dried completely for the restoration and control pools. The coefficient

of variation is calculated by dividing the standard deviation by the mean for water depth in each pool. The total number of days inundated will be calculated by adding the number of days a pool measured some depth of water. The total number of days inundated will be averaged to calculate an average for the site. The maximum number of days inundated is the maximum continuous number of days a pool had some depth of water during the survey period. This maximum number will be averaged to calculate a site average. In general, the range and coefficient of variation of the hydrological parameters are more meaningful as a comparative measure for pool systems than is the mean. For example, by using the range rather than the mean, a restored pool that is very similar to one of the outlying reference pools would be considered within the range of expected variation; whereas, if compared only to the mean of the reference pools, it would be considered inadequate.

Mean water depth, average total number of days inundated, and average maximum number of days inundated for the restoration site are compared to the reference pools using 90 percent confidence intervals. Confidence intervals are calculated using a standard deviation of the variable of interest (total state listed species frequency), a predetermined alpha level (0.1 for this project), and sample size (n=12 pools at the reference site or n=130 pools at Lonestar Ridge West). This statistical calculation determines the range in which the true mean is contained with a 90 percent confidence level. If the 90 percent confidence interval of Lonestar Ridge West overlaps the 90 percent confidence interval of the reference pools, the standard is being met and success has been achieved. For the coefficient of variation and number of times pools dried completely, the ranges (minimum value and maximum value) of these variables at the restoration site were compared to the range from the reference pools. If the ranges overlapped, the standard is being met and success has been achieved.

Flora

The botanical monitoring component of the project includes: (1) floral surveys for pool-by-pool species composition; (2) estimates for percent vegetative cover and plant species frequencies; and (3) whole pool estimates of percent cover for plant species (i.e., upland, emergent wetland, and vernal pool species) and for overall vegetative cover. Each of the three types of data was collected for the prerestoration baseline data set.

For purposes of monitoring or sampling, the pool is defined as the area within the topographic line that delimits the high water elevation when the basin contains its maximum volume. This area will be surveyed whether or not the pool fills to maximum volume. All monitoring activities will be completed in restored and reference pools in each monitoring year. Microtopographic

maps may be used to map populations of endangered plant taxa or exotic plants, if deemed useful or necessary by the Project Biologist (i.e., to guide exotic removals).

Species composition will be determined for reference pools and all restored pools. Monitoring will include two assessments during each year to detect both early and late maturing vernal pool species; this will generally be in March and May, but the exact timing will be dependent on the weather conditions each year. A complete floral inventory will be compiled each season at both locations.

Floral surveys were conducted at Lonestar Ridge West in the spring of 2011 at locations where pools were delineated by HELIX biologists from 2000-2007 (Table 9). Four vernal pool endemic species were observed in at least one of the 60 existing pools. Eight other native species were observed in at least one pool. Nine nonnative species were observed in at least one pool.

Average frequency of endemic vernal pool plant species for each pool will be compared the reference vernal pool plant species using a 90 percent confidence interval. The number of pools in which a species found divided by the total number of pools possible gives the frequency of that species. Confidence intervals are calculated using a standard deviation of the variable of interest (average frequency of vernal pool plant species), a predetermined alpha level (0.1 for this project), and sample size (n=12 pools at the reference site or n=130 pools at Lonestar Ridge West). This statistical calculation determines the range in which the true mean is contained with a 90 percent confidence level. If the 90 percent confidence interval of Lonestar Ridge West overlaps the 90 percent confidence interval of the reference pools, the standard is being met and success has been achieved. Average frequency of endemic vernal pool plant species at the existing pools at Lonestar Ridge West (n=60 pools) during the spring 2011 surveys are shown in Table 9.

Table 9. Spring 2011 Frequency of Plant Species Observed in Existing Pools at Lonestar Ridge West

Scientific Name	Common Name		Wetland Indicator Status	# Pools Present	Frequency (%)
Eryngium aristulatum[1]	San Diego Button-Celery	Native	OBL	10	16.7
Eleocharis macrostachya	Pale Spike-Rush	Native	OBL	3	5.0
Plagiobothrys sp.	Popcorn Flower	Native	FACW	2	3.3
Psilocarphus brevissimus	Woolly marbles	Native	OBL	1	1.7
VERNAL POOL ENDEMIC SPECIES Average Frequency [90% Confidence Interval]					**6.7 [5.3, 8.1]**
Sisyrinchium bellum	Blue-eyed Grass	Native	FAC+	16	26.7
Grindelia robusta	Gum Plant	Native	FACW	3	5.0
NATIVE WETLAND SPECIES Average Frequency [90% Confidence Interval]					**15.9 [12.7, 19.1]**
Eremocarpus setigerus	Dove Weed	Native	UPL	8	13.3
Allium sp.	Wild Onion	Native	UPL	3	5.0
Chlorogalum sp.	Soap Plant	Native	UPL	2	3.3
Castilleja exserta	Purple Owl's Clover	Native	UPL	1	1.7
Lasthenia californica	Goldenfields	Native	UPL	1	1.7
Plantago erecta	Dwarf plantain	Native	UPL	1	1.7
NATIVE UPLAND SPECIES Average Frequency [90% Confidence Interval]					**4.5 [3.5, 5.5]**
Lolium multiflorum	Rye Grass	Nonnative	FAC*	45	75.0
Hordeum marinum	Mediterranean Barley	Nonnative	FAC+	43	71.7
Sonchus sp.	Sow Thistle	Nonnative	FAC	3	5.0
NONNATIVE WETLAND SPECIES Average Frequency [90% Confidence Interval]					**50.6 [42.2, 59.0]**
Avena sp.	Wild Oat	Nonnative	UPL	45	75.0
Bromus madritensis ssp. *rubens*	Red Foxtail Brome	Nonnative	UPL	18	30.0
Bromus diandrus	Common Ripgut Grass	Nonnative	UPL	14	23.3
Erodium sp.	Filaree	Nonnative	UPL	7	11.7
Salsola tragus	Russian Thistle	Nonnative	UPL	4	6.7
Hypochaeris glabra	Smooth Cat's-ear	Nonnative	UPL	1	1.7
NONNATIVE UPLAND SPECIES Average Frequency [90% Confidence Interval]					**24.7 [19.0, 30.4]**

1. Federal and State Endangered Plant Species

In the summer of 2011, the federal and state endangered San Diego button-celery increased in frequency at the site and was identified in 41.7 percent (25 of 60 pools) of the disturbed pools delineated at Lonestar Ridge West (Figure 3). Caltrans expects San Diego button-celery to be present in at least 41.7 percent of the enhanced and created pools (54 of 130 pools) at Lonestar Ridge West after the five-year monitoring period. No other listed plants were observed. Caltrans expects the other listed vernal pool plant species installed (spreading navarretia, California Orcutt grass, and Otay mesa mint) to occur onsite after the five year monitoring period.

Estimates of cover, distribution, and abundance of plant species will be made for the entire pool basin for reference pools and the restoration pools using the Releve code system (EDAW 2006). The codes for the cover and distribution sampling of plant species are found in Table 10. Targeted vernal pool species include mesa brodiaea, pygmy crassula, annual hairgrass, waterwort, San Diego button-celery, little mousetail, spreading navarretia, Otay mesa mint, California Orcutt grass, and woolly marbles.

Table 10. Releve Codes for Cover, Distribution, and Abundance of Plant Species

Code	Cover (percent)	Distribution	Abundance (number of individuals)
1	0-5	Solitary	1-25
2	6-25	Clumps/Groups	26-50
3	26-50	Patches/Cushions	51-100
4	51-75	Carpets/Numerous Colonies	101-500
5	>75	+/- Pure Stands	>500

Percent overall vegetative cover will be estimated for the entire pool basin for reference pools and the restoration pools at the time species frequencies are estimated. These estimates will be done near the end of the drying phase, when soils are still saturated, every year for the entire 5-year monitoring period.

Average native and nonative cover will be calculated from the whole pool estimates using the Releve code system (Table 11). To calculate average native and nonnative cover, the code was replaced with the middle value of the range represented by each code. For example, a pool given a code of 2 for San Diego button-celery would receive a cover value of 15.5 (half way between 6 and 25) for calculating average cover. This process was followed for all species except when the species are represented by single individuals. In this case a code of 1 was given for a cover value of 1, as a cover value of 2.5 would have overestimated the cover of species at the site.

Table 11. Releve Codes for Cover, Distribution, and Abundance of Plant Species

Code	Cover (percent)	Cover Value used for Calculating Average Cover
1	0-5	2.5 (except for single individuals in pools =1)
2	6-25	15.5
3	26-50	37.5
4	51-75	62.5
5	>75	87.5

Average native and nonnative cover for each restored pool will be compared to the project success standards using a 90 percent confidence interval as described for average frequency

above. Confidence intervals are calculated using a standard deviation of the variable of interest (total native and nonnative cover), a predetermined alpha level (0.1 for this project), and sample size (n=12 reference pools or n=130 pools at Lonestar Ridge West). Average native and nonnative cover at the existing pools at Lonestar Ridge West (n=60 pools) during the spring 2011 surveys are shown in Table 12.

Table 12. Spring 2011 Average Plant Cover in Existing Pools at Lonestar Ridge West

	Lonestar Ridge West Average Cover (%) [90% Confidence Interval]
Vernal Pool Endemic Species	2.1 [1.1, 3.1]
Native Wetland Species	1.4 [0.6, 2.2]
Native Upland Species	1.8 [0.6, 3.0]
Nonnative Wetland Species	45.8 [40.3, 51.3]
Nonnative Upland Species	22.4 [18.6, 26.2]
Bare Ground	18.1 [11.9, 24.3]
Ponded	4.5 [1.4, 7.6]
TOTAL	**96.1**

The 90 percent confidence interval for each restored pool must be completely above or completely below the success standard for the standard to be considered met (depending on whether the standard is a greater than or less than threshold). If the 90 percent confidence interval contains the success standard, the standard is not being met. The success standards for restored pools are at least 25 percent cover of native plants, less than 5 percent cover of nonnative vegetation, and no perennial noxious weeds (less than 1 percent cover) at the end of the five year monitoring period. These species must be present in years that precipitation is within one standard deviation of the long-term mean and not be absent more than 2 consecutive years.

Fauna

Sampling for fairy shrimp will be done each year in natural reference pools and the restoration pools. Sampling will begin 2 weeks after the first pools fill and continue approximately every 2 weeks thereafter or until San Diego fairy shrimp (SDFS) or Riverside fairy shrimp (RFS) are detected. Species composition of pools changes over time as pools dry and fill and populations appear and disappear; thus, consistent sampling is necessary to determine species composition.

The following sampling methods were used for the pre-restoration baseline data set and will be used for the 5-year monitoring period. Filled pools will be sampled for crustaceans using variously sized dip-nets of known aperture depending on the depth and size of the pool. The net

is dropped vertically into the pool, pushed horizontally for a known distance, and then quickly removed vertically. The depth to which the net is submerged will be noted and, in this way, the volume of water sampled could be calculated. For most pools, three 3.3 foot samples will be taken, where possible.

The analysis of the samples will include separating animals from algae and debris, mixing and diluting samples, observing collected specimens under a microscope, and identifying fairy shrimp to species level. Other invertebrates, including versatile or Lindahl's fairy shrimp (*Branchinecta lindahli*) (LFS), or aquatic vertebrates in pools will be noted during sampling.

Aquatic invertebrates will be sampled, in accordance with USFWS guidelines by a certified biologist holding a valid 10(a) permit. Caltrans Biologist Sue Scatolini (TE-074955) conducted fairy shrimp surveys at Lonestar Ridge West on May 3 and May 22, 2010 and identified San SDFS in eleven disturbed pools and Riverside fairy shrimp RFS in the cattle stock pond (SP). LFS were not detected (Table 13, Figure 3).

Table 13. Spring 2010 Fairy Shrimp Surveys at Lonestar Ridge West

Vernal Pool #	Fairy Shrimp Species Identified	Vernal Pool #	Fairy Shrimp Species Identified
67 (SP)	RFS	119	SDFS
102	0	121	SDFS
104	SDFS	122	0
105, 106, 107	SDFS	123	0
111, 112	0	127	SDFS
114	SDFS	128	SDFS
116,117	SDFS	129	SDFS
118	SDFS	Pool outside of vernal pool restoration area	SDFS

All pools at the site will be surveyed over the monitoring period to estimate the number of hatched SDFS and RFS and gravid females. A vernal pool will no longer be sampled for San Diego fairy shrimp and Riverside fairy shrimp once that species has been positively identified in the pool to prevent further disturbance. If LFS is identified in any of the pools during monitoring, however, additional monitoring may be necessary. However, visual observations of shrimp will be completed each subsequent year.

Dry samples will be taken from a small subset (5 to 10) of randomly selected restored and control pools known to support fairy shrimp in the fall of each year to determine the density of viable cysts in the soils. The sampling will consist of setting up two perpendicular transects using

string, such that they meet in the deepest point in the pool. One transect should pass over the second lowest point in the pool. Five core samples of approximately 2 inches in diameter and 2 inches deep will be taken with one core sample in the pool center (deepest spot) and one radiating in each of the four directions on the transect lines approximately 1 meter from the pool center. The core samples should only be taken when the pool sediment is completely dry at the surface and subsurface. The samples will be analyzed by a USFWS-approved biologist to determine the genus and density of cysts collected. The samples should be processed in the laboratory using standard washing protocol. Cysts are removed from the damp soil in the isolated size fraction by trained personnel under a dissecting microscope.

For the crustacean community, the success criteria at the end of the 5-year monitoring period will include quantitative measures of viable populations of sensitive fairy shrimp species (SDFS and RFS). The restored pools must contain viable populations of fairy shrimp species within the range of densities for species within equivalent reference pools and show a stable or increasing trend relative to the control pools for at least three wet seasons before a determination of success can be made. Remedial measures may be indicated if the above criteria are not met. The corrective actions to be used will vary depending on particular circumstances, such as the water chemistry is not adequate or populations are not viable despite inoculation. The possible corrective measures are numerous and could include everything up to soil recontouring and reinoculation. Fairy shrimp surveys of each pool will be conducted by experienced and certified (holding a valid USFWS 10(a) survey permit) biologists. It is expected that the 18 enhanced pools (1.30 acres) will continue to support San Diego fairy shrimp and the enhanced stock pond (0.25 acre) will continue to support Riverside fairy shrimp.

5.3.4 Photodocumentation

Photodocumentation of reference and restored pools is a useful technique to monitor habitat quality (i.e., hydrology and disturbance) and plant cover. Additional points may need to be created at the time pools are restored or enhanced, to monitor their development. Pools will be photographed twice a year from the same vantage point: when water first ponds or February 1, whichever comes first; and near the end of the drying phase when whole-pool qualitative floral monitoring is done.

5.4 UPLAND WATERSHED MONITORING

5.4.1 Success Criteria

A primary measure of success for restoration is the ability of a revegetated native plant community to be self-supporting (i.e., the ability to sustain itself with natural water and nutrient sources) and self-maintaining (i.e., the ability to successfully reproduce). In addition, the primary objective is to attain a native upland shrub community and Quino habitat that is biologically diverse and consistent with the existing natural system in the vicinity of the restoration area. If the planting is successful and performs according to the below-mentioned success criteria after 5 years, the restoration effort may be considered completed upon concurrence of the USFWS, CDFG, and RWQCB. Provided below are success and recommended remedial measures for the 5-year post installation monitoring program. The Project Biologist will be responsible for meeting the success criteria.

The upland vegetation will be monitored quarterly during the five year monitoring period. Estimated upland cover at the site will be based on an average of qualitative estimates made during the site visits using the Releve code system as described in Section 6.4.3 to estimate percent vegetative cover for native plants, nonnative plants, and bare ground. Upland species will be examined to determine percentage of cover, mortality and composition. Targeted upland species include wild onion (*Allium* spp.), California sagebrush, purple owl's clover (*Castilleja exerta*), small-flowered soap plant (*Chlorogalum parviflorum* and *Chlorogalum pomeridianum*), blue dicks (*Dichelostemma capitatum*), variegated dudleya (*Dudleya variegata*), flat-topped buckwheat (*Eriogonum fasciculatum*), San Diego barrel cactus, gum plant (*Grindelia robusta*), fascicled tarweed (*Deinandra fasciculata*), coast goldenbush (*Isocoma menziesii*), California goldfields (*Lasthenia californica*), purple needlegrass, cholla cactus, adobe popcornflower (*Plagiobothrys acanthocarpus*), dwarf plantain, checker-bloom (*Sidalcea malvaeflora*), San Diego sunflower (*Viguiera laciniata*), and star lily (*Zigadennus fremontii*). Upland cover was estimated at Lonestar Ridge West during surveys conducted in spring 2011 (Table 14).

Table 14. Spring 2011 Average Upland Plant Cover at Lonestar Ridge West

	Lonestar Ridge West Average Cover (%) [90% Confidence Interval]
Native Species	11.7 [8.3, 15.1]
Nonnative Species	88.3 [79.3, 97.3]
Bare Ground	1.7 [1.0, 2.4]
TOTAL	**101.7**

Average native and nonative cover will be compared to the project success standards for each year listed below using a 90 percent confidence interval. Confidence intervals are calculated

using a standard deviation of the variable of interest (total native or nonnative cover), a predetermined alpha level (0.1 for this project), and sample size. The 90 percent confidence interval must be completely above or completely below the success standard for the standard to be considered met (depending on whether the standard is a greater than or less than threshold). If the 90 percent confidence interval contains the success standard, the standard is not being met.

1 Year after Installation

Success Standards: 90 percent survival of transplants and container stock, overall native cover of at least 30 percent in the grassland areas and 10 percent on the mima mounds, nonnative cover of less than 40 percent, no trash, and no significant erosion.

Remedial Measures: As necessary, replant with container plants and seed, increase weed control, remove trash, and correct erosion and sedimentation problems.

2 Years after Installation

Success Standards: 80 percent survival of remaining transplants and container stock, overall native cover of at least 40 percent in the grassland areas and 15 percent on the mima mounds, nonnative cover of less than 30 percent, no trash, and no significant erosion.

Remedial Measures: As necessary, replant with container plants and seed, increase weed control, remove trash, and correct erosion and sedimentation problems.

3 Years after Installation

Success Standards: 70 percent survival of remaining transplants and container stock, overall native cover of at least 50 percent in the grassland areas and 20 percent on the mima mounds, nonnative cover of less than 25 percent, no invasive exotics, no trash, and no significant erosion.

Remedial Measures: As necessary, replant with container plants and seed, increase weed control, remove trash, and correct erosion and sedimentation problems.

4 Years after Installation

Success Standards: 70 percent survival of remaining transplants and container stock, overall native cover of at least 60 percent in the grassland areas and 25 percent on the mima mounds, nonnative cover of less than 20 percent, no invasive exotics, no trash, and no significant erosion.

Remedial Measures: As necessary, replant with container plants and seed, increase weed control, remove trash, and correct erosion and sedimentation problems.

5 Years after Installation

Final Success Standards: 70 percent survival of remaining transplants and container stock, overall native cover of at least 70 percent in the grassland areas and 30 percent on the mima mounds, nonnative cover of less than 15 percent, no invasive exotics categorized as High or Moderate in the California Invasive Plant Council's Invasive Plant Inventory (excluding common non-native grassland species present prior to enhancement), no trash, and no significant erosion.

Remedial Measures: As necessary, reseed with native species, increase weed control, remove trash, and correct erosion and sedimentation problems.

5.4.2 Monitoring Methods

Post-installation monitoring and reporting will occur for up to 5 years to ensure proper establishment of the upland mitigation area. Monitoring supervised by the Project Biologist will focus on onsite conditions, plant health, pests (including exotic plants), and performance of the maintenance Contractor and will be conducted monthly during the first two monitoring years, then quarterly during the remainder of the five year monitoring period.

Monitoring results will determine the progress of the mitigation areas relative to the success standards and the potential need for remedial measures. The Project Biologist will prepare annual monitoring reports that will be submitted to the USFWS, CDFG, and RWQCB for review and approval.

Qualitative Monitoring

Qualitative surveys will consist of a general site walkover and characterization of the Lonestar Ridge West restoration site. General observations, such as fitness and health of restored plants, and signs of overirrigation or drought stress will be noted during the surveys. Shrub species will be examined to determine percentage of cover, height, mortality, and composition. Additionally, potential soil erosion, vandalism, weeds, and pest problems will be identified. Photodocumentation will also be conducted annually. Annual reports prepared over the five-year monitoring period will include a minimum of twenty photos taken showing representative photos of vernal pools and mima mounds and at least ten photos taken showing representative photos of

the overall condition of the upland vegetation at the site. Photographs will be taken from the same vantage point in the same direction, and photodocumentation points and direction will be mapped. Caltrans will also provide an oblique aerial photograph of the site annually during the five year monitoring period.

Wildlife Monitoring

Nesting sites, roosting sites, burrows and tracks, bird calls, sightings, and other signs of wildlife use of the newly created habitat will be recorded quarterly during the five year monitoring period. Any evidence of use of the site by golden eagles will be noted during the quarterly wildlife surveys. These notes will be important for early identification of species colonization patterns and will be included in the monitoring reports.

To understand the ecological recovery of the site, more detailed wildlife studies will be conducted every year of the monitoring period for San Diego and Riverside fairy shrimp, Quino checkerspot butterfly (larval and adult surveys), and burrowing owl. The purpose of these studies is to (1) calibrate the ecological success of the site in addition to species targeted in the BO; and (2) provide a comprehensive biological resources inventory to serve as a baseline for long-term management. These studies will be directed by the Project Biologist and will be performed by experienced and certified (holding a valid USFWS 10(a) survey permit) biologists, where applicable. The following studies will be performed:

- Yearly protocol-level Quino surveys (once per week [weather permitting] for a minimum of five weeks throughout the flight season on non-consecutive days)

- Yearly protocol-level fairy shrimp surveys (wet season surveys beginning two weeks after the first pools fill and continuing approximately every two weeks thereafter or until SDFS or RFS are detected)

- Yearly protocol-level burrowing owl surveys (during the quarterly wildlife surveys identifying mima mound locations where burrowing owls are utilizing artificial or natural burrows)

These studies will be performed during the appropriate survey season. Where applicable, USFWS protocols will be employed.

Success criteria will include maintaining appropriate habitat for Quino, fairy shrimp, and burrowing owl and appropriate foraging habitat for golden eagle; the establishment of a

minimum of 17 focused planting areas that are dominated by Quino host and nectar resource plants; the presence of SDFS in 38 of the created or enhanced shallow pools and RFS in 3 of the created or enhanced deeper pools and the cattle stock pond; and the presence of burrowing owl using burrows onsite at the end of the five year monitoring period.

5.5 REPORTING

Annual monitoring reports will be submitted to the USFWS, CDFG, and RWQCB by January 31 of every year until the project has achieved the success criteria. The monitoring reports will include the following:

- A list of names, titles, and companies of all persons who participated in monitoring activities and contributed to report preparation
- General observations, analysis of quantitative monitoring data (e.g., success, failure, remedial actions), statistical assessment of vegetation growth in meeting the success criteria, comparisons of current vegetation growth to the reference sites, and progress toward final acceptance
- A summary of the qualitative data and a summary of the remedial measures that were implemented during the reporting period, along with those needed for the coming year
- A summary of the remedial measures implemented during the reporting period and recommendations for the following year
- Photographs
- Maps identifying monitoring areas, transects, quadrats, planting zones, and habitat types, as appropriate
- Compliance with measures outlined in the BO

A final report summarizing results over the 5-year monitoring period will be submitted to the USFWS, CDFG, and RWQCB upon completion of the monitoring program.

5.6 PROJECT COMPLETION

Once the final 5-year success criteria are achieved to the satisfaction of the USFWS, CDFG, and RWQCB, the 5-year monitoring and maintenance obligation will be fulfilled and the project deemed completed. Caltrans will notify the USFWS, CDFG, and RWQCB that the final success

criteria have been met upon acceptance of the final monitoring reports. A long-term maintenance and monitoring fund will be established by Caltrans to allow for regular monitoring and maintenance so that the intended functions and values of the mitigation area are sustained in perpetuity. This endowment fund will provide a mechanism to transfer the deed and management responsibilities to the POM for management in perpetuity.

5.7 AGENCY CONFIRMATION

Following receipt of Notification of Completion, the USFWS, CDFG, and RWQCB may visit the Lonestar Ridge West restoration site to confirm that the goals of the mitigation obligation have been achieved. If a performance criterion has not been met for any portion of the mitigation sites in any monitoring period, Caltrans will report the cause of failure and propose remedial action(s) or other contingency measures for approval by the agencies. If the performance criteria are still not satisfied with implementation of approved remedial action(s), the responsible party's maintenance and monitoring obligations will continue until the USFWS, CDFG, and RWQCB give final confirmation that the performance criteria have been met, or until contingency mitigation obligations have been fulfilled. Restoration and enhancement will not be deemed successful until at least one year after any contingency measures related specifically to success criteria are implemented.

Once the mitigation obligations have been met, Caltrans will request a letter from the USFWS, CDFG, and RWQCB releasing them from their 5-year monitoring obligation.

CHAPTER 6.0
REFERENCES

Bauder, E T. 1990. Recent and Projected Losses; Their Condition; and Threats to their Existence. Prepared for Endangered Plant Project, California Department of Fish and Game, Interagency Agreement No. C-1483.

Brown, J.W., H.G. Real and D K. Faulkner. 1992. Butterflies of Baja California. Lepidoptera Research Foundation, Inc., Beverly Hills, California.

California Department of Transportation (Caltrans). 2011. Biological Assessment State Route 11 and Otay Mesa East Port of Entry San Diego County, California. April.

City of San Diego (City). 2001. Land Development Code Biology Guidelines (as amended by Resolution No. R-294943). May 19.

County of San Diego (County). 1997. Multiple Species Conservation Program (MSCP) County of San Diego Subarea Plan. October 22.

Dudek & Associates, Inc. 2003. Quino Checkerspot Butterfly Habitat Restoration Plan for State Route 125 South San Diego County, California. Prepared for EDAW, Inc.

EDAW. 2006. Third Quarter Monitoring Report for the State Route 125 South Vernal Pool and Quino Checkerspot Butterfly Habitat Restoration Site (March-May 2006). November.

Giesy, J.P., S. Dobson, and K.R. Solomon. 2000. Ecotoxicological risk assessment for Roundup herbicide. Review of Environmental Contamination and Toxicology. 167:35-120.

HELIX Environmental Planning, Inc (HELIX). 2008. U.S. Fish and Wildlife Service Wet Season Protocol Level Survey Report for San Diego and Riverside Fairy Shrimp (*Branchinecta sandiegonensis and Streptocephalus woottoni*): Lonestar Ridge. August 15.

HELIX. 2009a. Biological Technical Report for Lonestar Industrial Park. May 22.

HELIX. 2009b. U.S. Fish and Wildlife Service Wet Season Protocol Level Survey Report for San Diego and Riverside Fairy Shrimp (*Branchinecta sandiegonensis and Streptocephalus woottoni*): Lonestar Ridge. June 26.

HELIX. 2010. Natural Environment Study for State Route 11 and the Otay Mesa East Port of Entry: Tier II Environmental Impact Report/Environmental Impact Statement. October.

HELIX. 2011. Addendum to the Tier II Natural Environment Study for State Route 11 and the Otay Mesa East Port of Entry. August.

Mattoni, R., G. Pratt, T. Longcore, J. Emmel, and J. George. 1995. The endangered quino checkerspot butterfly, *Euphydryas editha quino* (Lepidoptera; Nymphalidae). Journal of Research on the Lepidoptera 34:99-118.

Mueller-Dombois, D.R. and H. Ellenberg. 1974. Aims and Methods of Vegetation Ecology. John Wiley & Sons, New York.

RECON. 1997. Dennery Canyon Vernal Pool, Coastal Sage Scrub, and Mule Fat Scrub Restoration Plan. March.

Scatolini, S. 2010. 90-Day Report for Fairy Shrimp for the Lonestar Mitigation Site, City of San Diego, San Diego County, California. March.

U.S. Fish and Wildlife Service (USFWS). 1993. Determination of endangered status for three vernal pool plants and the Riverside fairy shrimp. Federal Register 58:41384-41392.

USFWS. 1997a. Determination of endangered status for the San Diego fairy shrimp. Federal Register 62: 4925-4939.

USFWS. 1997b. Determination of endangered status for the Laguna mountain skipper and Quino checkerspot butterfly. Final Rule. Federal Register 62:2313-2322.

USFWS. 1998. Recovery plan for vernal pools of southern California. U.S. Fish and Wildlife Serve, Portland, Oregon. 133+pp.

USFWS. 2002. Designation of Critical Habitat for the Quino Checkerspot Butterfly. Final Rule. Federal Register 67:18356-18395.

USFWS. 2011. Biological Opinion for the State Route 11/Otay Mesa East Port of Entry, Otay Crossings Commerce Park, and Otay Business Park Projects, San Diego County, California. November 23.

Unitt, P. 2005. San Diego County Bird Atlas. Published by the San Diego Museum of Natural History. 645 pages.

Zedler, P.H. 1987. The Ecology of Southern California Vernal Pools: A Community Profile. National Wetlands Research Center, Research and Development, U.S. Fish and Wildlife Service, U.S. Department of the Interior, Washington, D.C.

APPENDIX A
EXISTING VERNAL POOL/ UNVEGETATED BASIN DATA
LONESTAR RIDGE WEST

Lonestar Mitigation Pool ID	HELIX ID[1]	Area (square feet)[1]	Average Depth (inches)[2]	Average Duration (days)[2]	Common Name		Wetland Indicator Status	Percent Composition[3]	Fairy Shrimp[4]
2P	1D6	820			Red Foxtail Brome	Non-native	UPL	50%	
					Rye Grass	Non-native	FAC*	30%	
					Wild Oat	Non-native	UPL	10%	
					Common Ripgut Grass	Non-native	UPL	5%	
					Blue-eyed Grass	Native	FAC+	5%	
12P	1C2	651			Rye Grass	Non-native	FAC*	30%	
					Wild Oat	Non-native	UPL	30%	
					Mediterranean Barley	Non-native	FAC+	25%	
					Blue-eyed Grass	Native	FAC+	5%	
					Russian Thistle	Non-native	UPL	5%	
					Dove Weed	Native	UPL	5%	
13P	1C3	1202			Rye Grass	Non-native	FAC*	40%	
					Mediterranean Barley	Non-native	FAC+	20%	
					Common Ripgut Grass	Non-native	UPL	10%	
					Blue-eyed Grass	Native	FAC+	10%	
					Wild Oat	Non-native	UPL	10%	
					San Diego Button-Celery[5]	Native	OBL	10%	
14P	1D7	240			Wild Oat	Non-native	UPL	70%	
					Red Foxtail Brome	Non-native	UPL	20%	
					Dove Weed	Native	UPL	10%	
16P	1C4	857			Rye Grass	Non-native	FAC*	30%	
					Red Foxtail Brome	Non-native	UPL	30%	
					Wild Oat	Non-native	UPL	25%	
					Dove Weed	Native	UPL	10%	
					Blue-eyed Grass	Native	FAC+	5%	
19P	1D8	319			Rye Grass	Non-native	FAC*	60%	
					Wild Oat	Non-native	UPL	20%	
					Mediterranean Barley	Non-native	FAC+	10%	
					Dove Weed	Native	UPL	5%	
					Blue-eyed Grass	Native	FAC+	5%	
24P	1DF	1562			Rye Grass	Non-native	FAC*	40%	
					Mediterranean Barley	Non-native	FAC+	30%	
					Wild Oat	Non-native	UPL	20%	
					Common Ripgut Grass	Non-native	UPL	10%	

Lonestar Mitigation Pool ID	HELIX ID[1]	Area (square feet)[1]	Average Depth (inches)[2]	Average Duration (days)[2]	Common Name		Wetland Indicator Status	Percent Composition[3]	Fairy Shrimp[4]
	1B7	165			Rye Grass	Non-native	FAC*	40%	
					Common Ripgut Grass	Non-native	UPL	30%	
					Wild Oat	Non-native	UPL	15%	
					Red Foxtail Brome	Non-native	UPL	10%	
					Blue-eyed Grass	Native	FAC+	5%	
28P	1BF	701			Rye Grass	Non-native	FAC*	60%	
					Mediterranean Barley	Non-native	FAC+	20%	
					Wild Oat	Non-native	UPL	10%	
					Common Ripgut Grass	Non-native	UPL	5%	
					Red Foxtail Brome	Non-native	UPL	5%	
31P, 32P	1BB, 1BC	4843			Rye Grass	Non-native	FAC*	30%	
					Mediterranean Barley	Non-native	FAC+	30%	
					Wild Oat	Non-native	UPL	20%	
					Common Ripgut Grass	Non-native	UPL	10%	
					Dove Weed	Native	UPL	5%	
					Blue-eyed Grass	Native	FAC+	3%	
					San Diego Button-Celery	Native	OBL	2%	
33P	1D9	1873			Mediterranean Barley	Non-native	FAC+	50%	
					Rye Grass	Non-native	FAC*	20%	
					Wild Oat	Non-native	UPL	10%	
					Ponded			20%	
37P	1E0	770			Mediterranean Barley	Non-native	FAC+	70%	
					Wild Oat	Non-native	UPL	10%	
					Rye Grass	Non-native	FAC*	10%	
					Red Foxtail Brome	Non-native	UPL	5%	
					San Diego Button-Celery	Native	OBL	5%	
38P, 39P	1BD	774			Mediterranean Barley	Non-native	FAC+	50%	
					Wild Oat	Non-native	UPL	20%	
					Rye Grass	Non-native	FAC*	20%	
					Red Foxtail Brome	Non-native	UPL	10%	
40P	1E1	643			Rye Grass	Non-native	FAC*	50%	
					Mediterranean Barley	Non-native	FAC+	30%	
					Wild Oat	Non-native	UPL	15%	
					Red Foxtail Brome	Non-native	UPL	5%	

Lonestar Mitigation Pool ID	HELIX ID[1]	Area (square feet)[1]	Average Depth (inches)[2]	Average Duration (days)[2]	Common Name		Wetland Indicator Status	Percent Composition[3]	Fairy Shrimp[4]
41P	1BE	405			Mediterranean Barley	Non-native	FAC+	45%	
					Rye Grass	Non-native	FAC*	20%	
					Wild Oat	Non-native	UPL	20%	
					Dove Weed	Native	UPL	5%	
					Blue-eyed Grass	Native	FAC+	5%	
					San Diego Button-Celery	Native	OBL	5%	
42P	1C0	325			Rye Grass	Non-native	FAC*	60%	
					Mediterranean Barley	Non-native	FAC+	20%	
					Wild Oat	Non-native	UPL	10%	
					Dove Weed	Native	UPL	5%	
					Russian Thistle	Non-native	UPL	5%	
48P	1DA	390			Rye Grass	Non-native	FAC*	45%	
					Wild Oat	Non-native	UPL	20%	
					Soap Plant	Native	UPL	20%	
					Goldenfields	Native	UPL	10%	
					Blue-eyed Grass	Native	FAC+	3%	
					Purple Owl's Clover	Native	UPL	2%	
51P	1C1	2721			Rye Grass	Non-native	FAC*	40%	
					Mediterranean Barley	Non-native	FAC+	40%	
					Wild Oat	Non-native	UPL	10%	
					Blue-eyed Grass	Native	FAC+	5%	
					Red Foxtail Brome	Non-native	UPL	5%	
52P	1DB, 1E2	1253			Rye Grass	Non-native	FAC*	40%	
					Mediterranean Barley	Non-native	FAC+	35%	
					Wild Oat	Non-native	UPL	10%	
					San Diego Button-Celery	Native	OBL	10%	
					Russian Thistle	Non-native	UPL	5%	
53P, 54P	1E3	4380			Mediterranean Barley	Non-native	FAC+	40%	
					Wild Oat	Non-native	UPL	15%	
					Rye Grass	Non-native	FAC*	10%	
					Common Ripgut Grass	Non-native	UPL	5%	
					Ponded			30%	
56P	1DC	234			Rye Grass	Non-native	FAC*	45%	
					Common Ripgut Grass	Non-native	UPL	20%	
					Wild Oat	Non-native	UPL	20%	
					Blue-eyed Grass	Native	FAC+	10%	
					San Diego Button-Celery	Native	OBL	5%	

Lonestar Mitigation Pool ID	HELIX ID[1]	Area (square feet)[1]	Average Depth (inches)[2]	Average Duration (days)[2]	Common Name		Wetland Indicator Status	Percent Composition[3]	Fairy Shrimp[4]
57P	1DD	220			Rye Grass	Non-native	FAC*	30%	
					Wild Oat	Non-native	UPL	20%	
					Mediterranean Barley	Non-native	FAC+	10%	
					Red Foxtail Brome	Non-native	UPL	10%	
					Blue-eyed Grass	Native	FAC+	10%	
					Soap Plant	Native	UPL	10%	
					Gum Plant	Native	FACW	5%	
					Russian Thistle	Non-native	UPL	5%	
58P	1DE	1			Wild Oat	Non-native	UPL	40%	
					Rye Grass	Non-native	FAC*	30%	
					Red Foxtail Brome	Non-native	UPL	20%	
					Blue-eyed Grass	Native	FAC+	10%	
59P	1D2	100			Rye Grass	Non-native	FAC*	40%	
					Wild Oat	Non-native	UPL	20%	
					Mediterranean Barley	Non-native	FAC+	20%	
					Red Foxtail Brome	Non-native	UPL	10%	
					Dove Weed	Native	UPL	10%	
67P (SP)	1B5	10520	1.87	15	Rye Grass	Non-native	FAC*	3%	RFS[6]
					Common Ripgut Grass	Non-native	UPL	1%	
					Pale Spike-Rush	Native	OBL	1%	
					Ponded			95%	
68P	1E4	1525			Rye Grass	Non-native	FAC*	40%	
					Mediterranean Barley	Non-native	FAC+	20%	
					Wild Oat	Non-native	UPL	10%	
					San Diego Button-Celery	Native	OBL	10%	
					Pale Spike-Rush	Native	OBL	5%	
					Bare Ground			15%	
69P	1CF	130			Rye Grass	Non-native	FAC*	50%	
					Mediterranean Barley	Non-native	FAC+	20%	
					Wild Oat	Non-native	UPL	20%	
					Bare Ground			10%	
70P	1D3	80			Rye Grass	Non-native	FAC*	55%	
					Red Foxtail Brome	Non-native	UPL	30%	
					Wild Oat	Non-native	UPL	10%	
					Blue-eyed Grass	Native	FAC+	5%	

Lonestar Mitigation Pool ID	HELIX ID[1]	Area (square feet)[1]	Average Depth (inches)[2]	Average Duration (days)[2]	Common Name		Wetland Indicator Status	Percent Composition[3]	Fairy Shrimp[4]
72P	1D4	83	1.60	14	Rye Grass	Non-native	FAC*	30%	
					Wild Oat	Non-native	UPL	30%	
					Red Foxtail Brome	Non-native	UPL	30%	
					Blue-eyed Grass	Native	FAC+	5%	
					Gum Plant	Native	FACW	5%	
73P	1D5	33			Rye Grass	Non-native	FAC*	45%	
					Wild Oat	Non-native	UPL	35%	
					Red Foxtail Brome	Non-native	UPL	20%	
79P	1D0	1393			Mediterranean Barley	Non-native	FAC+	35%	
					Rye Grass	Non-native	FAC*	30%	
					Wild Oat	Non-native	UPL	10%	
					San Diego Button-Celery	Native	OBL	5%	
					Bare Ground			20%	
82P	1D1	270			Wild Oat	Non-native	UPL	50%	
					Mediterranean Barley	Non-native	FAC+	30%	
					Common Ripgut Grass	Non-native	UPL	20%	
86P, 87P	1E5	1380			Rye Grass	Non-native	FAC*	50%	
					Mediterranean Barley	Non-native	FAC+	20%	
					Common Ripgut Grass	Non-native	UPL	10%	
					Wild Oat	Non-native	UPL	10%	
					Ponded			10%	
105P, 106P, 107P	1CE	113	1.53	19	Mediterranean Barley	Non-native	FAC+	30%	
					Rye Grass	Non-native	FAC*	10%	
					Filaree	Non-native	UPL	10%	SDFS[7]
					Wild Onion	Native	UPL	10%	
					Bare Ground			40%	
109P	1CC	573			Rye Grass	Non-native	FAC*	40%	
					Wild Oat	Non-native	UPL	20%	
					Mediterranean Barley	Non-native	FAC+	5%	
					San Diego Button-Celery	Native	OBL	5%	
					Bare Ground			30%	
110P	1CB	180			Rye Grass	Non-native	FAC*	40%	
					Mediterranean Barley	Non-native	FAC+	25%	
					Wild Oat	Non-native	UPL	10%	
					San Diego Button-Celery	Native	OBL	5%	
					Bare Ground			20%	

Lonestar Mitigation Pool ID	HELIX ID[1]	Area (square feet)[1]	Average Depth (inches)[2]	Average Duration (days)[2]	Common Name		Wetland Indicator Status	Percent Composition[3]	Fairy Shrimp[4]
111P, 112P	1C8	184	4.11	24	Mediterranean Barley	Non-native	FAC+	40%	
					Rye Grass	Non-native	FAC*	10%	
					Pale Spike-Rush	Native	OBL	10%	
					Bare Ground			20%	
					Ponded			20%	
114P	1C9	1040	2.45	17	Rye Grass	Non-native	FAC*	20%	SDFS
					Filaree	Non-native	UPL	20%	
					Wild Onion	Native	UPL	10%	
					Bare Ground			50%	
116P, 117P	1CD	1290	2.54	14	Rye Grass	Non-native	FAC*	20%	SDFS
					Woolly marbles	Native	OBL	20%	
					Mediterranean Barley	Non-native	FAC+	5%	
					Sow Thistle	Non-native	FAC	5%	
					Bare Ground			30%	
					Ponded			20%	
118P	1E7	1071			Mediterranean Barley	Non-native	FAC+	90%	SDFS
					Common Ripgut Grass	Non-native	UPL	5%	
					Ponded			5%	
119P	1C5	161	3.41	36	Mediterranean Barley	Non-native	FAC+	50%	SDFS
					Rye Grass	Non-native	FAC*	25%	
					Filaree	Non-native	UPL	5%	
					Sow Thistle	Non-native	FAC	5%	
					Bare Ground			5%	
					Ponded			10%	
121P	1C6	254	1.70	17	Rye Grass	Non-native	FAC*	30%	SDFS
					Mediterranean Barley	Non-native	FAC+	10%	
					Filaree	Non-native	UPL	5%	
					Dwarf plantain	Native	UPL	3%	
					Smooth Cat's-ear	Non-native	UPL	2%	
					Bare Ground			50%	
122P	1E9	608	1.60	15	Rye Grass	Non-native	FAC*	30%	
					Mediterranean Barley	Non-native	FAC+	30%	
					Filaree	Non-native	UPL	20%	
					Bare Ground			20%	
123P	1EA	375	2.28	17	Wild Onion	Native	UPL	20%	
					Rye Grass	Non-native	FAC*	15%	
					Mediterranean Barley	Non-native	FAC+	10%	
					Bare Ground			55%	

Lonestar Mitigation Pool ID	HELIX ID[1]	Area (square feet)[1]	Average Depth (inches)[2]	Average Duration (days)[2]	Common Name		Wetland Indicator Status	Percent Composition[3]	Fairy Shrimp[4]
126P	1EB	380	1.67	13	Bare Ground			100%	
127P	1EC	638	1.20	14	Filaree	Non-native	UPL	20%	SDFS
					Mediterranean Barley	Non-native	FAC+	10%	
					Popcorn Flower	Native	FACW	10%	
					Rye Grass	Non-native	FAC*	5%	
					Sow Thistle	Non-native	FAC	5%	
					Bare Ground			50%	
128P	1C7	177	1.40	13	Filaree	Non-native	UPL	10%	SDFS
					Popcorn Flower	Native	FACW	10%	
					Bare Ground			80%	
	1E6	182	2.40	14	Rye Grass	Non-native	FAC*	70%	
					Wild Oat	Non-native	UPL	15%	
					Blue-eyed Grass	Native	FAC+	5%	
					Gum Plant	Native	FACW	5%	
					Bare Ground			5%	
	201	101			Rye Grass	Non-native	FAC*	60%	
					Mediterranean Barley	Non-native	FAC+	20%	
					Wild Oat	Non-native	UPL	15%	
					Red Foxtail Brome	Non-native	UPL	5%	
	1FD	52	1.70	17	Wild Oat	Non-native	UPL	5%	
					Mediterranean Barley	Non-native	FAC+	5%	
					Ponded			90%	
	1FE	114			Wild Oat	Non-native	UPL	5%	
					Mediterranean Barley	Non-native	FAC+	5%	
					Ponded			90%	
	200	82			Wild Oat	Non-native	UPL	5%	
					Mediterranean Barley	Non-native	FAC+	5%	
					Ponded			90%	
	1FF	187			Wild Oat	Non-native	UPL	5%	
					Mediterranean Barley	Non-native	FAC+	5%	
					Ponded			90%	
	202	84	2.50	9	Wild Oat	Non-native	UPL	5%	
					Mediterranean Barley	Non-native	FAC+	5%	
					Ponded			90%	

Lonestar Mitigation Pool ID	HELIX ID[1]	Area (square feet)[1]	Average Depth (inches)[2]	Average Duration (days)[2]	Common Name		Wetland Indicator Status	Percent Composition[3]	Fairy Shrimp[4]
	1CA	100			Rye Grass	Non-native	FAC*	70%	
					Wild Oat	Non-native	UPL	15%	
					Mediterranean Barley	Non-native	FAC+	5%	
					Bare Ground			10%	
	1BA	710			Wild Oat	Non-native	UPL	25%	
					Mediterranean Barley	Non-native	FAC+	25%	
					Common Ripgut Grass	Non-native	UPL	25%	
					Red Foxtail Brome	Non-native	UPL	25%	
	1B9	550			Wild Oat	Non-native	UPL	25%	
					Mediterranean Barley	Non-native	FAC+	25%	
					Common Ripgut Grass	Non-native	UPL	25%	
					Red Foxtail Brome	Non-native	UPL	25%	
	1B8	377			Wild Oat	Non-native	UPL	20%	
					Mediterranean Barley	Non-native	FAC+	80%	

1. Data collected by HELIX Biologists between 2005 and 2006 (HELIX 2009a).

2. Data collected by HELIX Biologists 2007/2008 (HELIX 2008) and 2008/2009 (HELIX 2009b).

3. Data collected by Caltrans Biologists between March and April 2011.

4. Data collected by Caltrans Biologists in May 2010.

5. San Diego button-celery is federally endangered, state endangered, CNPS List 1B.1, and County Sensitive.

6. Riverside fairy shrimp (RFS) is Federally endangered, MSCP Narrow Endemic, and County Sensitive.

7. San Diego fairy shrimp (SDFS) is Federally endangered, MSCP Narrow Endemic, and County Sensitive.

APPENDIX B
PROJECT PLANS FOR
LONESTAR RIDGE WEST