

**HABITAT RESTORATION AND SENSITIVE PLANT SPECIES MITIGATION PLAN
FOR THE SUNBOW II PHASE 3 SPA PLAN AMENDMENT
CHULA VISTA, CA**

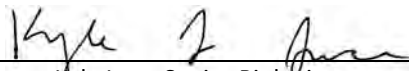
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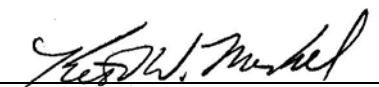
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INTRODUCTION

Merkel & Associates (M&A) was contracted by Lennar Homes (Project Applicant) to prepare a habitat restoration and compensatory sensitive plant species mitigation plan for impacts associated with the Sunbow II Phase 3 Amendment Project (Project) that includes a proposed Multiple Species Conservation Plan (MSCP) Preserve Boundary Line Adjustment (BLA). The Project proposes to mitigate for impacts to Otay tarplant (*Deinandra conjugens*), Orcutt's bird's-beak (*Dicranostegia orcuttiana*), decumbent goldenbush (*Isocoma menziesii* var. *decumbens*), and San Diego County viguiera (*Bahiopsis laciniata*) through the following:

- 1) Conveyance of the proposed Sunbow MSCP Preserve lands to the Chula Vista Central City Preserve lands be conserved, maintained, and managed by the City of Chula Vista in perpetuity as directed in the Chula Vista Central City Preserve Area-Specific Management Directives for Preserve Management Area 3 (RECON Environmental, April 26, 2004) and funded by the Sunbow Preserve Community Facilities District (No. 98-3); and
- 2) Implementation of this project restoration plan.

This plan has been prepared by a qualified City-approved biologist familiar with the City's MSCP Subarea Plan and includes but is not limited to: an implementation plan; appropriate seed mixtures and planting methods; an irrigation method; quantitative and qualitative success criteria; a maintenance, monitoring, and reporting program; an estimated completion time; and contingency measures. The project applicant is required to prepare and implement this plan subject to the oversight and approval of the Development Services Director (or their designee). The objectives of this habitat restoration and sensitive plant species mitigation plan are to:

- Restore non-native grassland to native grassland and Diegan coastal sage scrub habitats that will support sensitive plant species within areas of proposed MSCP BLA Give areas;
- Compensate for the proposed project impacts to Orcutt's bird's-beak, decumbent goldenbush, and San Diego County viguiera within the proposed habitat restoration areas through the implementation of mitigation standards for these species; and
- Enhance native grassland restoration areas with Otay tarplant.

Biological surveys including focused rare plant surveys of the Project area (Figure 1) were conducted by M&A during the winter of 2019, spring/summer of 2020, and winter (January) of 2021 (1.66-acre off-site area on Otay Ranch property, only) (Merkel & Associates 2021). The distribution of vegetation communities and locations of sensitive plant populations within the project boundary are shown on Figure 2. Four of the sensitive plant species (i.e., Otay tarplant, Orcutt's birds'-beak, decumbent goldenbush, San Diego County viguiera) would be significantly impacted through implementation of the project. Detail regarding the sensitivity status, on-site distribution, and habitat of these species is provided within the biological impact analysis report for the Sunbow II Phase 3 project (Merkel & Associates 2021).

Three of the sensitive species for which impacts have been found to be significant will require compensatory mitigation in the form of habitat restoration and plant replacement in the restored habitat. A total of 91 Orcutt's bird's beak, 289 decumbent goldenbush, and 5,952 San Diego County

viguiera, will be impacted by the Project and an equivalent number of each must be replaced within the onsite restoration area.

A total of 5,449 Otay tarplant individuals were mapped within the Sunbow II Phase 3 property. A total of 4,044 individuals were mapped within the existing preserve and 1,405 were mapped outside the existing preserve (Merkel & Associates 2021). Total quantity and population extent mapped for the site is based on the greatest number of plants and extent recorded from the winter surveys (which included mostly vestigial remains of plants) and the early summer surveys (which included flowering plants). It should be noted that population size of this annual plant is expected to fluctuate yearly and is dependent upon climatic factors such as temperature and rainfall.

Under the project, a total of 836 Otay tarplant individuals distributed over 0.34 acre are anticipated to be impacted. The project proposes to mitigate Otay tarplant impacts through conveyance of Preserve lands to the City that include substantially more than 836 Otay tarplant individuals and significantly more than 0.34 acres of occupied habitat. As a result, mitigation needs for this species would be met by conveyance alone.

Because the mitigation requirements for Otay tarplant are met through conservation of existing plant populations the restoration of this species under this plan is non-compensatory in nature. Therefore, the restoration goals for Otay tarplant under this restoration plan are to enhance the distribution and abundance of this narrow endemic species within the habitat restoration without establishment of the same compensatory mitigation standards as would apply to the other species included in this plan.

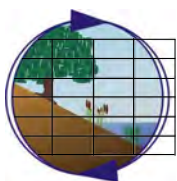
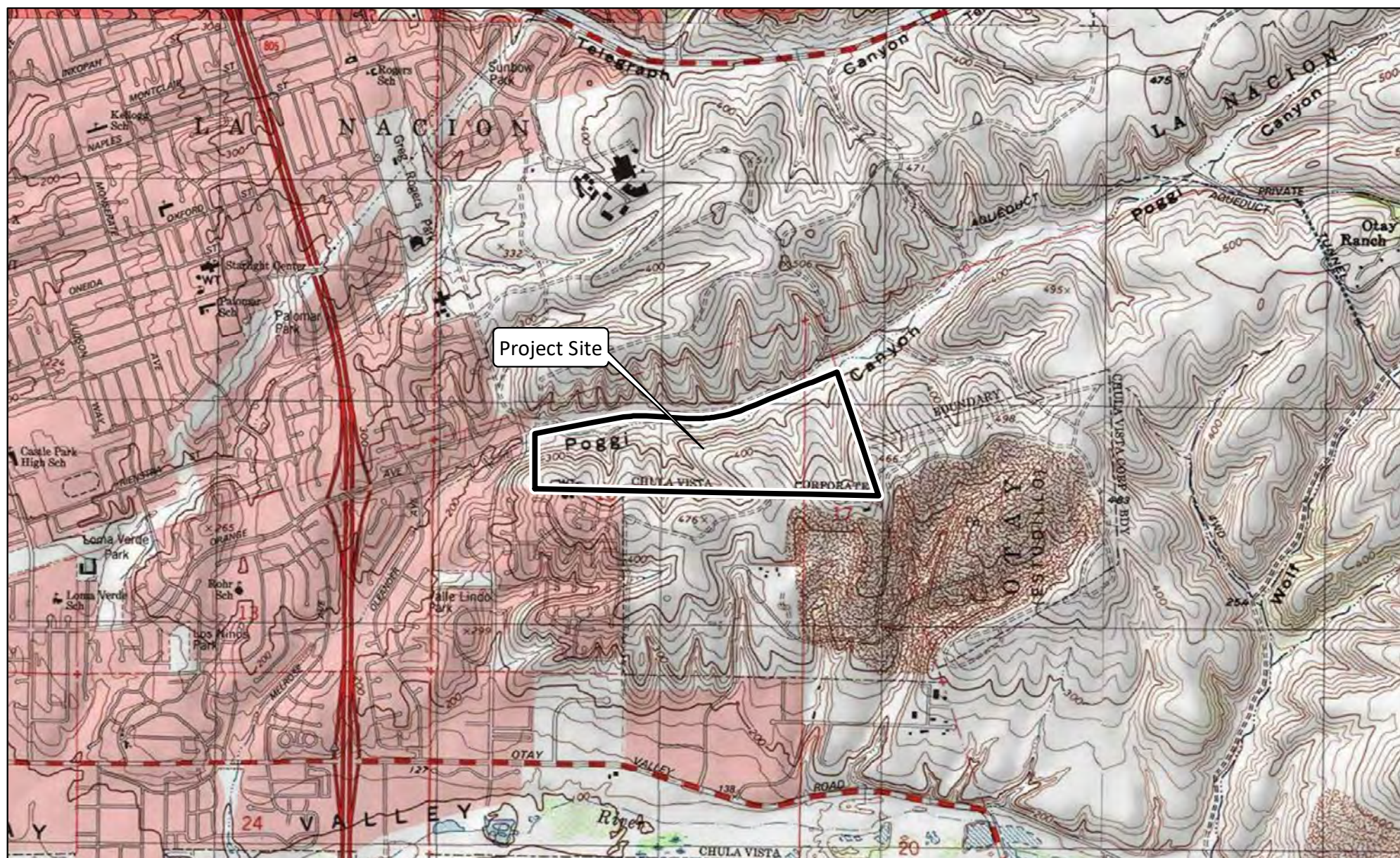
The focus of this plan is to identify the implementation, monitoring requirements, and performance standards for required compensatory mitigation as well as restoration goals that shall be used in evaluating the restoration effort. The mitigation standards and restoration goals provided within this report will follow federal, state, and local rules, guidelines, and regulations, including the California Environmental Quality Act (CEQA) and the Chula Vista Multiple Species Conservation Plan (MSCP) Subarea Plan (City of Chula Vista 2003).

LOCATION

The Sunbow II Phase 3 property (Assessor's Parcel Numbers 644-011-06-00 and 644-020-11-00) is located south of Olympic Parkway (previously East Orange Avenue) and east of Brandywine in the City of Chula Vista within San Diego County. Further, the project site is situated within Sections 17 and 18, Township 18 South, Range 1 West of the U.S. Geological Survey 7.5 minute Imperial Beach, California Quadrangle (Figure 1). The restoration area will occur near the northeast corner of the Sunbow II Phase 3 property (Figures 3 and 4).

GENERAL PHYSIOGRAPHY

The elevation of the Project area ranges from approximately 212 feet mean sea level (MSL) at the Poggi Creek channel storm drain outlet near the northwest corner of the site to a high elevation of 470 MSL located near the southeast corner of the site. The soils within the project study area are derived from Alluvium, Otay Formation, San Diego Formation, Sweetwater Formation and previously placed fill (Geocon 2019; Geologic Map). Soils are mapped as Diablo clay, 15 to 30



Project Vicinity Map

Sunbow II Phase 3 SPA Amendment

Source: USGS 7.5' Imperial Beach, CA Quadrangle

Figure 1

Vegetation Communities

- Coastal and Valley Freshwater Marsh
- Southern Willow Scrub
- Mule Fat Scrub
- Diegan Coastal Sage Scrub
- Native Grassland
- Non-native Grassland
- Non-native Vegetation
- Urban/Developed
- Waters of the State (RWQCB)/Streambed (CDFW)

Special Status Species (Numbers Provided Indicate Total Observed On-site for Each Species)

Special Status Flora

- Otay Tarplant (*Deinandra conjugens*) - 5,449
- Decumbent Goldenbush (*Isocoma menziesii* var. *decumbens*) - 803
- Orcutt's Bird's-beak (*Dicranostegia orcuttianus*) - 911
- Ashy Spike-moss (*Selaginella cinerascens*) - 2
- Coast Barrel Cactus (*Ferocactus viridescens*) - 2
- Palmer's Sagwort (*Artemisia palmeri*) - 44
- San Diego County Needlegrass (*Stipa diegoense*) - 10
- San Diego County Viguiera (*Bahiopsis laciniata*) - 7,647
- San Diego Bursage (*Ambrosia chenopodifolia*) - 24
- San Diego Marsh Elder (*Iva hayesiana*) - 816
- Small-flowered Bindweed (*Convolvulus simulans*) - 91
- Southwestern Spiny Rush (*Juncus acutus* ssp. *leopardii*) - 750

Special Status Fauna

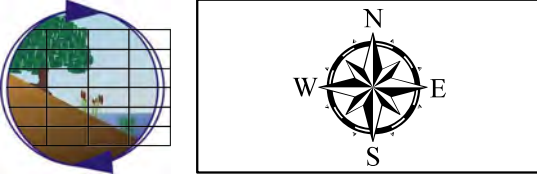
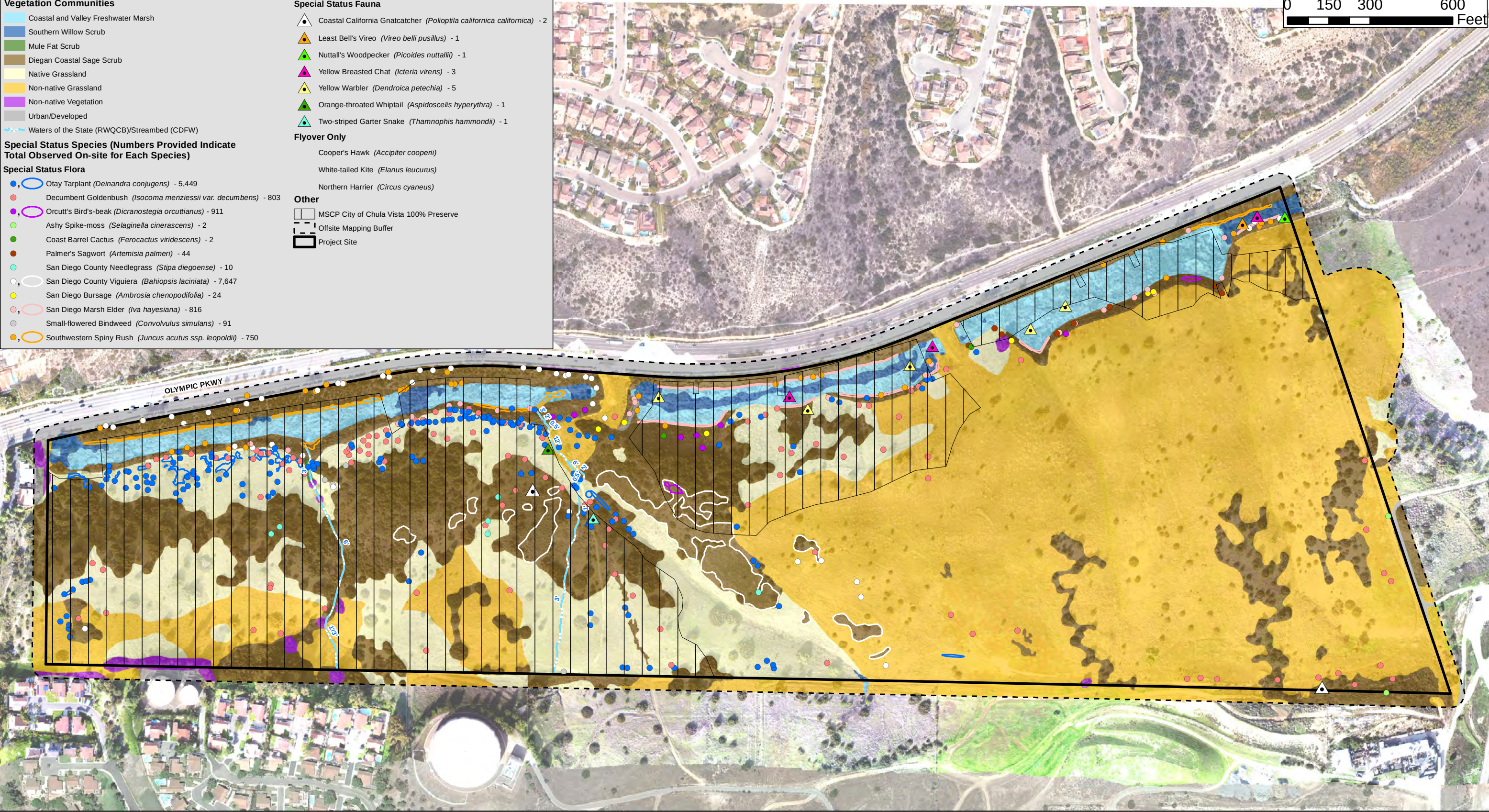
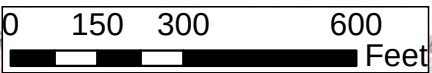
- Coastal California Gnatcatcher (*Poliopitila californica californica*) - 2
- Least Bell's Vireo (*Vireo belli pusillus*) - 1
- Nuttall's Woodpecker (*Picoides nuttallii*) - 1
- Yellow Breasted Chat (*Icteria virens*) - 3
- Yellow Warbler (*Dendroica petechia*) - 5
- Orange-throated Whiptail (*Aspidoscelis hyperythra*) - 1
- Two-striped Garter Snake (*Thamnophis hammondi*) - 1

Flyover Only

- Cooper's Hawk (*Accipiter cooperii*)
- White-tailed Kite (*Elanus leucurus*)
- Northern Harrier (*Circus cyaneus*)

Other

- MSCP City of Chula Vista 100% Preserve
- Offsite Mapping Buffer
- Project Site



Biological Resources Map
Sunbow II Phase 3 SPA Amendment

Aerial Source: Merkel & Associates Jan. 2020

Created on: January 19, 2021

Figure 2

percent slopes; Diablo clay, 30 to 50 percent slopes; Linne clay loam, 9 to 30 percent slopes; Olivenhain cobbly loam, 9 to 30 percent slopes; Salinas clay loam, 2 to 9 percent slopes; Olivenhain cobbly loam, 2 to 9 percent slopes on the mesa top; and terrace escarpments on the surrounding slopes (USDA 2002) (Figure 3). The regional climate is characterized by warm, dry summers and mild winters with most of the annual precipitation falling between December and March. Annual rainfall is approximately 9-13 inches (USDA-NRCS 2002).

Areas supporting Otay tarplant include mostly gentle, north-facing slopes with soils predominately mapped as Diablo Clay with a relatively small area of Linne Clay Loam near the southwest corner of the property. The area proposed for restoration occurs on a gentle north-facing slope with soils mapped as Diablo Clay (Figure 3).

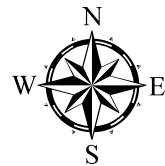
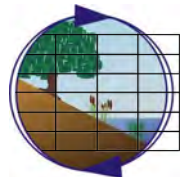
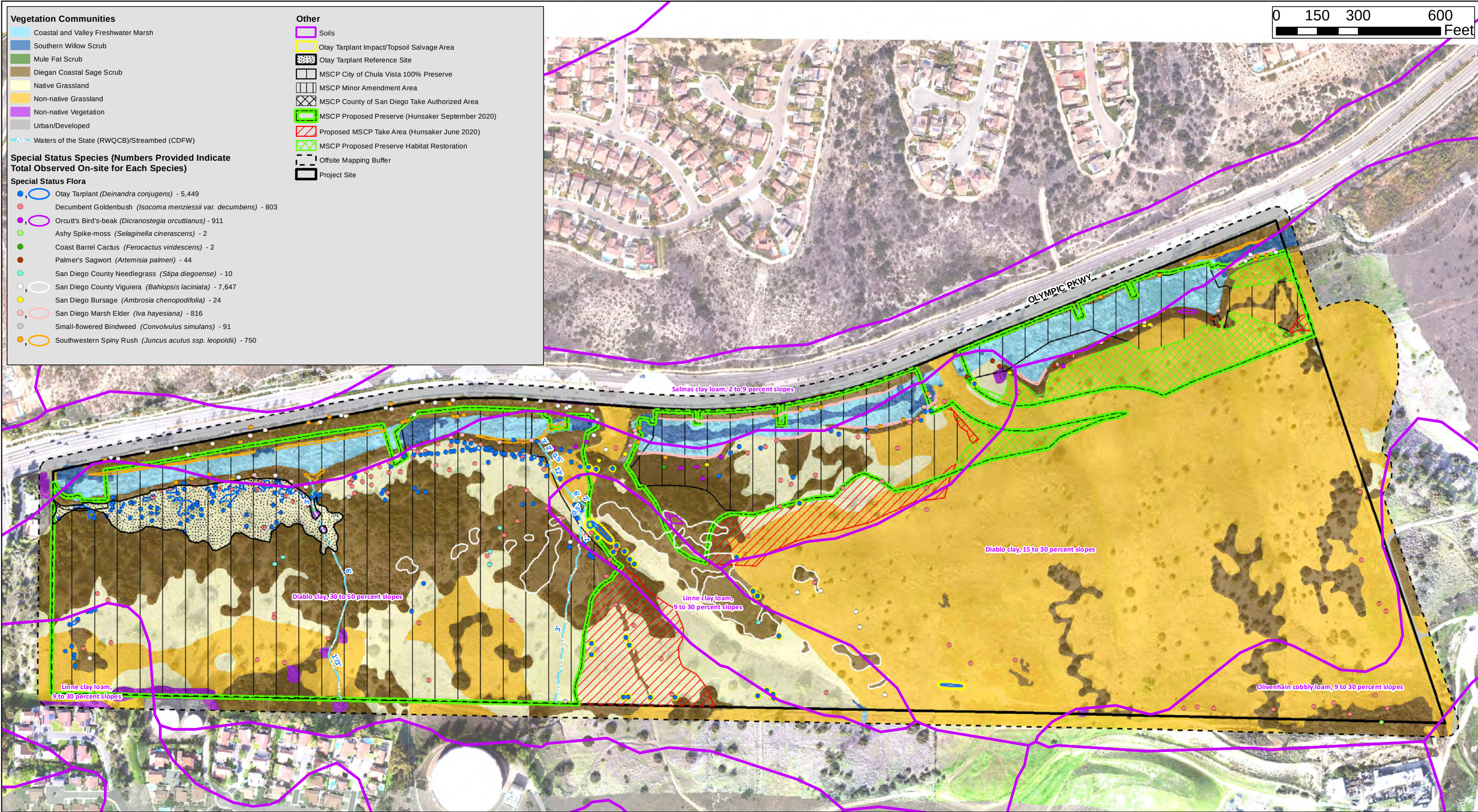
SITE SELECTION

Rationale for Selected Site

The restoration area has been discussed with the City of Chula Vista and the Resource Agencies. The location provides an opportunity to enhance habitat within the City preserve system and augment upland habitat along Poggi Canyon Creek. The restoration will occur within the proposed MSCP BLA designated area to be put into the preserve system “give” areas. The area occurs on a gentle north-facing slope on Diablo Clay soils which is similar to conditions of where a majority of the Otay tarplant populations are found to occur on-site within the existing preserve to the west of the enhancement areas within intact native grasslands. No Otay tarplant was observed in the proposed restoration area during focused surveys; however, populations of Otay tarplant and Orcutt’s bird’s-beak are found adjacent along with both Diegan Sage Scrub and native grasslands. As such, the selected site is expected to provide habitat contiguity and be similar in capacity to support targeted restoration. In addition, the proximity of the site to existing desirable habitat conditions and natural populations of targeted species in the restoration program increases the chances for success.

Site Conditions

The restoration area is currently dominated by non-native grassland comprised of invasive grass and forb species including purple false brome (*Brachypodium distachyon*), Italian rye grass (*Festuca perennis*), wild oat (*Avena* spp.), black mustard (*Brassica nigra*), and sweet fennel (*Foeniculum vulgare*). These plants, especially the grass species, form a dense thatch that precludes the germination and growth of Otay tarplant and other clay associates which have difficulty competing with the Eurasian grasses and weeds.

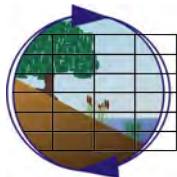
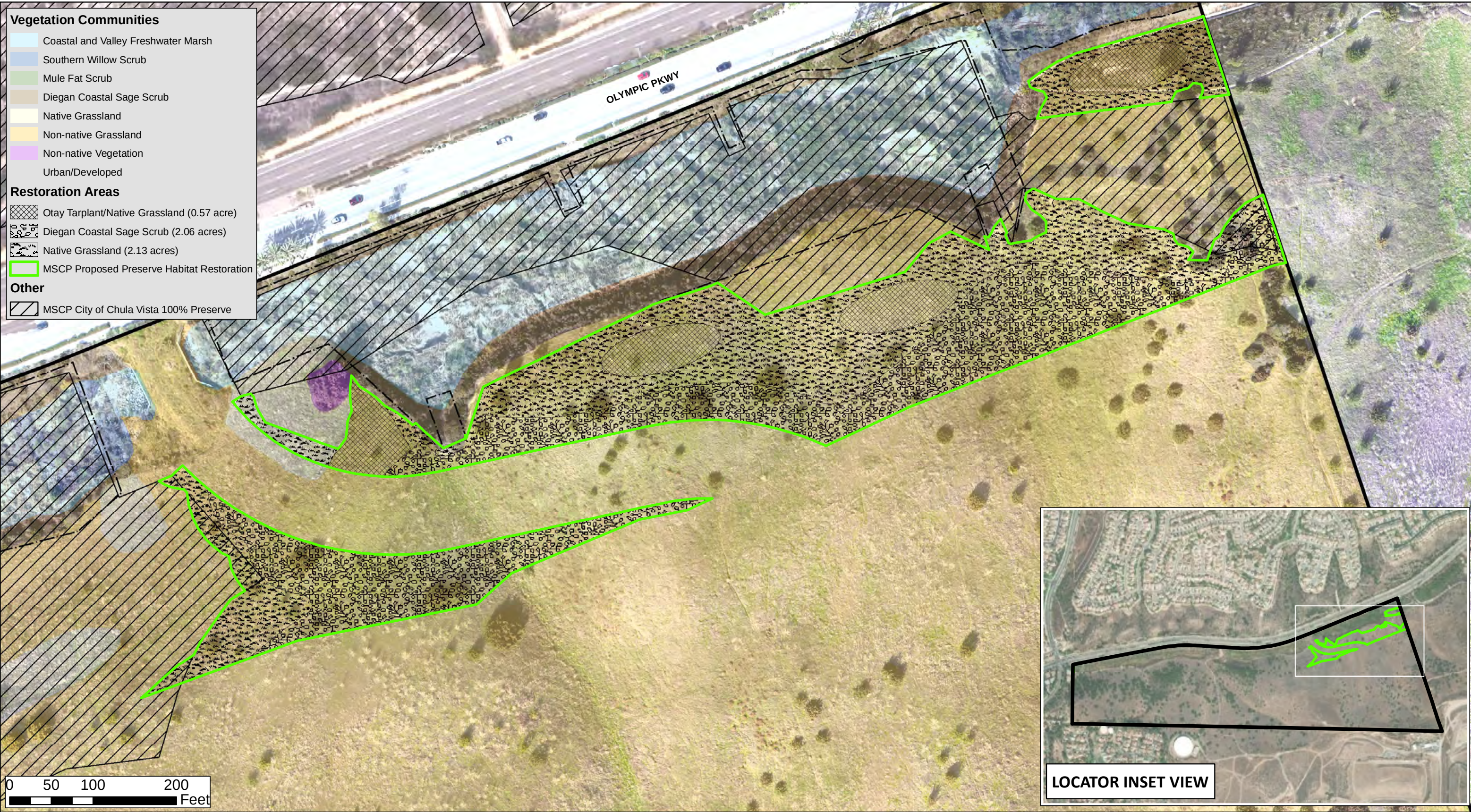


Habitat Restoration and Otay Tarplant Impact/Topsoil Salvage Areas
Sunbow II Phase 3 SPA Amendment

Aerial Source: Merkel & Associates Jan. 2020

Created on: January 19, 2021

Figure 3



Aerial Source: Merkel & Associates Jan. 2020

Habitat and Sensitive Species Restoration Areas
Sunbow II Phase 3 SPA Amendment

Created on: January 19, 2021

Figure 4

IMPLEMENTATION PLAN

SITE PREPARATION METHODS

Weed and Debris Removal

All soil surfaces within proposed restoration areas shall be free of debris and weed growth prior to top-soil application and planting. Most of the vegetation occurring in these areas is comprised of non-native annual forbs and grasses including black mustard (*Brassica nigra*), purple false brome (*Brachypodium distachyon*), and slender wild oat (*Avena barbata*). The 4-6 inches of soil will be scrapped with heavy machinery to remove the thatch and underlying non-native seed bank.

After clearing, the site may be treated with an herbicide to treat any remaining aggressive non-native perennial species such as sweet fennel (*Foeniculum vulgare*) and tree tobacco (*Nicotiana glauca*) that are not fully removed by the surface scraping. This would be done to prevent their re-emergence. All debris deemed unsuitable to remain on-site by the Project Biologist shall be removed and disposed of properly at a certified landfill. Debris may include introduced trash, rock, non-native tree leaf litter (e.g., eucalyptus trees) or any construction refuse associated with building activities that may conflict with the restoration effectiveness.

Seed Salvage

Seed from Otay tarplant will be collected from all proposed impact areas and sowed within restoration areas during the appropriate planting season. The seed will be collected when it is mature (i.e., summer) by hand and placed in breathable containers (i.e., burlap bags) and transferred to a native plant nursery for cleaning and storage until ready for sowing during the following planting season. Approximately 5 percent of the seed will be held at the nursery for bulking purposes where it can be propagated for one season for the purpose of seed amplification in the event that a seed source is needed for remedial planting or propagation. The bulked seed will be cleaned and prepared for sowing within the restoration areas during the fall of the second year. In the event the seed collected from impact sites is not productive, and seed propagated at the nursery is insufficient, a special seed collection from natural populations of Otay tarplant within the property's open space may be arranged, as determined by the Project Biologist.

Bentonitic Claystone Salvage

Various areas of the Project site feature inclusions of bentonitic claystone soil (Geocon 2019). Although this soil is not conducive for development given its expansive qualities, it is often associated with rare, clay endemic plants including Otay tarplant as well as the federally listed Threatened and state listed Endangered San Diego thorn-mint (*Acanthomintha ilicifolia*) which has historic occurrences on similar soils in the immediate area but which was extirpated in the Sunbow area approximately three decades ago. The transfer of this soil to the restoration area will benefit the growth of Otay tarplant as well as provide the opportunity for introduction of San Diego thorn-mint either through natural recruitment or sowing of seed from a yet to be determined approved seed translocation opportunity. Introduction of San Diego thorn-mint to the restoration area would assist the project in supporting the Project's one Conservation Recommendation stated in the USFWS Biological Opinion for the Sunbow II, Phase 3 project as stated below.

- #1 *The open space habitats proposed for Sunbow site are considered to be important for numerous species which are candidates or future candidates for federal listing. Many of*

these species currently carry state listing status and are a focus of multi-species planning efforts intended to reduce the need for future listings. Among the most important resources within the open space are coastal cactus wrens and Otay tarplant. Potential exists for the compatible enhancement of these resources along with the restoration of on-site sage scrub habitats. In addition, there is a good potential for restoration of San Diego thornmint to some of the open space clay lenses. The Service would look favorably on such multi-species enhancement efforts should the Corps or applicant incorporate consideration of these species into the on-site restoration and maintenance program.

While Conservation Recommendations are not obligatory, the potential areas for acting on this recommendation are very limited within the Chula Vista Subarea preserve system and the present restoration is ideally suited to support expansion of heavy clay habitat and narrow endemic management objectives.

A 6-10 inch layer of the salvaged bentonitic claystone will be applied and keyed in to create the final rough grade of the lower slopes of the restoration area. The soil transfer will occur prior to the mass grading of the site and is expected to require the use of heavy equipment which may include scrapers, dozers, loaders, and hauling trucks. A total of 850 cubic yards of bentonite clay are expected to be salvaged and transferred to the restoration area and placed in areas where Otay tarplant restoration is to be conducted (Figure 4). This claystone will be moderately compacted and then capped with a thin veneer of salvaged topsoil (approximately 2-4 inches) containing Otay tarplant seed as described below.

Topsoil Salvage

In areas where Otay tarplant will be impacted by the development project, the top 2 to 4 inches of topsoil will be salvaged prior to mass grading in these areas. The topsoil is expected to contain the seed of Otay tarplant as well as beneficial microbes, invertebrates, and mycorrhizal fungi. At the discretion of the Project Biologist, the native vegetation in these areas will be crushed and then mixed into the topsoil prior to salvage. Topsoil salvage is expected to occur prior to or during mass grading of the project. The salvage and application is expected to utilize similar equipment as described above for the bentonitic claystone translocation described above. In soil salvage areas that are excessively weedy as identified by the Project Biologist, all non-native biomass will be removed from the surface prior to salvaging the soil. This work will be conducted by hand using weed trimmers, rakes, and blowers. Whenever possible, the biomass removal will be conducted prior to non-native plant species setting seed.

Topsoil Application and Decompaction

All topsoil containing seed from Otay tarplant will be applied to the receptor locations following the application of the bentonitic claystone described above. The topsoil will be applied to match the contours of the surrounding grade. The soil shall be spread to a depth of 2 to 4 inches and then track walked to provide minimal compaction. Soils overly compacted will be gently ripped using a skip loader with an attached gannon box with rippers or by other comparable methods (e.g., plow or ripping fork drawn by tractor) that are approved by the Project Biologist.

PROPAGULE INTRODUCTION METHODS**Native Grassland****Container Plants**

Following site preparation container plants, including decumbent goldenbush, will be planted within the native grassland restoration area. The plant materials, container size, and unit count to be used in this restoration are shown in Table 1. The plant material distribution on the site is to be spotted by the Project Biologist and will be unevenly distributed to develop natural aggregations and clustering of species following naturally occurring habitat patterns.

Table 1. Native Grassland Restoration Container Plant Palette (1.71 acres)

Botanical Name	Common Name	Unit Size	Density (centers)	Percent Cover	Approximate Count
<i>Corethrogyne filaginifolia</i>	Sand Aster	1-gallon	3-foot	5.0	413
<i>Isocoma menziesii</i> var. <i>decumbens</i>	Decumbent Goldenbush	1-gallon	3-foot	2.0	165
<i>Stipa diegoensis</i>	San Diego Needlegrass	1-gallon	5-foot	20.0	596
<i>Stipa pulchra</i>	Purple Needlegrass	1-gallon	4-foot	50.0	2,327
Total					3,501

Hydroseeding

Following planting, the native grassland will be hydroseeded. The hydroseed mix, including decumbent goldenbush, is provided in Table 2).

Table 2. Native Grassland Restoration Seed Mix (1.71 acres)

Botanical Name	Common Name	Minimum Purity/ Germination	Pure Live Seed Percentage	Lbs./Acre	Total Lbs.
<i>Bloomeria crocea</i>	Common Golden Star	95/80	76.0	0.5	0.86
<i>Convolvulus simulans</i>	Small-flowered bindweed	NA	NA	0.5	0.86
<i>Corethrogyne filaginifolia</i>	Sand Aster	5/40	2.0	4.0	6.84
<i>Dichelostemma capitatum</i> ssp. <i>capitatum</i>	Blue Dicks	95/80	76.0	0.5	0.86
<i>Eriophyllum confertiflorum</i>	Golden Yarrow	30/50	15.0	2.0	3.42
<i>Eschscholzia californica</i>	California Poppy	98/75	73.5	2.0	3.42
<i>Grindelia camporum</i>	Rayless Gumplant	30/65	19.5	2.0	3.42

<i>Isocoma menziesii</i> var. <i>decumbens</i>	Decumbent Goldenbush	25/40	10.0	2.0	3.42
<i>Lasthenia coronaria</i>	Royal Goldfields	50/60	30.0	1.0	1.76
<i>Lupinus bicolor</i>	Miniature Lupine	98/85	83.3	2.0	3.42
<i>Melica imperfecta</i>	Coast Range Melic	90/60	54.0	1.0	1.76
<i>Sisyrinchium bellum</i>	Blue-eyed Grass	95/75	71.3	2.0	3.42
<i>Stipa diegoensis</i>	San Diego Needlegrass	70/60	42.0	1.0	1.76
<i>Stipa pulchra</i>	Purple Needlegrass	70/60	42.0	8.0	14.08
Total				28.50	49.30

A slurry comprised of 2,000 lbs./acre of fiber mulch and 160 lbs./acre of soil stabilizer (e.g., Super Tack) will be applied with the proposed seed mix. All seeding shall occur in the late fall or early winter months (i.e., November 1 through December 15) to take advantage of seasonal conditions. All seeding will occur following plant installation.

The above seed mix and container plant list were selected based upon existing species composition of native grassland habitat found on-site. Additional species known from the local region have also been included in the above mix to increase species diversity. All container plants/seed will be propagated/collected from plants within a five-mile radius of the work area to the extent practicable. It is preferred, when feasible, that seed be collected from on-site proposed development areas (prior to construction) as well as open space areas of the property. This is especially relevant for sensitive species with a limited local distribution including small-flowered bindweed (*Convolvulus simulans*) and San Diego County needlegrass (*Stipa diegoensis*). All seed/plants are expected to be contract collected/grown, and therefore sufficient lead time (e.g., 6-months) is required for obtaining the required materials. Seed used for dispersal and growing of container plants will be required to be collected when it becomes available during the late spring-early summer

The Otay tarplant collected from the site will be broadcast under the supervision of the Project Biologist into the smaller Otay tarplant restoration areas prior to application of the grassland hydroseed mix.

Diegan Coastal Sage Scrub

Container Plants

Following site preparation, the Diegan coastal sage scrub areas will be planted with the container plants, including decumbent goldenbush and San Diego County viguiera, identified in Table 3.

Table 3. Diegan Coastal Sage Scrub Container Plant Palette (3.13 acres)

Botanical Name	Common Name	Unit Size	Density (center)	Percent Cover	Approximate Count
<i>Artemisia californica</i>	Coastal Sagebrush	1-gallon	4-foot	25.0	2,130
<i>Bahiopsis laciniata</i>	San Diego Viguiera	1-gallon	4-foot	37.0	3,152
<i>Bergerocactus emoryi</i>	Velvet Cactus	1-gallon	4-foot	3.0	256
<i>Cylindropuntia prolifera</i>	Coast Cholla	1-gallon	4-foot	2.0	170
<i>Cylindropuntia californica</i> var. <i>californica</i>	Snake Cholla	1-gallon	4-foot	2.0	170
<i>Eriogonum fasciculatum</i> var. <i>fasciculatum</i>	Flat-top Buckwheat	1-gallon	4-foot	15.0	1,278
<i>Isocoma menziesii</i> var. <i>decumbens</i>	Decumbent Goldenbush	1-gallon	4-foot	4.0	341
<i>Isomeris arborea</i>	Bladderpod	1-gallon	4-foot	2.0	170
<i>Lycium brevipes</i> var. <i>brevipes</i>	Common Desert Thorn	1-gallon	6-foot	3.0	114
<i>Lycium californicum</i>	California Desert Thorn	1-gallon	6-foot	3.0	114
<i>Opuntia littoralis</i>	Prickly Pear	1-gallon	4-foot	5.0	426
<i>Rhus integrifolia</i>	Lemonadeberry	1-gallon	10-foot	5.0	68
<i>Simmondsia chinensis</i>	Jojoba	1-gallon	4-foot	5.0	426
<i>Yucca schidigera</i>	Mohave Yucca	1-gallon	4-foot	3.0	255
Total					9,070

Hydroseeding

The seed mix, including document goldenbush and San Diego County viguiera, will be applied to the Diegan coastal sage scrub areas is identified in Table 4.

Table 4. Diegan Coastal Sage Scrub Seed Mix (3.13 acres)

Botanical Name	Common Name	Minimum Purity/ Germination	Pure Live Seed Percentage	Lbs./Acre	Total Lbs.
<i>Acmispon glaber</i> var. <i>glaber</i>	Coastal Deerweed	95/80	76.0	3.0	9.39
<i>Bahiopsis laciniata</i>	San Diego Viguiera	50/60	30.0	1.0	3.13
<i>Dichelostemma capitatum</i> ssp. <i>capitatum</i>	Blue Dicks	95/80	76.0	0.5	1.57
<i>Eriophyllum confertiflorum</i>	Golden Yarrow	30/50	15.0	2.0	6.26
<i>Eschscholzia californica</i>	California Poppy	98/75	73.5	2.0	6.26
<i>Isocoma menziesii</i> var. <i>decumbens</i>	Decumbent Goldenbush	25/40	10.0	2.0	6.26
<i>Lasthenia coronaria</i>	Royal Goldfields	50/60	30.0	1.0	3.13
<i>Lupinus bicolor</i>	Miniature Lupine	98/85	83.3	2.0	6.26
<i>Stipa lepida</i>	Foothill Needlegrass	70/60	42.0	8.0	25.04
Total				21.5	67.30

In addition, Orcutt's bird's-beak seed will be collected from the site and will also be included in the seed mix. The above seed mix and container plant list were selected based upon existing species composition of Diegan coastal sage scrub found on-site. Additional species known from the local region have also been included in the above mix to increase species diversity. All container plants/seed will be propagated/collected from plants within a five-mile radius of the work area to the extent practicable. It is preferred, when feasible, that seed be collected from on-site proposed development areas (prior to construction) as well as open space areas of the property.

EROSION CONTROL

Standard erosion control BMP devices (i.e., straw wattles, silt fence) will be installed on finished slopes of the restoration area having a gradient that is greater than 4:1 to ensure soil stabilization and prevention of sediment transport. All devices will be properly trenched per standard installation guidelines for these products and will stay in place until vegetation has sufficiently established as determined by the Project Biologist. Erosions control BMP devices will be installed following site preparation and prior to planting.

FENCING/SIGNAGE

The restoration area is located in a relatively remote area of the property without easy access from the public. No fencing or signage is specified unless determined at a later date to be necessary due to trespass/vandalism.

INSTALLATION LETTER

A letter summarizing the as-built conditions of the site will be written by the Project Biologist following completion of the installation. The letter will be used to assist with the long-term monitoring and maintenance of the site and will include:

- a summary of the bentonitic claystone salvage and application;
- a summary of the Otay tarplant seed translocation effort including quantities of seed collected/cleaned, applied to the site, and retained for future use;
- a summary of the Orcutt's bird's-beak seed translocation effort including quantities of seed collected/cleaned, and applied to the site;
- a summary of species and quantities of each planted, including decumbent goldenbush and San Diego viguiera;
- a summary of the methods utilized to salvage and apply topsoil to the restoration site;
- a figure depicting locations of bentonitic claystone salvage, topsoil salvage, and final dimensions of the restoration site including native grassland and coastal sage scrub areas;
- a description of any problems or unexpected issues related to the work;
- identification of any variations from the described approach specified in this plan;
- photographs depicting the installation including fixed photo points of the restoration site to use as reference points for future reports.

IMPLEMENTATION SCHEDULE

Implementation of this plan shall occur concurrently with development of the Project. The specific year during which implementation will occur has not yet been identified and is dependent upon Project approvals and the development schedule. A proposed schedule based on biological considerations including specific seasonal timing requirements is provided in Table 5.

Table 5. Implementation Schedule

Task	Timing of Implementation
Otay Tarplant Baseline Survey	Completed Summer 2020
Field Delineation	Summer During Blooming Period
Collect Otay Tarplant and Orcutt's Bird's-beak Seed from Impact Areas	Summer First Year
Salvage and Transfer of Otay Tarplant Topsoil	Summer/Fall Following Seed Collection
Conduct Seed Bulking at Nursery	Winter of First Year
Conduct Site Preparation Work	Fall of First Year
Install Above Grade Irrigation System	Fall of First Year
Install Seed and Container Plants	Late Fall or Early Winter of First Year
Conduct Supplemental Seeding/Planting	Fall or Early Winter of Second Year

PLANT ESTABLISHMENT**Natural Precipitation/Irrigation**

Plant establishment will be mostly dependent upon natural precipitation. As such, the hydroseed application will occur during the late fall or early winter months to take advantage of seasonal conditions. If possible, the application will be timed to coincide with a rainstorm event that occurs after the slurry mulch is allowed to dry (typically 24 hours). As a contingency measure if rainfall is insufficient for seed germination and plant growth, a simple, above grade, overhead irrigation system will be constructed to be used to supplement natural rainfall. Use of this system is expected to occur as needed, on a monthly basis, under the direction of the Project Biologist. All above ground irrigation system components will be removed upon receiving final signoff.

Weeding

Native plant establishment requires diligent weed control. Weed control is especially important during the first two years when native plants are easily out-competed for soil nutrients and sunlight by quick growing non-native forbs and grasses. Typical quick growing weeds in restoration areas include Eurasian grasses such as ripgut (*Bromus diandrus*), red brome (*Bromus madritensis* ssp. *rubens*), and wild oat (*Avena barbata*). Common invasive forbs include black mustard (*Brassica nigra*), sweet fennel (*Foeniculum vulgare*), California burclover (*Medicago polymorpha*), and white sweetclover (*Melilotus albus*). Weeds should either be removed by hand or with the use of herbicide. Both methods require that maintenance workers are fully capable of identifying non-native seedlings from native seedlings. All weeding shall occur before weeds flower and set seed. At a minimum, weed removal will occur monthly during the winter and spring months (December-May) and will occur bimonthly during the summer and fall months (June-November).

Maintenance	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Weeding	X	X	X	X	X		X		X		X	X

GENERAL IMPLEMENTATION SPECIFICATION

RESPONSIBILITIES AND QUALIFICATIONS

Owner/Applicant

Lennar Homes will be financially responsible for all aspects of this plan and is the owner/applicant for the Sunbow II Phase 3 Amendment Project. Upon completion and final signoff of the restoration effort, the City of Chula Vista will take ownership and management of the area as part of the MSCP Preserve.

Revegetation Team

Implementation of this plan will require the use of qualified personnel including a Revegetation Contractor and a Project Biologist. Work may occur by either a single firm or two firms, as long as the following requirements are met.

Revegetation Contractor

The Revegetation Contractor shall have experience in native habitat restoration, having successfully completed a minimum of three similar native habitat restoration projects. The contractor shall be responsible for all site preparation, installation of plant materials, and any necessary maintenance activities or remedial actions required during the installation and establishment period. The contractor must be capable of distinguishing commonly encountered weeds (in all stages of development) from native species to minimize or avoid impacts to target individuals.

Project Biologist

The Project Biologist shall have the following qualifications:

1. Bachelor's degree in biology, botany, ecology or horticulture. A thorough understanding of regulations regarding native habitats (i.e., native grassland, coastal sage scrub) and federally listed species including Otay tarplant;
2. three years of local experience in identifying and sampling native vegetation including a familiarity with native grassland and coastal sage scrub flora, habitat restoration, and Otay tarplant biology;
3. two years of training and/or local experience in growing or working with the type of native plant species used in this project (either in a nursery setting or in the field);
4. expertise in native grassland and coastal sage scrub ecology and knowledge of these habitat's flora, fauna, climate, soil, topography, hydrology, vegetation and wildlife, and how these factors relate to the native habitat restoration efforts;
5. a thorough understanding of soil types in southern California that support native grassland, coastal sage scrub, and Otay tarplant.

The Project Biologist will be responsible for monitoring all aspects of the restoration effort. Once installed, the Project Biologist shall be responsible for monitoring the establishment of the site, and for preparing reports documenting the status of the project. The Project Biologist shall assist the owner with any decisions regarding the need for specific remedial actions during the monitoring period, as well as short-term maintenance activities.

MAINTENANCE PROGRAM

The maintenance and monitoring program will continue for a period of 5 years following implementation or until the project is given final approval by the Resource Agencies and the City. The Revegetation Contractor will visit the site a minimum of six times a year (at one to two month intervals, depending on the need) during the first four years and a minimum of three times during year five. During each site visit, the Revegetation Contractor will remain at the site a sufficient amount of time to complete the responsibilities specified in this section.

WEED CONTROL

As mentioned previously, weed removal will require constant diligence by the Revegetation Contractor. Weeding is especially important for the first two years when native plants are most susceptible to competition from non-native species. Hand pulling and herbicide application shall be used to control non-native species. All herbicide shall be applied by a firm with a state of California Pesticide Applicators License. All herbicide application shall be carefully applied to avoid impacts to target species, especially Otay tarplant. All highly invasive exotic weed species noted on List A and List B of the California Exotic Pest Plant Council (CALEPPC) list of Exotic Pest Plants of Greatest Ecological Concern in California, shall be removed from the restoration area. Weeding shall focus on limiting the build up of thatch that would preclude the establishment of Otay tarplant.

SUPPLEMENTAL WATERING

All restoration is expected to be dependent upon natural precipitation; however, a temporary irrigation system will be installed to ensure establishment if rainfall is low during the winter and spring months. All supplemental watering will be discontinued no later than the third year to ensure that all target species become naturalized to the site.

TRASH AND DEBRIS

All restoration areas shall remain trash and debris free throughout the 5-year maintenance and monitoring period. All trash and debris shall be either recycled or disposed of at a certified landfill.

MONITORING AND SUCCESS ASSESSMENT

MONITORING AND REPORTING

The primary goal of the restoration effort will be to restore native habitats favoring narrow endemic clay associate plant species including Otay tarplant, and to meet mitigation standards for Orcutt's bird's-beak, decumbent goldenbush, and San Diego County viguiera. The mitigation elements of the plan call for establishment of at least 91 Orcutt's bird's-beak, 289 decumbent goldenbush, and 2,979 San Diego County viguiera (half the quantity of plants impacted by the Project). The Orcutt's bird's-beak and San Diego County viguiera will be planted in Diegan coastal sage scrub. The decumbent goldenbush will be planted in both native grassland and coastal sage scrub areas. Otay tarplant is to be planted in native grassland.

Monitoring will begin with the commencement of planned restoration activities and continue through the end of the 5-year maintenance and monitoring period.

Reference Site Monitoring

A reference site will be established within property's open space preserve from which data will be obtained and compared with identical information obtained from the restoration site in order to determine project success. Given that Otay tarplant is an annual species and populations are expected to naturally fluctuate from year to year depending upon climatic conditions, it will be assumed that the reference site will provide a baseline from which to compare important variables such as abundance, growth, flower production, pollinator presence, and habitat species composition.

The selected reference site occurs within relatively high-quality native grassland habitat located near the northwest corner of the property (Figure 2). This area supports the greatest number of Otay tarplant documented for the property and is considered to be similar in physical and chemical characteristics to that of the proposed site (i.e., gentle north-facing slope underlain by clay soils). Specific sampling areas comparable to the size of the treatment areas will be established within the reference site. Multiple sampling areas within both the restoration and reference sites shall be established to capture site variability so that sampling areas are representative of both sites.

Qualitative Monitoring

Qualitative monitoring will occur to document overall site health and provide information relative to:

- Plant Phenology – Annual species (Otay tarplant, Orcutt's bird's-beak) life cycle including germination, flowering, and seed. Information will be used to schedule the most appropriate dates to conduct quantitative assessments.
- Presence of pollinators – information will be gathered to determine presence and diversity of pollinator species present.
- Species Diversity – Plant species composition will be recorded to document diversity and natural recruitment.

- Rainfall – Rainfall records will be obtained on a monthly basis from the nearest reliable weather station. Rainfall amounts will be compared with data relative to annual plant germination and flowering.
- Thatch Build Up – thatch build up will be assessed during the summer/fall to ensure timely removal occurs to avoid suppression of native plant germination.
- Erosion Control – site erosion will be assessed to determine effective use of BMPs or provide recommendations for alternative measures.
- Presence of Site Debris/Trash – Any trash found on-site will be recommended for removal and proper disposal.
- Irrigation Operation – Inspection of the irrigation system will occur during each qualitative site assessment to ensure proper functioning.

In addition, qualitative monitoring will include supervision of all installation and subsequent maintenance work to ensure that the project is being implemented properly to achieve prescribed goals. This includes providing recommendations for remedial measures to ensure project success. Duties of the Project Biologist shall include the following:

1. Verification of project boundaries to ensure that all existing native vegetation areas are protected during the installation process and properly buffered during any herbicide application programs;
2. Review and approval of all site preparation work including soil decompaction activities;
3. Review of re-vegetation contractors order for all plant material;
4. Site approvals of all plant material;
5. Final site review at the completion of installation;
6. Preparation of the final installation and plant establishment check-off lists;
7. Final approvals of installation, plant establishment, and maintenance and long-term remedial recommendations to ensure project success.

Quantitative Monitoring

Quantitative monitoring will occur on an annual basis to determine if performance standards are being met or if any remedial measures are required to meet these standards. Monitoring methods will be consistent throughout the 5-year maintenance and monitoring period to ensure reliability and comparison of data from year to year.

Otay Tarplant

Quantitative monitoring will occur at the peak flowering period of Otay tarplant as determined from qualitative monitoring visits. Population counts will be obtained from the restoration area and the designated reference site located near the northwest corner of the property. GPS equipment will be used to record data points and polygons of Otay tarplant populations. Populations will be determined based on groupings of individuals as defined as being within a distance of 4 meters of each other. Otay tarplant populations containing less than 100 plants will be individually counted

while populations of greater than 100 individuals will be estimated to the nearest 10. Total acreage of occupied area at the restoration site will be calculated from mapped population boundaries.

Four twenty-five meter transects will be established (staked) at both the reference site and the restoration site. A one-meter square quadrat will be used to estimate cover at each meter along the transects. The placement of the quadrat will alternate to each side of the tape with each meter intercept. Percent total vegetative cover, percent cover by species, and percent cover of bare ground/dead will be estimated at each intercept. Percent cover will be estimated in 5% increments above 5% cover, and 1% increments below 5% cover. In addition to measuring cover, the quantity of Otay tarplant individuals including the number of flowering plants occurring within each quadrat will be recorded and totaled for the transect.

Each year, Otay tarplant data recorded for the restoration site shall be compared with data obtained from the reference site. The average annual percent change from year-to-year in total quantity of plants and percent cover of flowering individuals at the restoration site shall be compared to the sampled reference area.

Orcutt's Bird's-beak

Quantitative monitoring will occur at the peak flowering period of Orcutt's bird's-beak as determined from qualitative monitoring visits. Population counts will be conducted only at the restoration site. Mitigation will be considered successful if a minimum of 91 Orcutt's bird's-beak are counted within the restoration site during 3 of the 5 years of the maintenance and monitoring period.

Decumbent Goldenbush and San Diego County Viguiera

Population counts of decumbent goldenbush and San Diego County viguiera will be conducted only at the restoration site. Mitigation will be considered successful if a minimum of 289 decumbent goldenbush and 2,979 San Diego County viguiera (half the quantity of plants impacted by the Project) are established at the restoration site at the end of the 5-year maintenance and monitoring period.

Photographic Documentation

The Project Biologist shall further document the restoration effort utilizing photographic monitoring. Photo points will be established at strategic locations that best depict the restoration effort. Photographs will be taken each year from these photo points and provided in the annual reports. Additional photographs shall be taken of the following activities:

1. Pre-existing conditions prior to any restoration actions occurring;
2. Installation of erosion control devices;
3. Post-installation of erosion control devices;
4. Hydroseed application;
5. Maintenance and monitoring of the restoration site;
6. Installation of signs and markers;
7. Installation of herbivore control devices;
8. Spring and summer growing activities;
9. Start and end points of the permanent transects (annually); and
10. Any other activities deemed to be significant with the restoration effort.

Monitoring Schedule

Following installation, monitoring will occur per the following schedule:

Monitoring Type	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Qualitative	X		X	X	X	X	X					X
Quantitative							*X					

* May vary depending on results of qualitative monitoring.

SUCCESS CRITERIA

Otay Tarplant

The goal of the restoration effort for Otay tarplant will be to enhance the proposed native grassland restoration areas. The restoration targets expansion of the population with up to 836 Otay tarplant individuals within 0.34 acre of clay enriched native grassland habitat. The proposed Otay tarplant enhancement within the grassland restoration area is a goal of the restoration plan and not a project compensatory mitigation standard. Therefore, there is no requirement to meet the restoration goal in order to achieve the 5-year sign off. Given that this species is an annual plant and populations fluctuate due to climatic conditions, a reference site with recorded baseline information will be used to compare with the restoration site to determine project success. The following formula will be used to calculate minimum quantities of Otay tarplant for reaching the goal:

$$R_n(I/R_1) = X$$

I = Net loss of Otay tarplant from Project

R_1 = Baseline population count at reference site

R_n = Population count at reference site in monitoring year n

X = Annual minimum goal for Otay tarplant population count at restoration site

The same formula will be used to determine the minimum goal for number of flowering plants. The goal for Otay tarplant will be considered accomplished if the project minimum number of plants and flowering individuals is achieved within the final 3 years of the 5-year monitoring program.

Although the goal may be accomplished early, the full five years of maintenance and monitoring described above will be conducted. If the restoration site count is less than that year's calculation, then the criteria will be concluded to not have been met for that maintenance and monitoring year and recommendations will be made to assist with meeting the goals the following year.

Habitat Area Goal

An additional goal of the project restoration effort will be to establish 1.71 acres of native grassland and 3.13 acres of Diegan coastal sage scrub as shown on Figure 4.

Habitat Coverage Goal

In addition, percent cover of native species for each restored habitat shall have the goal of meeting the following cover criteria:

Table 6. Performance Goals for Vegetative Cover

	Year 1 Implementation	Year 2	Year 3	Year 4	Year 5
% Cover of Native Grassland Species	----	30%	40%	50%	60%
% Cover Diegan Sage Scrub Species	----	30%	50%	60%	70%

Percentage coverage goals for native grassland are relative to the native species composition within the reference site. Percentage coverage goals for Diegan Coastal Sage Scrub are based on direct recorded coverage. If the site fails to meet the annual project success goal, the contractor will implement remedial measures to ensure the restoration sites meet or exceed the project success standards the following year.

In addition, no highly invasive exotic weed species listed by the California Exotic Pest Plant Council (CALEPPC) will be allowed to occur within the restoration at anytime throughout the 5-year maintenance and monitoring period.

Project Mitigation Standards

The following standards are provided to comply with MM-BIO- 1 of the project's EIR and serve to mitigate for impacts to Orcutt's bird's beak, decumbent goldenbush, and San Diego County viguiera. Unlike the Otay tarplant and habitat restoration goals discussed above, the following standards are provided for the purpose of mitigation.

Orcutt's Bird's-beak

As mentioned previously, mitigation will be considered successful if a minimum of 91 Orcutt's bird's-beak are counted within the restoration site during 3 of the 5 years of the maintenance and monitoring period.

Decumbent Goldenbush and San Diego County Viguiera

As mentioned previously, mitigation will be considered successful if a minimum of 289 decumbent goldenbush and 2,979 San Diego County viguiera (half the quantity of plants impacted by the Project) are established at the restoration site at the end of the 5-year maintenance and monitoring period.

If the site fails to meet project success standards, the Revegetation Contractor at the direction of the Project Biologist will implement remedial measures each year to ensure the restoration site will meet or exceed the project success standards the following year.

Annual Project Progress Reports

Throughout the maintenance and monitoring period, the Project Biologist will submit a monitoring report by December 1st each year to Lennar Homes for submittal to the City of Chula Vista, U.S. Fish & Wildlife Service, and California Department of Fish and Wildlife. This annual report will review project progress to date based on identified success standards. The results of the annual report would include information gathered from both the qualitative and botanical monitoring surveys. When appropriate, remedial measures will be recommended for implementation during the following year. A discussion of the statistical methodology (including confidence intervals) and the results shall also be included in the annual reports.

Remedial and Contingency Measures

The Biological Monitor will provide recommendations for remedial measures if success standards are not met. These measures may include re-seeding of areas, additional watering, additional weed control, plant palette substitutions, and additional soil decompaction. These measures will be discussed in the annual report for review by Lennar Homes.

If the restoration site is failing to meet the project success standards, the maintenance and monitoring period with the continuance of remedial measures shall be extended. In the event the Project Biologist is of the opinion that the mitigation will not reach success, alternative mitigation shall be identified in consultation with Lennar Homes, City of Chula Vista, USFWS, and CDFW. These recommendations would be provided in annual reports prepared by the Project Biologist in consultation with Lennar Homes.

Long-term Management

Following final signoff from the City and each of the resource agencies, the City will take management responsibility as anticipated by the City's Central City Area Specific Management Plan. The long-term management funding source for this area is CFD 98-3.

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