



1720 Midvale Drive  
San Diego, CA, 92105  
Phone: 619.972.7932  
Phone: 619.972.8714  
[www.blackhawkenv.com](http://www.blackhawkenv.com)

---

# **ALVARADO CREEK AFFORDABLE HOUSING PROJECT HABITAT MITIGATION AND MONITORING PLAN**

**CITY OF SAN DIEGO, SAN DIEGO COUNTY, CALIFORNIA**

***Prepared for:***

Ascent Environmental, Inc.  
1230 Columbia Street, Suite 440  
San Diego, CA 92101  
Contact: Eric Ruby  
Telephone: 619.219.800  
E-mail: [Eric.Ruby@AscentEnvironmental.com](mailto:Eric.Ruby@AscentEnvironmental.com)

***Prepared by:***

Blackhawk Environmental, Inc.  
1720 Midvale Drive  
San Diego, CA 92105  
Contact: Ryan Quilley  
Telephone: 610.804.8916  
E-mail: [ryanq@blackhawkenv.com](mailto:ryanq@blackhawkenv.com)

**February 1, 2021**  
Revised June 2, 2022

## **TABLE OF CONTENTS**

<b>1.0</b>	<b>INTRODUCTION</b>	<b>4</b>
<b>2.0</b>	<b>EXISTING CONDITIONS</b>	<b>5</b>
2.1	Environmental Setting of Impacted Areas	5
2.2	Environmental Setting and Mitigation Site Characteristics	8
2.3	Regulatory Requirements	11
<b>3.0</b>	<b>MITIGATION ROLES AND RESPONSIBILITIES</b>	<b>15</b>
3.1	Financially Responsible Party	15
3.2	Project Restoration Team	15
3.2.1	Project Applicant	15
3.2.2	Project Restoration Specialist	15
3.2.3	Restoration Installation Contractor	16
3.2.4	Restoration Maintenance Contractor	16
<b>4.0</b>	<b>MITIGATION SITE PREPARATION</b>	<b>17</b>
4.1	Mitigation Site and Resource Protection	17
4.2	Erosion Control	17
4.3	Weed Eradication	17
4.4	Topsoil/Plant Salvage	20
4.5	Clearing, Grubbing, Grading, Recontouring and Decompacting	20
<b>5.0</b>	<b>IRRIGATION</b>	<b>22</b>
<b>6.0</b>	<b>PLANT INSTALLATION SPECIFICATIONS</b>	<b>23</b>
6.1	Container Plants	24
6.2	Cuttings	25
6.3	Seeding	25
6.4	Planting Design, Methodology and Timing	26
6.4.1	Planting Design	27
6.4.2	Planting Methodology and Timing	28
6.4.2.1	Container Plants	28
6.4.2.2	Seeding	29
6.4.2.3	Cuttings	30
<b>7.0</b>	<b>MAINTENANCE PROGRAM AND SCHEDULE</b>	<b>31</b>
7.1	120-Day Plant Establishment Period (PEP)	31
7.2	Schedule of Activities	31
7.3	Weed Control	31
7.4	Horticultural Treatments	35
7.5	Trash and Debris Removal	36
7.6	Replanting and Reseeding	36
7.7	Mitigation Site Protection, Signage and Vandalism	36
7.8	Irrigation Maintenance	36

<b>8.0</b>	<b>FIVE-YEAR MAINTENANCE PERIOD</b>	<b>37</b>
8.1	Monitoring and Reporting Schedule	37
8.1.1	Quantitative Monitoring	37
8.1.2	Qualitative Monitoring	37
<b>9.0</b>	<b>MONITORING METHODS</b>	<b>38</b>
9.1	Qualitative Methods	38
9.2	Quantitative Methods	39
9.2.1	Point-Intercept Transects	39
9.2.2	Cuttings and Container Plant Survival Counts	40
9.2.3	Photographic Documentation	40
<b>10.0</b>	<b>MONITORING AND PERFORMANCE STANDARDS</b>	<b>41</b>
<b>11.0</b>	<b>REPORTING PROGRAM</b>	<b>46</b>
11.1	Maintenance Monitoring Memoranda	46
11.2	Annual Reporting	46
<b>12.0</b>	<b>COMPLETION OF MITIGATION</b>	<b>47</b>
12.1	Notification of Completion	47
12.2	Agency Confirmation	47
12.3	Long-Term Management	47
12.3.1	Non-Native and Invasive Species Control	48
12.3.2	Access	48
12.3.3	Trash Removal	48
12.3.4	Unforeseen Environmental Impacts	49
<b>13.0</b>	<b>CONTINGENCY MEASURES AND ADAPTIVE MANAGEMENT</b>	<b>50</b>
13.1	Initiating Procedures	50
13.2	Funding Mechanism	50
<b>14.0</b>	<b>REFERENCES</b>	<b>51</b>

## 1.0 INTRODUCTION

The Habitat Mitigation and Monitoring Plan (Plan) herein provides direction for implementing a program to restore, create and enhance native habitats to offset temporary and/or permanent impacts to native habitat as a result the Alvarado Creek Affordable Housing Project (Project). The Project proposes 227, 100-percent, affordable residential rental apartment units in one 5-story type III-A building, over one level of type I-A above ground podium structure within the 3.86-acre Project. The 227 residential units include 54 studios, 53 one-bedroom units, 60 two-bedroom units and 60 three-bedroom units. Common area amenities include a pool area and access to the proposed Alvarado Creek trail.

A community trail is proposed to be constructed along the onsite portion of Alvarado Creek within the proposed development. An existing sewer line and easement is proposed to be relocated southerly across Alvarado Creek to an existing point of connection near the Grantville Trolley Station.

In order to ensure that the 100-year floodplain water surface elevation does not increase due to the proposed Project, Alvarado Creek is proposed for widening to increase the capacity of the channel. Widening of the channel will entail excavation of a new channel bank on the non-development side of Alvarado Creek (south). The margin between the new channel slope and existing channel will be excavated to increase the overall capacity of the channel. To offset proposed impacts to City designated sensitive areas, the new channel slope is proposed for habitat creation to provide onsite mitigation. Although no modifications to the northern channel slope are proposed as part of the Project, adjacent developed concrete pads would be removed and allowed to revegetate with native habitat following construction, providing additional habitat buffer and opportunity for natural wetland recruitment.

Development of the Project will result in direct impacts to a total of 0.283 acre (i.e., 0.213 acre of temporary impacts and 0.070 acre of permanent impacts) to City wetland/ESL habitats including the following wetland habitat types: Arundo-dominated wetland (0.060 acre temporary and 0.047 acre permanent impacts), disturbed wetland/unvegetated channel (0.002 acre temporary and 0.008 acre permanent impacts), Non-native riparian (0.137 acre temporary and 0.015 acre permanent impacts) and Southern Riparian Woodland (0.014 acre temporary and no permanent impacts).

These areas met City or San Diego (City) Biology Guidelines criteria as wetlands and are considered Environmentally Sensitive Lands (ESL) protected under City of San Diego Environmentally Sensitive Lands Ordinance. Additionally, impacts to wetland vegetation requires mitigation for impacts to the United States Army Corps of Engineers (USACE) jurisdictional waters under Section 404 of the federal Clean Water Act, Regional Water Quality Control Board (RWQCB) jurisdictional waters under Section 401 of the Porter Cologne Water Quality Control Act and California Department of Fish and Wildlife (CDFW) riparian habitat under Section 1602 of the California Fish and Wildlife Code.

This Plan includes (1) the Project purpose, restoration, habitat creation and enhancement goals and objectives, (2) A detailed description of the existing conditions, environmental setting, revegetation site characteristics, hydrology and regulatory requirements of the Alvarado Creek Affordable Housing

Project Mitigation Site (Mitigation Site), (3) roles and responsibilities of relevant parties involved in the Project, (4) a plan to create, restore or otherwise enhance 0.599 acre (Mitigation Site) of wetland habitat types of similar or increased function to those proposed for impacts. Restoration activities are expected to generate 0.599 acre of onsite mitigation credit in excess of a 2:1 ratio in order to offset impacts from development of the Project, in accordance with regulatory requirements, in order to achieve no net loss of wetland function as a result of Project impacts, (5) guidance on initial Mitigation Site installation including Mitigation Site preparation, irrigation, plant installation, and (6) the 5-year maintenance and monitoring program.

The goal of the proposed Mitigation Site is to establish 0.416 acres of southern riparian scrub and 0.183 acres of southern riparian scrub – transition habitat within the five-year monitoring period, that will eventually mature into a mixture of southern riparian forest and southern riparian scrub. The mitigation aims to create, restore and enhance the existing habitat onsite, currently comprised mostly of non-native riparian, Arundo-dominated, and disturbed lands that will be impacted by the Project. The restoration design will involve initial grading of the Mitigation Site to expand the existing floodplain in order to establish conditions suitable for self-sustaining southern riparian scrub and southern riparian forest habitats.

This Plan includes maintenance and monitoring recommendations and associated performance standards in order to provide quantitative and qualitative data that will aid in assessing the success of the restoration effort. This Plan has been developed in conjunction with findings of the Alvarado Creek Affordable Housing Biological Survey Report and has been designed to be consistent with the City of San Diego's ESL Regulations and San Diego Land Development Manual – Biological Guidelines, 2018. It is anticipated that this Restoration Plan will also fulfill requirements under 1600, 401, 404 permits which are anticipated as a requirement for Project implementation.

## **2.0 EXISTING CONDITIONS**

### **2.1 Environmental Setting of Impacted Areas**

The proposed Alvarado Creek Affordable Housing Project is located on 3.86-acres southeast of Mission Gorge Road, south of Mission Gorge Place, and north of Interstate 8 (I-8) and the Grantville Trolley station (Figure 1). The Project is located within the following Assessor Parcel Numbers (APNs): 416-320-06, 461-320-08 and 461-320-09. Alvarado Creek bisects portions of the 3.86-acre Project development and includes jurisdictional wetland and non-wetland areas. A formal jurisdictional delineation effort was conducted, and results of this effort are included in the *Alvarado Creek Affordable Housing Project Jurisdictional Delineation Report* (Blackhawk 2021). As a component of the affordable housing project development, onsite mitigation for impacts to ESL habitat was determined to be necessary, and subsequent restoration, enhancement and habitat creation will be implemented concurrently with development and following grading activities.

Existing onsite and surrounding land uses include a variety of industrial and commercial businesses, with Alvarado Creek bisecting the Project. The Project is located on three previously developed

parcels. Parcels north of Alvarado Creek are actively used for light industrial use and commercial uses such as auto repairs and sales, metal fabrication, convenience stores, etc. The area surrounding the Project to the north and east includes similar commercial and industrial land uses, characterized by single and multi-story buildings with paved hardscaped surfaces and landscaping.

The Project parcel south of Alvarado Creek includes previously graded areas with relic outbuildings that have been idle and are in disrepair. Existing land uses appear to include illegal dumping, fill material storage, and homeless encampments. Areas surrounding the Project to the south include commercial space, business centers, and transit hubs, including the Grantville Trolley Station.

Due to the heavily developed nature of the surrounding areas, the Project is isolated from surrounding MHPA Reserve areas, which include portions of the San Diego River approximately 0.35 miles to the west and northwest, and canyons along Interstate-8 approximately 0.36 miles to the south. Portions of Alvarado Creek within the Project show signs of vegetation management, including removal of giant reed (*Arundo donax*) and Mexican fan palm (*Washingtonia robusta*).

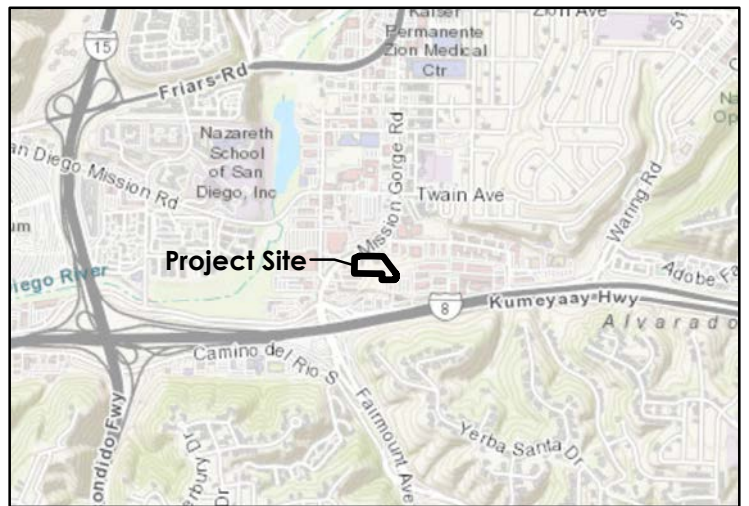
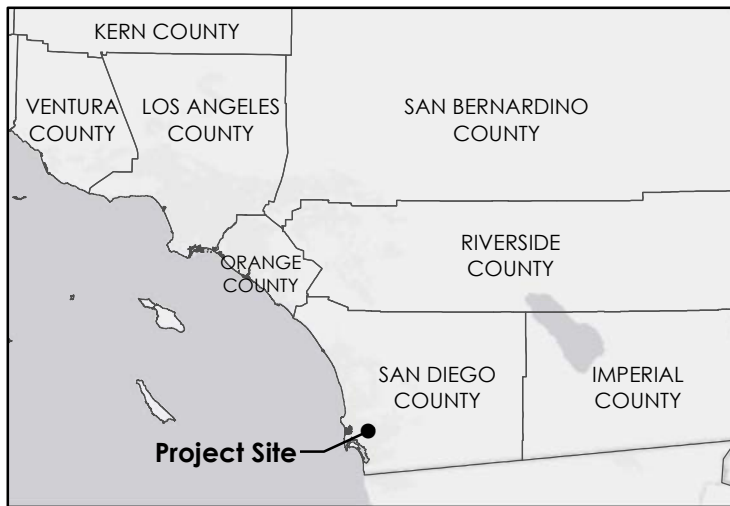
Existing native vegetation within the Mitigation Site provides guidance on suitable species to be included in revegetation efforts. Though, currently the Mitigation Site is largely disturbed and dominated by non-native species, the presence of natives such as California sycamore (*Platanus racemosa*), Fremont cottonwood (*Populus fremontii*), Gooding's black willow (*Salix gooddingii*), sandbar willow (*Salix exigua*) and coast live oak (*Quercus agrifolia*) among others, provides evidence that these species would proliferate if used during revegetation efforts. In addition, higher quality riparian habitats exist within downstream portions of the creek, which host a higher density of the aforementioned species varying from 60 to over 100 percent absolute cover. Multiple strata are also characteristic of these native communities and include a diversity of low-growing annuals and herbs, shrubs and larger trees. An evaluation of native species composition in nearby riparian habitats (San Diego River in the vicinity of Fairmont Ave. and North Camino Del Rio), in addition to an evaluation of native species naturally occurring within the Mitigation Site was utilized to inform all elements of the revegetation design, distribution and diversity. The Mitigation Site success criteria, specifically absolute cover and relative cover of wetland native species were developed from observations of mature native riparian habitat along the San Diego River. These areas were referenced for site design and species to be included in the plant palette; success criteria provided herein reflect anticipated canopy development and natural recruitment during the 5-year monitoring period.

Based on findings of the *Alvarado Creek Affordable Housing Project Biological Survey Report*, suitable portions of the undeveloped Project are targeted for restoration activities (Blackhawk 2021). The Mitigation Site will include 0.183 acre of habitat creation, 0.217 acre of habitat restoration and 0.199 acre<sup>1</sup> of habitat available for enhancement that will result in a net gain of 0.316 acre of wetland habitat and will enhance existing riparian habitat that is severely degraded due to a high abundance of noxious weed species.

---

<sup>1</sup>Within 0.283 acre of proposed areas, it was determined that 0.199 acre is available for mitigation through enhancement





Source: SANDAG & SanGIS 2017; Esri

Figure 1



## Project Vicinity, Location, and Reference Area

Alvarado Creek Affordable Housing Project

## 2.2 Environmental Setting and Mitigation Site Characteristics

A total of six vegetation communities/land use cover types were described and mapped within the Project. With the exception of the Urban/Developed Area and Disturbed Land, the remaining four vegetation communities are considered ESL and are subject to restoration, creation and/or enhancement. Vegetation communities were described according to Holland (1986) and Oberbauer (2008). The vegetation communities/land use cover types, associated impact acreages and MSCP Tier levels are shown in Table 1:

**Table 1. Summary of Proposed Project Impacts to Vegetation Communities/Land Use Types**

Vegetation Community/ Land Use Type	Impact	
	Temporary (Acres)	Permanent (Acres)
<i>Disturbed Land (Tier IV)</i>	0.233	0.036
<i>Urban/Developed Area (Tier IV)</i>	0.030	2.270
<b>Subtotals: Tier IV Communities</b>	<b>0.263</b>	<b>2.306</b>
<i>Arundo-dominated Wetland</i>	0.060	0.047
<i>Disturbed Wetland/Un-vegetated Channel</i>	0.002	0.008
<i>Non-native Riparian</i>	0.137	0.015
<i>Southern Riparian Woodland</i>	0.014	0.000
<b>Subtotals: Environmentally Sensitive Lands (Wetlands)</b>	<b>0.213</b>	<b>0.070</b>
<b>TOTAL</b>	<b>0.476</b>	<b>2.376</b>

Project-related impacts to ESL types outside the MHPA area of the Reserve would require compensatory mitigation at ratios based on the acreage of the impacts as established in the City Biology Guidelines (2018); impacts to Tier IV habitat types or developed areas would require no mitigation. Each vegetation community/land use cover type is described in detail in the Alvarado Creek Affordable Housing Project Biological Survey Report (Blackhawk, 2021).

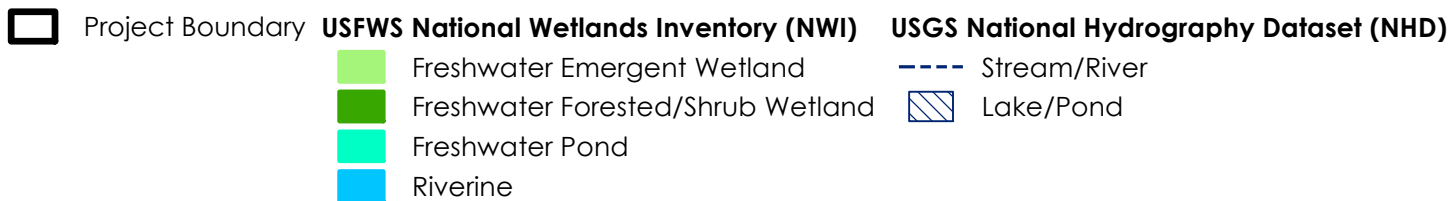
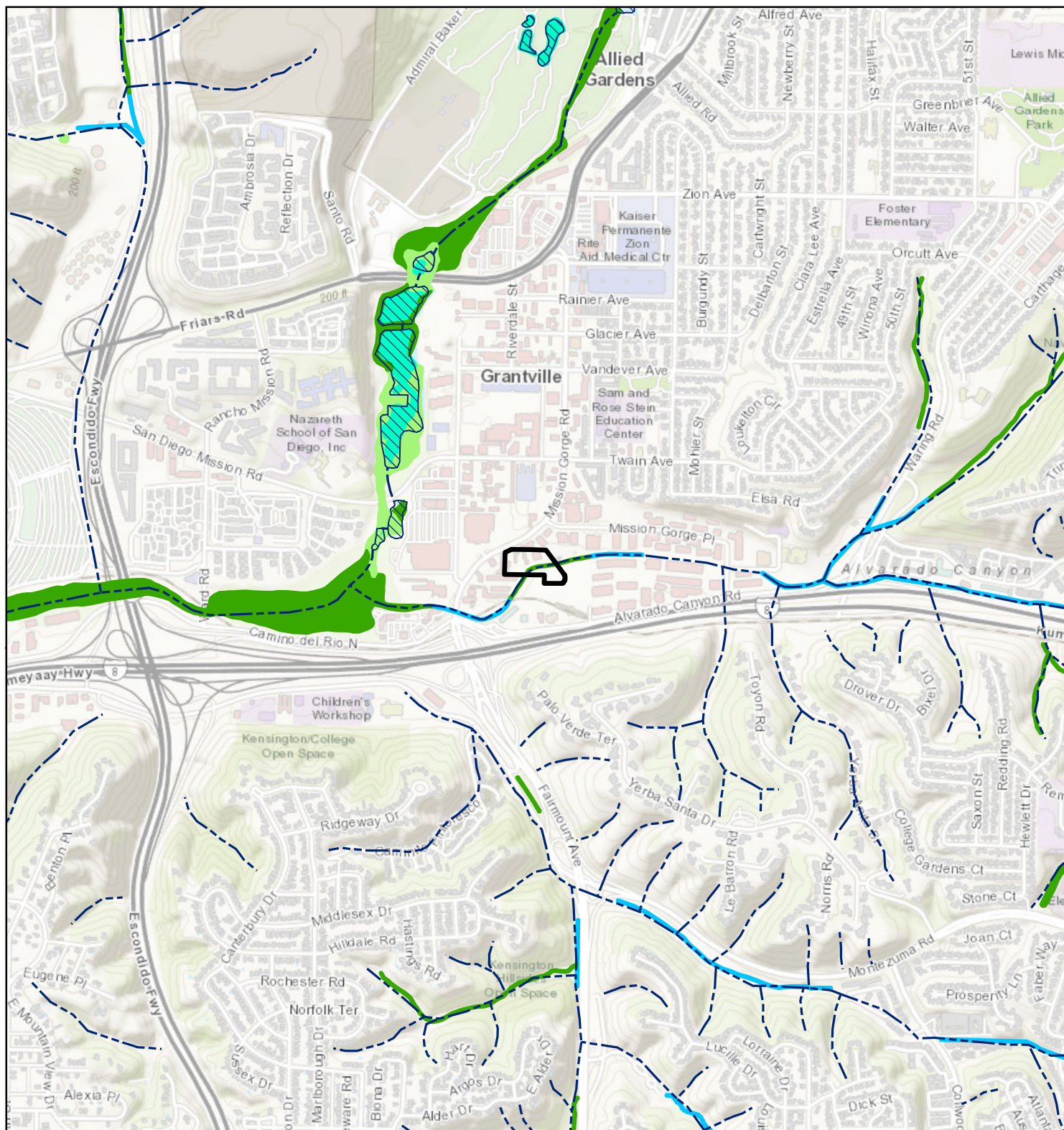
The Project consists of mostly flat developed/disturbed areas on the north and south side of Alvarado Creek. Steep banks on the north side of the creek directly abut developed parking lots; the south edge of the creek is bordered by more moderate slopes that gradually transition into disturbed upland habitat, dominated by non-native plant species.

Elevations within the Project generally drain towards the center of the Project area, where the Project is bisected by Alvarado Creek. Alvarado Creek flows on to the Project near the center of the eastern parcel boundary, flowing in a generally west-southwest direction through the south-central portion of the Mitigation Site, and leaving the site along the southern boundary.

Surface water and storm water flow within the various parcels is highly modified, but generally becomes concentrated before discharging directly into Alvarado Creek. Surface water entering Alvarado Creek from parcel 416-320-06-00 generally flows south to the parcel boundary, where surface water is redirected by a cinder block wall and diverted into a low-capacity non-vegetated



concrete swale, flowing east and discharging directly into the Alvarado Creek. Similarly, surface water from parcel 461-320-09-00, a paved lot, generally flows south to the parcel boundary located immediately adjacent to Alvarado Creek. At the southern boundary of parcel 461-320-09-00 water is restricted from entering Alvarado Creek by a man-made concrete wall, which redirects water along the property boundary to the west, before intercepting an existing road and Arizona crossing at the interface between parcels 416-320-06-00 and 416-320-09-00. The existing road carries surface water from both adjacent parcels directly to Alvarado Creek. Surface water from parcel 416-320-08-00 generally follows topographic contours flowing from the southeast of the parcel to northwest of the parcel, concentrating along graded unpaved roads and discharging into Alvarado Creek at an established Arizona crossing. Additional surface water from parcel 416-320-08-00 is directed along the western boundary within a vegetated unlined swale (Figure 2).



Source: USFWS NWI, USGS NHD, Esri

Figure 2



## Hydrology

Alvarado Creek Affordable Housing Project

A total of three distinct soil series mapped by USDA (1973) occur in the Project: Tujunga sand, 0 to 5 percent slopes, Riverwash, and Huerhuero-Urban land complex, 2 to 9 percent slopes (Figure 3). Both the Tujunga sand and Riverwash soil series are described as hydric according to USDA. Total acreages of each soil series within the Project are represented in Table 2 below.

**Table 2. Soils Occurring Within the Project**

<b>Soil Series</b>	<b>Acre(s)</b>	<b>Percent of Project</b>
Tujunga sand, 0 to 5 percent slopes (TuJ)	1.90	49
Riverwash (Rm)	1.76	46
Huerhuero-Urban land complex, 2 to 9 percent slopes (HuC)	0.20	5
<b>Total</b>	<b>3.86</b>	<b>100</b>

The Project proposes 307, 100-percent affordable, residential rental apartment units in one 5-story type III-A building, over one level of type I-A above ground podium structure. Primary access is provided via a driveway off Mission Gorge Road to drop-off, turnaround and garage parking areas. The structure will incorporate an underground stormwater vault with incorporated onsite treatment. The stormwater vault will be designed to capture onsite runoff and treat water prior to discharging runoff into Alvarado creek via an outfall located south of the development at the southern Project boundary. One additional stormwater outfall has been designed to convey stormwater and urban runoff from Friars Road along the east and south perimeter of the development, discharging into Alvarado Creek. Stormwater outfalls will be installed with concrete headwalls. The outfall associated with the re-routing of the stormwater system from Friars Road has been designed to include permanent erosion control at the outfall location.

The Project is located within Reach 2 of the Grantville Trolley Station/Alvarado Creek Revitalization Study, which requires the relocation and construction of the Alvarado Creek channel, creek trails and habitat restoration/creation. Implementation of the onsite portion of the Alvarado Creek improvements outlined in the revitalization study will require additional engineering and environmental design, and coordination with upstream and downstream property owners, and will be implemented following construction of the proposed Project. The proposed channel slope erosion protection discussed above is an interim measure until the ultimate Alvarado Creek channel improvements and habitat restoration are completed in the future.

## **2.3 Regulatory Requirements**

The *Alvarado Creek Affordable Housing Project Jurisdictional Delineation Report* and *Alvarado Creek Affordable Housing Project Biological Survey Report* (Blackhawk 2021) summarizes all applicable regulatory requirements as a result of development of the Project. In summary of findings from the aforementioned biological and jurisdictional reports, the Project includes impacts to City wetlands and riparian areas that are considered sensitive. Riparian habitat within the Project would be impacted during construction; however, no upland vegetation communities designated as Environmentally Sensitive Lands under the MSCP (i.e., Tier I, Tier II, and Tier IIIA) would be subject to Project-related disturbance.



As estimated, 0.283 acre of total impacts (i.e., 0.213 acre of temporary impacts and 0.070 acres of permanent impacts) would occur to wetland/riparian ESL habitats and be considered a significant impact under the City's LDC Biology Guidelines (City of San Diego 2018) (Figure 4). Proposed restoration, creation and enhancement procedures described herein will constitute compensation in the form of restoration/revegetation for all Project-related potential habitat loss.

Per the City Biology Guidelines (2018) and the ESL Regulations, wetland buffers do not have minimum set-back distances outside of the Coastal Overlay Zone, City Biology Guidelines state that wetland buffers shall be maintained as appropriate to protect the functions and values of the wetland. The proposed Project will incorporate native upland landscaping between the development and new community trail and proposed wetland areas (Figure 6). Landscaping would incorporate components of both chaparral, and riparian fringe communities to form a more natural upland transitional zone above the wetland areas. To maximize the effectiveness of the wetland buffer, shrubs, small trees and large tree species will be planted. Suggested species include black elderberry (*Sambucus nigra*), Western sycamore, Fremont cottonwood (*Populus fremontii*), toyon (*Heteromeles arbutifolia*), lemonadeberry (*Rhus integrifolia*), laurel sumac (*Malosma laurina*), coyote brush (*Baccharis pilularis*). These species provide a multi-tiered canopy and thick understory that will maximize the benefit of the wetland buffer per the requirements of the City Biology Guidelines (2018) and the ESL Regulations. These areas will be permanently or temporarily irrigated until vegetation is developed and self-sufficient. The maintained upland buffer may be subject to minimal trimming or hedging and weed eradication, while the unmaintained upland buffer will be allowed to fully mature and only subject to weed eradication activities. These landscaped buffer areas will be managed as part of on-site landscaping and are not subject to conditions outlined in herein and are not discussed further.

A summary of acreage of proposed restoration types is provided in Table 3 below. Determination of required mitigation acreages and proposed mitigation is detailed in the *Alvarado Creek Affordable Housing Project Biological Survey Report* (Blackhawk 2021).

**Table 3. Proposed Mitigation Site**

Total Wetland Mitigation Required	Proposed Mitigation			
	Restoration	Creation	Enhancement	Total
<b>0.580<sup>1</sup></b>	<b>0.217<sup>2</sup></b>	<b>0.183<sup>3</sup></b>	<b>0.199<sup>4</sup></b>	<b>0.599<sup>5</sup></b>

<sup>1</sup> A minimum of 1:1 ratio (0.283 acre) of the total mitigation is required to be achieved through restoration or enhancement for no-net loss.

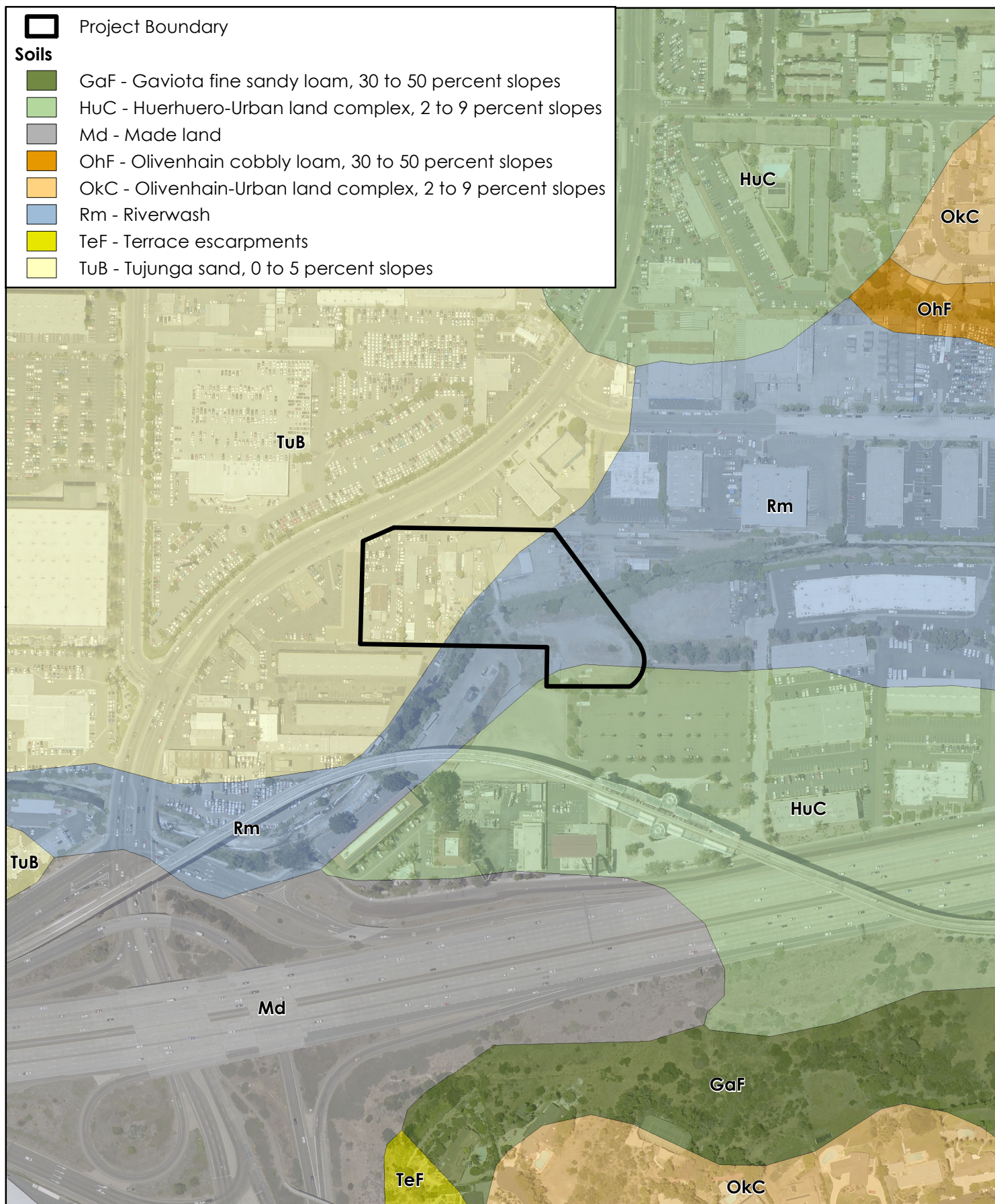
<sup>2</sup> Includes restoration of temporary impacts to City wetlands on site.

<sup>3</sup> Includes conversion of upland Tier IV communities to wetland/riparian habitat as part of channel widening restoration.

<sup>4</sup> Refer to discussion of wetland enhancement.

<sup>5</sup> Exceeds total wetland mitigation required under City Guidelines

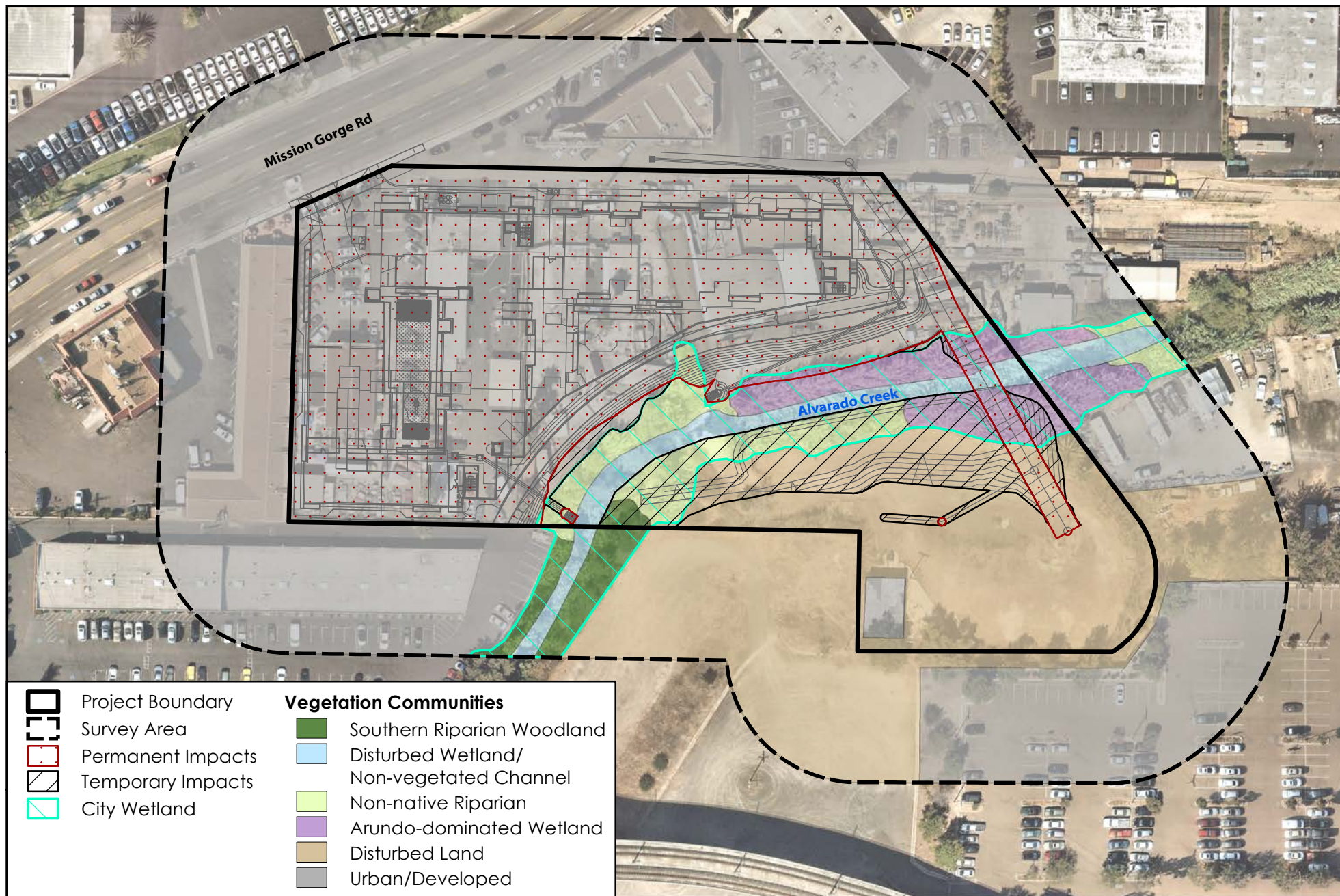




Source: USDA NRCS; SANDAG and SanGIS 2017

**Figure 3**  
**Soils**





Source: Nearmap 2019



Figure 4

## Vegetation Communities

Alvarado Creek Affordable Housing Project

### **3.0 MITIGATION ROLES AND RESPONSIBILITIES**

#### **3.1 Financially Responsible Party**

The financially responsible party for the successful restoration of the Site will be the Project Applicant, The Pacific Companies, Inc. (Pacific Companies). Upon approval, this Mitigation Plan will constitute a commitment to the City of San Diego that the Applicant will complete all proposed actions contained herein.

#### **3.2 Project Restoration Team**

The Project Restoration Team will consist of the following entities: Project Applicant, Restoration Installation Contractor, Restoration Maintenance Contractor, Project Restoration Specialist and Nursery. This section summarizes the responsibilities of each member of the Restoration Team.

##### **3.2.1 Project Applicant**

Pacific Companies will retain a qualified Habitat Restoration Specialist to oversee installation and monitoring portions of the restoration Program. The Project Habitat Restoration Specialist will have at least five years of experience monitoring wetland mitigation and restoration programs. Pacific Companies will also retain qualified restoration contractors to perform initial installation and maintenance activities consistent with the Plan. The restoration contractors will have documented experience related to the installation and maintenance of native plant installation and establishment.

##### **3.2.2 Project Restoration Specialist**

Pacific Companies will retain a Project Restoration Specialist who will be responsible for the overarching responsibility of overseeing the successful preparation, installation and maintenance of the restoration in coordination with designated representatives of Pacific Companies. The Restoration Specialist will further oversee the proper installation and management of appropriate erosion control as necessary for compliance with regulatory permits and/or Plan specifications. The Restoration Specialist will be responsible for inspection of container plants, seeds and/or pole cuttings prior to installation, and will not allow for installation of individuals which are in unsatisfactory condition such as disease, infestation, dead, stunted or other reasons. As necessary, the Restoration Specialist will redirect restoration and maintenance crews in order to meet the goals set out by this Plan.

The Restoration Specialist may be an individual or group of individuals who meet the following minimum requirements:

- 1) A Bachelor's degree in biology, ecology, botany, horticulture or landscape architecture
- 2) A minimum of five years of experience with restoration projects in southern California, preferably in wetland habitats
- 3) Knowledge of the vegetation communities proposed as part of the Plan effort, including species composition, understory and overstory components, and soil conditions
- 4) Well-versed in plant species identification necessary to complete monitoring assessments

- 5) Experience with plant installation and maintenance activities not limited to fertilization, pruning, weeding, irrigation and pest maintenance.

### **3.2.3 Restoration Installation Contractor**

Pacific Communities will retain a qualified installation contractor who will be responsible for the initial planting and establishment of the restoration effort. The restoration installation contractor will hold a valid C-27 Landscape Contracting License from the State of California, Maintenance Gardener Pest Control Business License or Pest Control Business License, and a Qualified Applicator Certificate or Qualified Applicator License, with Category B. The restoration contractors will have documented experience related to the installation and maintenance of native plant installation and establishment. Work performed by the Installation Contractor will be overseen by a full-time supervisor who will be onsite while installation is in progress. All work will be completed by a competent work crew trained in standard practices related to native habitat restoration and establishment. The crew supervisor will work closely with the Restoration Specialist to meet the goals of the Plan. The installation contractor's term of work will conclude following the initial 120-day establishment period outlined in the Plan.

### **3.2.4 Restoration Maintenance Contractor**

Pacific Communities will retain a qualified maintenance contractor. This contractor may be the same as the installation contractor. The maintenance contractor will hold all required licenses and qualifications as the installation contractor. Following the initial 120-day establishment period, the maintenance contractor will perform routine maintenance of the restoration efforts until restoration is determined complete by the Restoration Specialist and City representative. The maintenance contractor will perform all required components of restoration related to maintaining materials installed during the establishment period such as irrigation, weed management, erosion control, pest eradication, trash removal, exclusion fencing and/or plant replacement. The maintenance contractor will be responsible for addressing any areas of concern identified by the Restoration Specialist in progress reports. The level of work required by the maintenance contractor will be such that the success criteria of the Project remain on schedule within the prescribed five-year monitoring period. If progress reports indicate that success criteria are not on schedule or unlikely to be met within the five-year monitoring period, the maintenance contractor will implement measures such as additional seeding, plantings or cutting installations. Remedial actions will be coordinated with the Restoration Specialist and City as necessary.



## **4.0 MITIGATION SITE PREPARATION**

Following final grading and grubbing associated with the Project development, the temporarily unvegetated Mitigation Site will be prepared for restoration activities. Various pre-restoration activities will be conducted in order to ensure successful restoration of targeted areas identified within this Plan and are presented in detail below.

### **4.1 Mitigation Site and Resource Protection**

Prior to restoration activities, the Mitigation Site will be adequately delineated with stakes or fencing to ensure that impacts to all sensitive habitats, outside of the limits of habitat restoration work limits, will be avoided. Delineation will be installed using survey-grade equipment (sub-meter) to ensure accurate delineation. Following initial restoration activities, the Mitigation Site will be protected by a permanent split-rail fence and posted with signage to prevent human use on the northern perimeter between the trail and wetland buffer and a 6-foot chain link fence that will be installed along the southern boundary of the site.

### **4.2 Erosion Control**

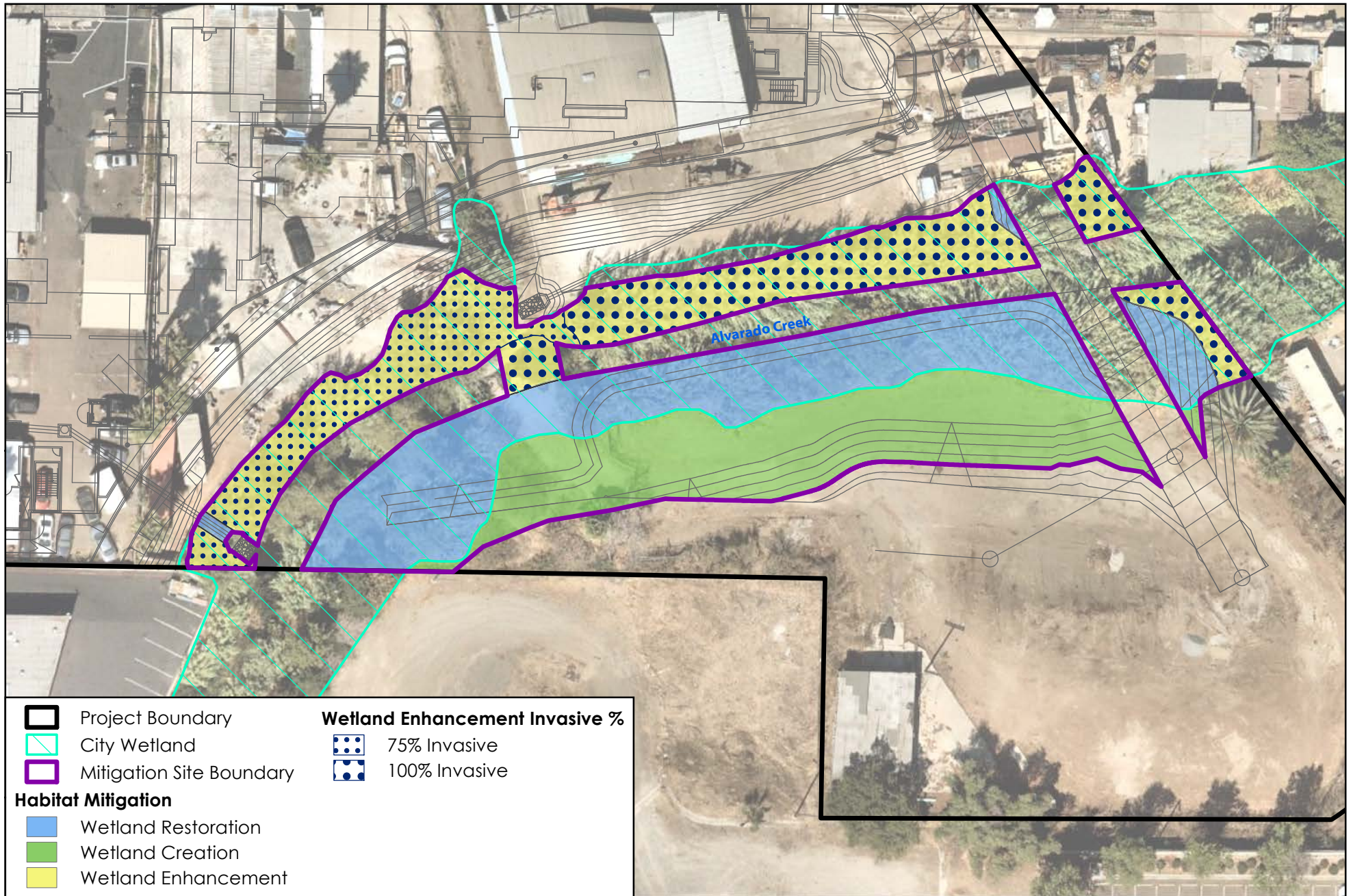
Eliminating erosion and downstream sedimentation is an important component of site preparation and maintenance throughout the life of the Project. Alvarado Creek is located within the Mitigation Site and therefore best management practices (BMPs) will be necessary to ensure sediment is not discharged into the onsite portions of the creek and carried off of the Mitigation Site. Silt fencing, fiber roll, coco-fiber matting, jute netting or other acceptable sediment and erosion control methods will be utilized until the Mitigation Site is sufficiently vegetated to no longer warrant use of BMPs. The Mitigation Site has been sufficiently stabilized for erosion control purposes once it has reached 70 percent of pre-construction vegetation cover levels.

BMPs shall be installed immediately following initial Mitigation Site preparation. Erosion control measures are expected to be minimal and only anticipated for early stages of the Project when recently disturbed soils are exposed. An adaptive approach should be implemented when determining the most effective location and types of BMPs to employ, with a particular focus on slopes, pre-existing drainage features, and loose, unvegetated soils where run-on or run-off is anticipated based on site topography. As discussed in section 4.0, existing native riparian tree species will be preserved to the maximum extent feasible and will provide additional bank stabilization.

### **4.3 Weed Eradication**

As a result of grading operations associated with Mitigation Site preparation, non-native weeds are expected to be at low levels immediately prior to restoration activities; however, there is a moderate to high potential for new weeds to sprout within newly disturbed soil. After all existing non-native shrubs and annual plants are removed from the Mitigation Site during Project development, any newly established weeds shall be removed through herbicide application, hand removal, or cut stump treatment using an approved herbicide.

Giant reed, documented primarily within the enhancement areas, is a prolific noxious weed that can be difficult to treat (Figures 4 and 5). Giant reed can spread through rhizomatous growth and therefore, treatment that targets subsurface portions of the plants is necessary to effectively control this species. Cut-stump treatment of giant reed is the most effective methodology for removing this species, when physical removal is not possible. Giant reed shall be cut to the base of the plant, immediately treated with an herbicide concentrate at the cut location, and the remaining plant roots will be left in place until killed. It is critical that cut stump treatment is performed in a manner in which herbicide is applied to each cut stump within 120 seconds of cutting to ensure the maximum absorption of herbicide. Failure to do so will result in continued resprouting of this species and potential development of resistance to certain herbicide formulations. Treated giant reed should be inspected in the months following initial treatment, particularly during the growth season to assess if additional treatments are necessary.



Source: Nearmap 2019

Figure 5



## Proposed Habitat Mitigation

Alvarado Creek Affordable Housing Project



#### **4.4 Topsoil/Plant Salvage**

Existing topsoil has a high potential to contain seeds from invasive weed species and therefore should be removed or mixed deep within fill soils. Topsoil salvage is not recommended for this Project to minimize potential for invasive species growth. Instead, clean (i.e., weed-free) topsoil should be imported to the Mitigation Site. Once Project grading activities are complete within the proposed mitigation areas, weed-free topsoil shall be installed. It is important that topsoil is installed shortly after grading activities have been completed to reduce growth of non-native species.

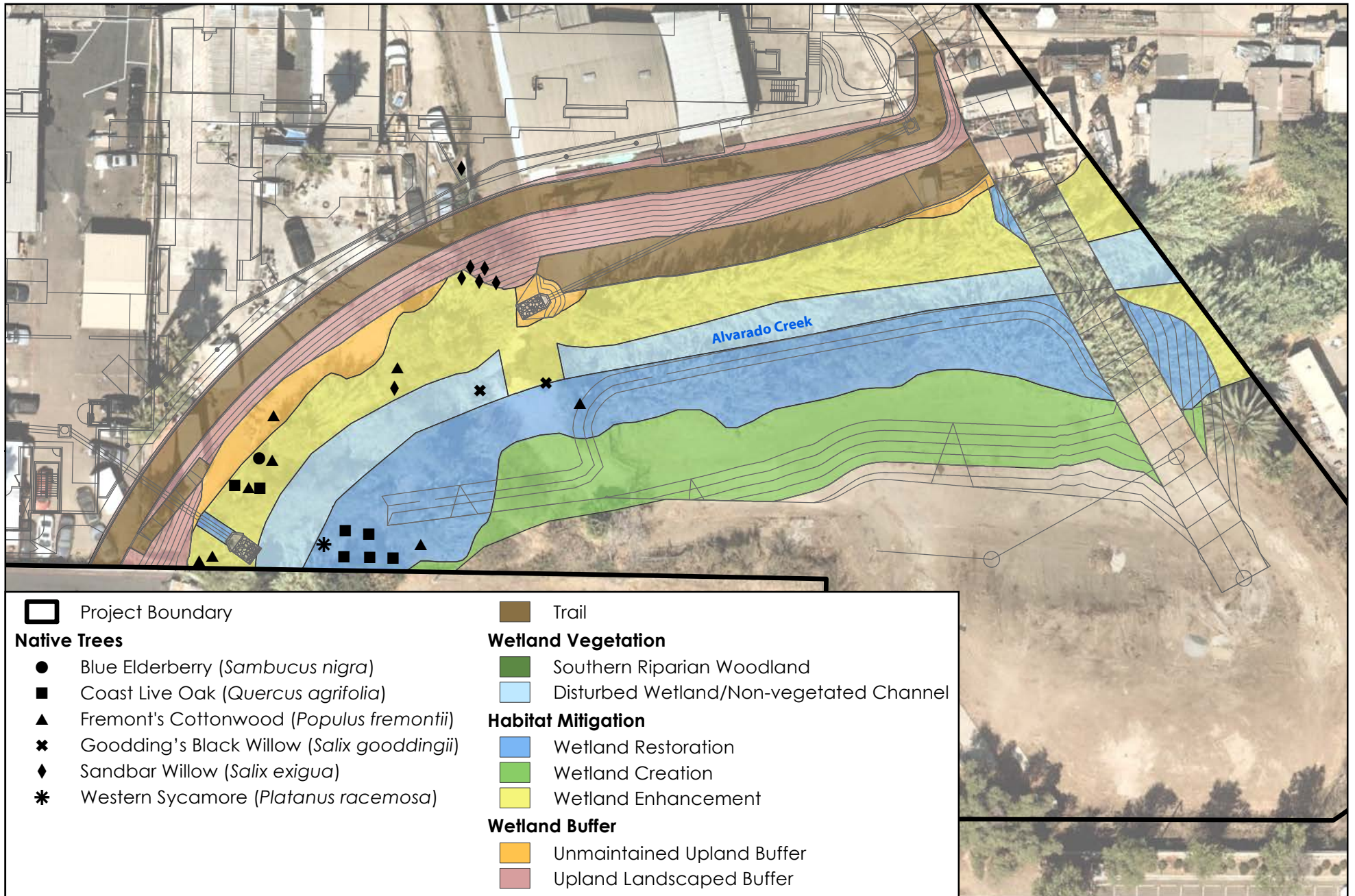
Currently, the Mitigation Site supports numerous mature beneficial native riparian tree species, including California sycamore, Fremont cottonwood, Gooding's black willow, sandbar willow and coast live oak. These tree locations are shown on Figure 6. The developer/maintenance contractor should preserve all trees located outside of permanent impact areas to the greatest extent feasible. Preservation of native riparian tree species will assist the restoration effort in multiple ways: expedite vegetative cover goals (particularly multi-tiered canopy structure), provide natural erosion control, especially along steep embankments subject to flood-scouring, provide a native seed source for natural recruitment of the aforementioned species, and contribute to soil quality through deposition of leaf litter and other organic materials that promote plant growth.

#### **4.5 Clearing, Grubbing, Grading, Recontouring and Decompacting**

The Mitigation Site will be cleared and grubbed as a component of Project development before onsite mitigation activities occur. Soil condition is a crucially important component of a successful restoration effort; in particular, soil nutrient levels and soil compaction that have direct effects on soil permeability and plant vigor. Topsoil from this particular Mitigation Site has a high potential to contain seeds from invasive weed species and therefore, within graded areas, topsoil should be removed or mixed deep within fill soils. Clean topsoil should be imported to the Mitigation Site. Imported topsoil should not be heavily compacted to ensure proper soil drainage and aeration. Topsoil is expected to contain sufficient amounts of nutrients required for native plant growth, therefore added fertilizers are not necessary and will only be applied during plant installation if determined to be beneficial by the Restoration Specialist. The Project Restoration Specialist should evaluate compaction and topsoil of the Mitigation Site during the final stages of grading to provide recommendations and ensure the site has met adequate site preparation prior to restoration activities commencing. The contractor shall ensure that all soils within mitigation areas are adequately de-compacted.

To eliminate the potential to transport invasive weed species to or from the Mitigation Site, all equipment should be adequately cleaned (free of mud, debris, brush, or seeds) prior to being mobilized to the Project and again prior to use at other Project sites.





Source: Nearmap 2019

Figure 6

## Native Trees



Alvarado Creek Affordable Housing Project

## 5.0 IRRIGATION

Irrigation techniques may involve hand-watering, overhead sprayers, soaker hoses, or drip irrigation techniques. Automated or manually operated methods are acceptable, provided that watering regimes provide enough water directly to the installed plants to maximize the chances of success. The Project design will incorporate temporary, above-ground water lines that will deliver water from the north side of the creek to the restoration site. The maintenance contractor will be responsible for maintenance of this system and ensure that water is adequately delivered to all plants.

Each zone shall be watered sufficiently, on a regular basis, to promote establishment of planted species. At the outset, and if no natural rainfall occurs, a general recommended watering frequency is twice per week. A shrub is sufficiently watered when applied surface water at each shrub “ponds” for several seconds before sinking down, indicating that the soils are saturated and draining. This frequency may be increased or decreased as necessary, based on direction given by the Restoration Specialist, and is expected to vary by season and drought conditions. For example, if sufficient natural rainfall occurs and sufficient residual soil moisture is retained, watering may not be necessary during the rainy seasons; conversely, more frequent watering cycles or longer durations may be needed during the hottest, driest times of the year.

Watering events should occur during the early morning hours to maximize watering depths while minimizing evapotranspiration loss. Watering in the late evening or at nighttime is not recommended as it can promote the growth of harmful fungi. It will be the responsibility of the maintenance contractor to maintain watering regimes. An automatic system may be installed to facilitate this process, though manual watering is acceptable, provided it occurs regularly under direction of the Restoration Specialist.

Deep pipe irrigation should be utilized for higher elevation portions of the site where wetland species are being planted. Deep pipe irrigation involves the installation of a perforated pipe (typically PVC or similar material) that is installed 2-3 feet below grade level when plants are first installed. This method encourages deep root growth and can drastically improve the long-term success of the Project once supplemental irrigation has been shut off.

The maintenance monitoring visits discussed in the following section will include any recommendations to adjust watering regimes over the next monitoring period and will consider both current weather conditions and forecasted weather projections.

## **6.0 PLANT INSTALLATION SPECIFICATIONS**

A variety of container plants, cuttings and seeding will be installed as part of this Plan. Specific plant palettes and seed mixes for the restoration, creation and enhancement areas are provided below in Tables 3 and 4. The proposed species mixes have been determined based on known conditions at the Mitigation Site and native species dominating the Project and vicinity prior to development. Habitat creation areas are intended to develop into a riparian transitional community, and restoration and enhancement areas are intended to develop into Southern Riparian Scrub during the Monitoring and Maintenance period. Both habitat types are intended to be dominated by riparian species and qualify as City Wetlands. It is anticipated that these habitat types will continue to mature during long-term management and ultimately develop into mixture of riparian scrub and riparian forest habitats over time.

Though, many of the species occurring within the Mitigation Site were non-native (i.e., giant reed), evaluation of the ecological requirements of non-native species is informative for determining which native species would be most suitable. Other factors that were taken into consideration when determining the most appropriate species included soil moisture and adjacent native habitat types.

All plants shall be from local sources or collected from nearby regions of San Diego County within 50 miles of the Project. Using local plant sources ensures minimal genetic variation from the native plants that naturally occur within Alvarado Creek. All container plants and seeds shall be acquired from a reputable supplier. Seed will be labeled with species, purity and quantity of seed in pounds.

**Table 4. Proposed Initial Native Plant Species Palette and Number of Individuals by Species**

<b>CREATION (0.183 acre) – RIPARIAN SCRUB TRANSITION</b>		
<b>Common Name</b>	<b>Scientific Name</b>	<b>Number of Individuals<sup>1</sup></b>
Arroyo willow	<i>Salix lasiolepis</i>	15 PC
Coast goldenbush <sup>1</sup>	<i>Isocoma menziesii</i>	15 CP
Coast live oak <sup>1</sup>	<i>Quercus agrifolia</i>	8 CP
Coyote brush <sup>1</sup>	<i>Baccharis pilularis</i>	12 CP
Goodding's black willow	<i>Salix gooddingii</i>	35 PC
Mulefat	<i>Baccharis salicifolia</i>	50 PC
Sandbar willow	<i>Salix exigua</i>	20 PC
<b>TOTAL</b>		<b>155</b>
<b>RESTORATION (0.217 acre) – SOUTHERN RIPARIAN SCRUB</b>		
Arroyo willow	<i>Salix lasiolepis</i>	40 PC
Fremont cottonwood	<i>Populus fremontii</i>	20 CP
Goodding's black willow	<i>Salix gooddingii</i>	35 PC
Mulefat	<i>Baccharis salicifolia</i>	55 PC
Sandbar willow	<i>Salix exigua</i>	32 PC
<b>TOTAL</b>		<b>182</b>
<b>ENHANCEMENT (0.199 acre) – SOUTHERN RIPARIAN SCRUB</b>		
Arroyo willow	<i>Salix lasiolepis</i>	35 PC
Fremont cottonwood	<i>Populus fremontii</i>	20 CP
Goodding's black willow	<i>Salix gooddingii</i>	25 PC
Mulefat	<i>Baccharis salicifolia</i>	32 PC
Sandbar willow	<i>Salix exigua</i>	25 PC
<b>TOTAL</b>		<b>137</b>
Adjustments to plant number and location may be altered in the field under the direction of Restoration Specialist. Container plants can be substituted for any pole cuttings.		
<sup>1</sup> Species to be planted within upper elevation of the site (transitional area)		
CP = container plants		
PC = pole cuttings		

## 6.1 Container Plants

The Restoration Specialist will evaluate the health of all container plants prior to planting. Any plants that are determined to be dead, diseased, stunted, rootbound, pest-infested, or inadequate for



other reasons will be rejected. Specific container plant placement will be under the direction of the Restoration Specialist and determined in the field. More detailed planting recommendations for container plants are provided below in Section 6.4. Deep pipe irrigation devices should be installed for riparian species that are planted along the southern cut slope of the Mitigation Site (southern edge of the Wetland Creation area).

## **6.2 Cuttings**

Willow and mulefat cuttings can be particularly successful and cost-effective in restoration, enhancement and habitat creation when adequate water is available and can provide rapid native growth. Alvarado Creek has been identified as a suitable location for this methodology to be employed based on a variety of factors including, but not limited to seasonal water source, elevation and surrounding species composition. Cuttings consist of the cut portion of willow or mulefat species that have been taken from an existing mature specimen. Cuttings can be taken from existing, healthy individuals without causing harm to the mother plant, provided care is taken to avoid over-pruning while harvesting cuttings. This methodology offers the added economic benefit of being sourced for free from existing plants. Source material should be from trees found onsite or adjacent to the Mitigation Site whenever possible, and this should be considered when preparing the construction specification documents. Cuttings should be installed in locations that contain appropriate soil moisture and/or where the water table is close to the ground surface. Since portions of the Mitigation Site contain slopes, it is recommended that larger poles (7–10 feet tall) are used in upper transitional areas of the site and are deeply planted (4 - 6 feet) within the ground to promote deep root growth reaching moist soils by the end of the 5-year maintenance period. Pole cuttings should be installed during the fall and early winter months. If cuttings are installed in the fall, planting should occur after the first significant rain event. Areas which require deeper planting will be determined by the Restoration Specialist. Container plants can be substituted for pole cuttings at the discretion of the Restoration Specialist.

## **6.3 Seeding**

The Mitigation Site will be seeded with native seeds in order to provide vegetative cover in addition to container plants and pole cuttings. Prior to seeding, the Restoration Specialist will verify that the appropriate seed quantities and species has been delivered. Seeding will be conducted through hand-application or with a seed grinder-type applicator. At the discretion of the Restoration Specialist, the top one to two inches of soil may need to be hand raked to properly mix and stabilize seed. Volunteer recruitment of native species is anticipated within the Mitigation Site. Seed transported from the upstream portions of the watershed should result in germination of volunteer plants over time, particularly due to increased water availability as a result of the grading plan and irrigation of the Mitigation Site.

**Table 5. Proposed Seed Palette**

<b>CREATION (0.183 acre) – RIPARIAN SCRUB TRANSITION</b>		
<b>Common Name</b>	<b>Scientific Name</b>	<b>Total Pounds</b>
California rose	<i>Rosa californica</i>	0.75
Coast goldenbush	<i>Isocoma menziesii</i>	2.2
Coyote bush	<i>Baccharis pilularis</i>	2.5
Douglas mugwort	<i>Artemisia douglasiana</i>	1.5
Giant wild rye	<i>Elymus condensatus</i>	1.0
San Diego sagewort	<i>Artemisia palmeria</i>	0.25
San Diego sedge	<i>Carex spissa</i>	0.5
Western ragweed	<i>Ambrosia psilostachya</i>	0.5
<b>TOTAL</b>		<b>9.2</b>
<b>RESTORATION &amp; ENHANCEMENT (0.416 acre) – SOUTHERN RIPARIAN SCRUB</b>		
Beardless wild rye	<i>Elymus triticoides</i>	2.0
California rose	<i>Rosa californica</i>	1.5
Douglas mugwort	<i>Artemisia douglasiana</i>	2.5
Mexican rush	<i>Juncus mexicana</i>	1.0
San Diego marsh elder	<i>Iva hayesiana</i>	2.0
San Diego sagewort	<i>Artemisia palmeria</i>	0.5
San Diego sedge	<i>Carex spissa</i>	1.0
Southern cattail	<i>Typha domingensis</i>	4.0
Tall flatsedge	<i>Cyperus eragrostis</i>	3.0
<b>TOTAL</b>		<b>17.5</b>

#### 6.4 Planting Design, Methodology and Timing

The success of the restoration effort hinges on conducting planting and seeding following specific protocols and during appropriate times of the year. This section outlines specific planting methodologies, recommended locations, irrigation and seasonal limitations for successful restoration. Prior to seeding, container planting and installation of cuttings, the Restoration Specialist will verify that the Mitigation Site is properly free from weeds, litter, debris, sufficiently decompacted, and with the soil surface scarified. Additionally, all erosion control measures should be in place, with the exception of hydromulch, if this is a chosen BMP.

### 6.4.1 Planting Design

Container plants and cuttings should be installed in a generally uniform fashion to provide the highest native vegetation cover throughout the Mitigation Site. Specific planting locations for each species will be implemented in the field as directed by the Restoration Specialist. Site-specific characteristics will be taken into consideration when determining planting locations, including but not limited to soil type, soil moisture, existing vegetation on site and sun exposure. At the discretion of the Restoration Specialist, planting locations and quantities can be modified or adjusted as needed based on specific site conditions. Container plants and cuttings will be installed in a generally uniform manner with equal spacing between plants. The species recommended in plant palettes above are capable of growing in proximity to one another and therefore, overcrowding of plantings is not anticipated.

### 6.4.2 Planting Methodology and Timing

The selected planting locations should maximize the growth potential of each installed plant, anticipate growth rates and mature states, and also consider its relationship to the adjacent vegetation. Should mortality occur within two years, dead individuals should be replaced at or near the original location, whichever is more appropriate. Year 5 success criteria aims to achieve total absolute cover of native species equal to, or greater than 75 percent, calculated from a weighted average of 65 percent native cover within the Habitat Creation area (Riparian Scrub Transition) and 80 percent native cover in the Habitat Restoration and Enhancement areas (Southern Riparian Scrub). In order to meet success criteria, modifications to plant locations and quantities, supplemental planting and/or other amendments may be prescribed by the Restoration Specialist at any time for areas lacking sufficient native growth.

Based on the historical rainfall regime in the San Diego region where the majority of annual rainfall occurs in the late fall, winter and early spring, installation of native plants should occur between November to March. Remedial plantings should occur between the months of November and March, but can occur at any time, provided supplemental irrigation is provided. Plants can be installed outside of the aforementioned time period, provided that adequate irrigation is provided.

#### 6.4.2.1 Container Plants

There are several steps involved in the installation of native plant container shrubs, and container plant installation will follow the specifications outlined below to the greatest extent feasible:

- **Step 1)** A hole is to be dug at each selected planting location about twice as wide and twice as deep as the parent container. If the excavated holes result in sides and/or bottoms with sheer edges, such edges should be roughened to facilitate root growth after planting. Some loose native soil should be left at the bottom of each hole. The excavated spoils shall be temporarily placed at the edge for later backfilling.
  - **Transitional Locations:** In locations identified by the Restoration Specialist to have slightly higher elevation and presumed lower water table, tree and perennial shrub species should be installed with a deep pipe irrigation system. The deep pipe irrigation apparatus should be installed during this step.

- **Step 2)** The bottom of the hole should be thoroughly soaked with water until “ponding” occurs and then allowed to drain or mostly drain before planting.
- **Step 3)** Water the container-bound plant enough to bind any dry or loose soil particles within.
- **Step 4)** Loosen the plant from its container by gently rolling the container along the ground, or gently squeezing the plant upward from the container bottom and edges, until the plant is free. Take care not to loosen much or any soil from the root.
- **Step 5)** Cut, untangle or otherwise separate any root-bound portions visible on the exterior of the removed container shrub and its parent soil such that occasional root extensions are free from the parent soil.
- **Step 6)** Gently place the shrub into its hole, leaving the base of the shrub/top of the rootball slightly above ground level. Backfill as necessary during this process to ensure that the base of the shrub in its final position will be placed approximately 1-2 inches above the grade of the surrounding ground.
- **Step 7)** Backfill with the excavated adjacent native soils around all sides of the planted shrub and its parent soil. During backfilling, a basin should be left around the plant capable of holding surface water around the base of the shrub. Do not over-compact.
- **Step 8)** Using hands or hand tools, lightly compact and fill in any air spaces with native soil.
- **Step 9)** Water the container shrub again following planting.
- **Step 10)** Cover the area around the plant (generally a 2-foot radius) with an acceptable mulch to a depth of about 4-6 inches. This is to retain moisture for the plant while also inhibiting weed and grass growth.
- **Step 11)** Mark the location of each installed container plant with pin flagging or some other visible marker. This will aid in monitoring of plant health throughout the maintenance period.

#### 6.4.2.2 Seeding

Seeding will be conducted after Mitigation Site preparation and following installation of cuttings and container plants. Seeding should also be conducted after all erosion control measures have been installed. The following specification for seeding shall be followed to the greatest extent feasible:

- **Step 1)** The Restoration Specialist or maintenance contractor will verify that quantities, purity, species and source location follow seed specifications outlined in Section 6 above. Seed application rates are provided in Table 5. If the delivered seed differs from the total pounds per acre, rates will be adjusted to achieve the specified application quantities.
- **Step 2)** The specified seed mixes, listed above, will be applied as dry-seed mixes. In areas that are receiving hydromulch or bonded fiber matrix BMPs, seed should be installed prior to application of hydromulch or mixed in with hydromulch during application.



- **Step 3)** Seed will be applied evenly by hand or using a seed spreader throughout all specified locations.
- **Step 4)** Following seed application, the top one to two inches of soil will be lightly raked by hand.
- **Step 5)** Seeded areas should be irrigated following seeding to ensure seed remains in target areas and to promote rapid germination. Irrigation of seeded areas shall be maintained until it is determined by the Restoration Specialist that the Mitigation is self-sustaining and no longer requires supplemental watering.

#### 6.4.2.3 Cuttings

Willow and mulefat cutting collection and planting procedures are critical to ensure long-term survivorship. Cuttings should be sourced from local, healthy populations free of pests and disease. Cuttings should be installed in the late fall or winter following the first significant rains of the season. Cuttings can be installed in the spring; however, survivorship is drastically decreased if willows and mulefat are installed late in the growing season or during dry conditions. In addition, collection of pole cuttings during the spring has the potential to impact protected nesting birds. Cuttings are the most successful when they are collected while the mother plant is dormant (i.e., lacking the majority of foliage).

- **Step 1) Obtain cuttings:**
  - Cuttings should be chosen based on the size, age and general health of the mother tree. No more than 30% of any one plant shall be removed to eliminate damage to existing trees.
  - Branches of willow and mulefat should be cut from portions of the tree that are approximately 2–7 years in age. Branches younger than 2 years (whips) should be avoided as they have a lower success rate. Whips to be avoided can be identified by very small diameter (<1 inch) and thin, green, bark.
  - Cuttings should be at least 3 feet long and at least 1-inch in diameter. Larger, 4 to 10-foot poles should also be collected for installation within the upper transitional portions of the Mitigation Site.
  - Cut branches are to be removed at a 45-degree angle. This method ensures the bottom of the plant is installed in the ground during planting.
  - Once cuttings are removed from the mother plant, cut a small piece off of the top of each pole with a horizontal cut. This cut removes the apical meristem and promotes the plant diverting energy into root growth rather than into foliar growth. This flat cut can also assist if poles need to be gently hammered into the soil. If the cutting contains small branches with leaves, the lower 90% of branches with leaves should be removed with only the upper portion remaining.
- **Step 2) Soak Cuttings**
  - Soaking cuttings prior to installation can increase survivorship substantially and eliminate the need for additional planting later in the maintenance period. Willows naturally produce a growth hormone, and collectively soaking cuttings can concentrate the rooting hormone and maximize rooting potential.

- Cuttings should be grouped together into a large watertight drum. It is critical that cuttings are placed upright, with the 45-degree cut at the bottom of the drum.
- The drum will then be filled with fresh water.
- Cuttings should be soaked for 5-10 days prior to planting and stored in the shade during this period.
- **Step 3) Excavate for Planting**
  - For each cutting, a hole will be dug to at least  $\frac{1}{2}$  the total length of the cutting and at least as wide as the widest diameter of the cutting. Additional widening of the hole is not necessary.
  - Once the hole is complete, it should be sufficiently watered prior to planting.
  - If rocky soils are encountered and digging to a depth of 50% of the cutting length is not possible, cuttings can be installed at an angle. It is critically important that at least 50% of the cutting is covered and making good contact with the soil to promote root development and prevent desiccation.
  - If feasible, cuttings can be installed simply by lightly hammering them into the ground. This method can only be implemented in very soft or saturated soils. If soils are not appropriate, hammering cuttings will not result in adequate planting depth and may severely damage the cutting.
- **Step 4) Backfill.** Backfill with the excavated adjacent native soils around all sides of the planted cutting. During backfilling, a slight basin should be left around the base of the cutting that is capable of ponding water. Ensuring good soil contact with the subsurface of the cutting is important to promote root growth.
- **Step 5) Water.** Once the cutting is backfilled, water the cutting a second time.
- **Step 6) Maintain Irrigation.** Planted areas should be irrigated following installation. Irrigation of cuttings areas shall be maintained until it is determined by the Restoration Specialist that the Mitigation Site is self-sustaining and no longer requires supplemental watering.

## **7.0 MAINTENANCE PROGRAM AND SCHEDULE**

### **7.1 120-Day Plant Establishment Period (PEP)**

The 120-day plant establishment period will begin after initial planting and seeding has been completed. The PEP plays a critical role in the success of restoration efforts and provides oversight to ensure that the majority of container plants, cuttings, and seed become effectively established. This period provides an assurance period where the installation contractor is contractually obligated to guarantee their workmanship. During this period, the installation contractor is required to conduct remedial measures to correct any issues that threaten plant establishment within the Mitigation Site. This period is critical for identifying issues which may inhibit revegetation efforts in early stages of the Project and provides an effective means of eliminating many problems that could affect long-term success of the Mitigation Site. The Restoration Specialist will visit the Mitigation Site at least once per month during the PEP and, if issues inhibiting plant establishment are observed, will provide specific action items to the restoration team. Adequate implementation of the PEP is integral to increase the likelihood of long-term success of the Mitigation Site. In order for the PEP to be considered complete, the Mitigation Site must be free of all trash and debris, all target non-native plants have been eradicated, at least 95 percent of cuttings and container plants have survived, and the Mitigation Site is de-compacted.

### **7.2 Schedule of Activities**

Following the 120-day plant establishment period, the 5-year maintenance period is initiated once the installation has been certified by the Restoration Specialist. The 5-year maintenance period is intended to allow adequate time for the Mitigation Site to become self-sustaining. The Project is considered self-sustaining when it has met the 5<sup>th</sup> year success standards outlined below. This period may be reduced if the 5<sup>th</sup> year success standards are met sooner as confirmed by resource agency sign-off. Once agency sign-off is received, the Mitigation Site would be subject to long-term management and maintenance through protection of the Mitigation Site for the remainder of the 5-year period and on an ongoing basis thereafter. Maintenance should minimally occur on a quarterly basis, where routine maintenance will be conducted, and a general site assessment will be performed. Newly established sites require typically more frequent maintenance, and therefore, maintenance visits should occur monthly the first year, every other month during year 2 and quarterly during year 3 through year 5. At the discretion of the Restoration Specialist, the frequency of visits may be altered, depending on the progression of the Mitigation Site as determined by the success standards.

### **7.3 Weed Control**

Control of non-native plants (weeds) requires accurate and timely identification of harmful weed species. During the first two years of Mitigation Site establishment, weed control will be a critically important component for the success of the Project. If allowed to become abundant, non-native plants can outcompete natives and reduce the overall ecological health of a site. Weeds that are encountered during maintenance visits will be removed promptly before they are allowed to set seed within the Mitigation Site. This requires diligent monitoring of the Mitigation Site by the

Restoration Specialist to identify specific problem areas and high priority weed species (noxious weeds). The Restoration Specialist will coordinate with the maintenance contractor following each visit and provide a monitoring memorandum that will summarize the health of the Mitigation Site and recommend remedial measures to be implemented by the maintenance contractor. If weeds are left to take over the Mitigation Site, the maintenance contractor will be liable to conduct supplemental seeding and planting to ensure the Mitigation Site meets success standards.

Weeds will be controlled at least once per quarter at a minimum and should occur more frequently during the first two years of the 5-year maintenance period. Generally speaking, weed treatments should be concentrated during the late winter, spring and early summer when weeds are most likely to proliferate and timed effectively to remove weeds before setting seed. The specific schedule should be flexible and based on specific plant recruitment and infestation patterns. The Restoration Specialist may recommend more frequent control measures or clustered visits to maintain weeds at manageable levels. The goals of the weed control program are to (1) comply with permit conditions; (2) reduce maintenance costs; and (3) achieve performance standards.

Weed control during the maintenance period will involve several key components:

1. Identify and eliminate resprouting weeds that were initially treated during the installation phase and 120-day performance period
2. Eliminate weeds that establish during the maintenance period
3. Identify and eliminate particularly noxious species

The primary species that occur or have the potential to occur onsite are identified in Table 6. This table also includes relevant species information and prescriptive weed treatment techniques that maximize the efficiency of weed control.

**Table 6. Anticipated Weeds and Treatment Methods**

Name	Scientific Name	Life Form	Reproduction	Treatment Methods <sup>1, 2</sup>
Bermuda grass	<i>Cynodon dactylon</i>	Perennial grass	Seed and rhizomes	Apply post-emergent herbicide to leaves and stems when they are growing vigorously from spring to late summer. Grass-selective Fusilade can be used if native broadleaf species are in close proximity. Glyphosate is most effective when applied while plants are NOT water stressed.
Black mustard	<i>Brassica nigra</i>	Annual herbs	Seed	Hand removal is effective when feasible. Glyphosate foliar application during rapid growth but before flowering. For mature plants, Triclopyr is effective at higher rates for mature plants. Ester formulation of Triclopyr (Garlon 4 Ultra) is more effective than amine formulation, may not be approved for aquatic applications.
Bristly ox tongue	<i>Helminthotheca echioides</i>	Annual herb	Seed	Post emergent foliar application of glyphosate prior to bolting stage



Name	Scientific Name	Life Form	Reproduction	Treatment Methods <sup>1, 2</sup>
Bur clover	<i>Medicago polymorpha</i>	Annual or biennial	Seed	Triclopyr provides best treatment. Imazapyr or foliar treatment with Glyphosate with surfactant during stages of rapid growth provides good control.
Canary island date palm	<i>Phoenix canariensis</i>	Perennial tree	Seed	cutting main stem to remove apical meristem and cut-stump treatment with undiluted Glyphosate or Triclopyr
Castor bean	<i>Ricinus communis</i>	Perennial shrub	Seed	Hand removal is effective if the majority of root system is removed, or cut-stump treatment with application of 25% glyphosate
Cheeseweed	<i>Malva parviflora</i>	Perennial herb	Seed	Mallow is one of the few weeds that Glyphosate is ineffective in controlling. Triclopyr may be effective in foliar applications.
Crown daisy	<i>Glebionis coronaria</i>	Annual herb	Seed	Foliar treatment with Glyphosate with surfactant during stages of rapid growth. Glyphosate mixed with Diquat may reduce seed production if applied after plant has bolted.
Curly dock	<i>Rumex crispus</i>	Perennial	Seed	Hand removal is effective when feasible. Foliar application during rapid growth with glyphosate mixed with surfactant. Glyphosate is more effective when mixed with ammonium sulfate.
Fennel	<i>Foeniculum vulgare</i>	Perennial herb	Seed or root crown	Foliar treatment with triclopyr in combination with glyphosate late Feb. to Mar. Glyphosate can be applied as foliar treatment, but less effective after plant has bolted. For persistent plants, cut-stump treatment with undiluted glyphosate is effective
Filaree	<i>Erodium sp.</i>	Winter annual or biennial herb	Seed	Post-emergence applications of glyphosate to rapidly growing plant with increased efficacy by addition of ammonium sulfate. Repeat applications may be needed for control.
Garden nasturtium	<i>Tropaeolum majus</i>	Perennial	Seed	Foliar application of Glyphosate with surfactant.
Giant reed	<i>Arundo donax</i>	Perennial grass	Roots, rhizomes, and seed	Undiluted Glyphosate applied as a cut stump treatment within 1-2 minutes after stem cutting. Regardless of timing, provides excellent control with no resprouting
Mexican fan palm	<i>Washingtonia robusta</i>	Perennial tree	Seed	Cut-stump treatment with 50-100% Triclopyr is most effective. Undiluted Glyphosate cut-stump treatments are also effective.
Pampas grass	<i>Cordaderia selloana</i>	Perennial grass	Seed (root crown)	Physically remove the entire crown and top sections of roots, or treatment with a post-

Name	Scientific Name	Life Form	Reproduction	Treatment Methods <sup>1, 2</sup>
			resprouts)	emergent application of glyphosate at about a 2% solution with surfactant. Provides good control when applied in both fall and early summer
Peruvian pepper tree	<i>Schinus molle</i>	Perennial tree	Seed	Cut stump treatment with undiluted Glyphosate or Garlon 3A (Triclopyr) is most effective. Treatment with Glyphosate or Triclopyr may be effective, but resprouting is possible.
Russian thistle	<i>Salsola tragus</i>	Annual herb	Seed	Hand removal is effective when feasible. Glyphosate foliar application with surfactant during rapid growth but before seeds set. Mixture with ammonium sulfate is more effective.
Salt cedar	<i>Tamarix ramosissima</i>	Perennial shrub/tree	Seed	Hand pulling is effective if root is removed. Cut-stump treatment with 50-100% Triclopyr is most effective. Undiluted Glyphosate may be used for cut-stump but is not as effective for foliar application due to reaction with salts on leaves.
Smilo grass	<i>Stipa miliacea</i>	Perennial grass	Seed	Foliar application of Glyphosate with surfactant during rapid plant growth.
Tocalote	<i>Centaurea melitensis</i>	Annual herb	Seed	Foliar application of Glyphosate with surfactant. Provides good late season control
Umbrella sedge	<i>Cyperus involucratus</i>	Perennial herb	Seed	Foliar application of Glyphosate with surfactant prior to setting seed.
Wild radish	<i>Raphanus sativus</i>	Annual herb	Seed	Hand removal is effective when feasible. Glyphosate foliar application during rapid growth but before flowering. For mature plants, Triclopyr is effective at higher rates for mature plants.

<sup>1</sup> Methods listed here are based on information from the University of California Statewide Integrated Pest Management Project. Site-specific treatment methods and formulations must be based on recommendations provided by a licensed Pest Control Advisor and follow all local, state and federal regulations.

<sup>2</sup> Garlon 4 Ultra and certain formulations of Glyphosate are not approved for aquatic use.

In some cases, weeds may be physically cut or removed by hand, particularly when plants are small and entire root system can be removed; however, many species will require application of herbicides in order to effectively control. For many of the species expected, or documented to occur within the Mitigation Site, cutting weeds at the base of the plant followed by application of an herbicide concentrate will be the most effective means for long-term removal of these species. Specific herbicide types, application rates and concentrations must be approved by a licensed Pest Control Advisor, and application shall be under the supervision of a Pest Control Applicator to ensure the Project abides by all applicable laws.

Generally, weed treatment should occur each season before seed set, unless otherwise specified by the Restoration Specialist. All debris collected during weed control activities shall be disposed of properly offsite. Crews should take care when transporting weed debris from or within the Mitigation Site to ensure seeds are not accidentally spread within the Mitigation Site (i.e., use burlap sacks or other means to effectively bag weeds when moving them from the Mitigation Site to proper disposal areas). Weed debris shall not be stored on the Mitigation Site after removal and should be removed daily.

Weed control methods should include the following:

- When possible, weeds should be removed by hand, and the restoration contractor should make every effort to ensure root systems are completely eliminated when removed by hand to prevent resprouting.
- Apply herbicide to weed species when hand removal is not feasible or ineffective. Herbicides such as RoundUp Custom are generally acceptable, but all herbicides used within the Mitigation Site should be evaluated by a PCA and applied only under the supervision of a licensed applicator as required by law. All herbicides should be evaluated to ensure that the appropriate amount of surfactant is incorporated to herbicide mixes.
- Weed seedlings and early growth should be removed on a periodic basis before they produce seed. Weeds that are in flower or contain seed heads should be removed by hand, as systemic herbicides such as Roundup can allow viable seeds to continue to mature following application.
- The Restoration Specialist will monitor weed removal activities and evaluate effectiveness of control methods periodically throughout each year and at a minimum, should provide oversight during or after each weed treatment visit. The Restoration Specialist may determine that alternate control methods are necessary to control weeds. The Restoration Specialist will monitor for potential resistance of weed species to herbicides and suggest alternatives if resistance is apparent.

Table 6 above lists the most likely weeds that will be encountered on the Mitigation Site; however, this list is not intended to represent the only weeds to be controlled. The Restoration Specialist may recommend eradication of other weed species if they are identified on Mitigation Site and have the potential to degrade the Mitigation Site.

## **7.4 Horticultural Treatments**

Horticultural treatments can include a variety of methods to promote healthy native plant growth and more rapid plant establishment such as pruning, mulching, disease control and soil amendments. These treatments may be necessary during the 5-year maintenance period, if native plants within the Mitigation Site show signs of disease or slow growth and establishment. All native perennial plants will be periodically monitored during regularly scheduled maintenance visits for potential signs of damage resulting from disease, insect infestations and herbivory. Plant health, particularly for young shrubs, will be monitored by the Restoration Specialist and maintenance contractor to determine if pest control measures or other horticultural treatments are required. The Restoration Specialist will prescribe site-specific protocols to ensure positive progression of native plant establishment. When significant plant pests and/or plant diseases are identified or plant growth is inhibited, plants will be treated as necessary; soil amendments, fertilizers or mulching may be

recommended for young plants showing slow growth, and establishment and installation of protective barriers such as screening may be required to prevent severe herbivory when observed to be significant. Under the direction of the Restoration Specialist, plants that show signs of severe disease may be pruned or removed entirely to prevent diseases from spreading to other healthy plants on the Mitigation Site. All plants that are removed due to disease will be replaced as necessary. In some cases, species substitution may be required if replacement plants become re-infected by the same pest. Pest control will follow an Integrated Pest Management approach that promotes pest control through preventative measures and natural controls in combination with conventional plant treatments. Active pest control measures will be necessary if pest species pose a significant threat to native plant establishment.

### **7.5 Trash and Debris Removal**

The maintenance contractor will be responsible for removing all trash and debris observed within the Mitigation Site during each maintenance visit. Trash and debris removal should be conducted in a manner that does not cause adverse impacts to native plants within the Mitigation Site. Native plant debris, dead limbs, or fallen trees should be left in place. Weed debris must be collected and removed from the Mitigation Site during each maintenance visit and disposed of at the appropriate facilities. At no time will weed debris be left on the Mitigation Site or disposed of in unapproved areas.

### **7.6 Replanting and Reseeding**

In order to meet success standards, dead or diseased plant material will be replaced by the maintenance contractor at the direction of the Restoration Specialist. Dead plant replacements or reseeded will be documented by the Restoration Specialist. Replanting and reseeded will be the responsibility of the maintenance contractor. Plant substitutions may be recommended by the Restoration Specialist, if deemed appropriate.

### **7.7 Mitigation Site Protection, Signage and Vandalism**

During the 120-day plant establishment period and subsequent 5-year maintenance and period, the Site will be adequately protected from outside disturbance within signage and/or fencing. Protection measures must be adequate to ensure that the Mitigation Site is free from outside disturbances such as vandalism, illegal dumping, etc. If vandalism is identified at any point during the PEP or 5-year maintenance period, remedial measures may be required based on the severity of site damage.

### **7.8 Irrigation Maintenance**

The maintenance contractor will be responsible for ensuring the irrigation system is functioning as intended and making any necessary adjustments or repairs throughout the PEP and 5-year maintenance period. The irrigation system should be inspected during each maintenance visit, and any components that are not operational will be replaced immediately to ensure plantings are not damaged as a result.



## **8.0 FIVE-YEAR MAINTENANCE PERIOD**

The 5-year maintenance period is initiated once the installation has been certified by the Restoration Specialist, following the 120-day PEP. The 5-year maintenance period is intended to allow adequate time for the Mitigation Site to become self-sustaining. The Mitigation Site is considered self-sustaining when it has met the 5<sup>th</sup> year success standards outlined below. This period may be reduced if the 5<sup>th</sup> year success standards are met sooner as confirmed by resource agency sign-off. Once agency sign-off is received, the Site would be subject to long-term management and maintenance that would continue protect the Mitigation Site for the remainder of the 5-year period and on an ongoing basis thereafter.

The success of restoration efforts depends heavily on diligent monitoring and maintenance of the Mitigation Site. Monitoring and maintenance activities are instrumental in ensuring proper soil conditions, low non-native plant cover, proper irrigation, and maintaining the Site free of significant pests and/or disease. The Restoration Specialist will play a key role in monitoring the Mitigation Site from the initial installation period, 120-day PEP and subsequent 5-year maintenance period. During the initial 120-day plant establishment period, monitoring will be qualitative, followed by a combination of qualitative and quantitative monitoring during the 5-year maintenance period.

### **8.1 Monitoring and Reporting Schedule**

For the purposes of this Plan, the monitoring schedule will be based on the calendar year; each monitoring period will begin on January 1.

#### **8.1.1 Quantitative Monitoring**

Quantitative monitoring will consist of collecting transect data and photographic documentation of the Mitigation Site. Quantitative monitoring including container plant counts and point intercept data collection should be conducted once per maintenance year during the spring or summer (April – August) and at approximately the same month of each year. Following each annual quantitative monitoring visit, an annual report will be produced to summarize findings with sufficient information to assess the health of the Mitigation Site. The report should contain enough evidence to evaluate the extent to which the Mitigation Site is meeting or deviating from the required success standards and recommend remedial measures if necessary.

The annual report for a given monitoring year will be submitted to applicable agencies by April 1 following the monitoring year. Though the maintenance term is expected to be five years, this period may be reduced if the Mitigation Site meets the outlined performance standards prior to the end of year 5. The City and all resource agencies overseeing applicable Project permits must concur that the Mitigation Site has met or exceeded performance standards before the Project transitions into the long-term maintenance phase.

#### **8.1.2 Qualitative Monitoring**

Qualitative monitoring will include a site assessment by the Restoration Specialist to be conducted during maintenance activities. Qualitative monitoring should occur monthly during year 1, every

other month during year 2 and quarterly during years 3 through 5. A progress report will be completed within one week of each qualitative monitoring visit and submitted to the City for review and comment.

## **9.0 MONITORING METHODS**

Mitigation Site monitoring methodology will include a combination of qualitative and quantitative monitoring techniques as specific below. The monitoring period will begin immediately following the 120-day plant establishment period. Qualitative monitoring will be conducted each month for the first six months of the monitoring period, then once every other month until the end of year two and each quarter, beginning of year three through five. Quantitative monitoring will occur once annually during the spring or summer (April – August) and at approximately the same month of each year. Quantitative monitoring will include transect data collection, planting survivorship assessment and photo-documentation. Annual reports will be submitted to the City and all applicable agencies within three months following the completion of annual monitoring.

The monitoring term is based on a five-year period; however, if performance standards have been met or exceeded prior to year five, the monitoring period may be reduced accordingly, following agency sign-off. The Mitigation Site must have undergone at least two years without supplemental irrigation before requesting early sign off. Until the Mitigation Site has met all success criteria, short-term responsibilities continue.

### **9.1.1 Qualitative Methods**

The Restoration Specialist will conduct qualitative horticultural monitoring that will focus on plant health and expansion, seed germination, identification of potential problems that may affect overall site success and evaluate presence of native and non-native species. The goal of qualitative monitoring is to proactively evaluate conditions of the Mitigation Site and provide timely recommendations to resolve any observed issues with intended progress. An important component of qualitative monitoring is to coordinate with the maintenance contractor in a timely manner in order to ensure that issues observed with Mitigation Site progression are addressed as soon as possible.

At a minimum, each qualitative monitoring visit should include the following:

- Survivorship assessment of all plantings
- Visually estimate percentage of non-native plant species
- Visually estimate native species cover, diversity, vertical structure, and overall ecological health of the Mitigation Site
- Provide representative photographs of Mitigation Site conditions
- Coordinate with the maintenance contractor to provide recommendations for necessary treatment, remedial planting/seeding and focus areas/species for weed treatment
- Evaluate potential pest or disease problems
- Assess impacts to the Mitigation Site from erosion, vandalism, or littering
- Provide list of all plant species observed on the Mitigation Site
- Assess irrigation schedule and maintenance needs

Following the qualitative evaluation, the Restoration Specialist will summarize findings in a qualitative memorandum that will be submitted to the City that will assess the need for any remedial action. Any time-sensitive corrective measures, including, but not limited to additional planting or seeding, adjustments to non-native control methods or schedule, irrigation schedule or volume, must be communicated with the maintenance contractor and City as soon as possible and ideally within less than two weeks of the visit to ensure issues are remediated prior to becoming a more serious threat to the success of the Mitigation Site.

### **9.1.2 Quantitative Methods**

Quantitative monitoring will provide numerical data for assessing the progress of the Mitigation Site that can be directly compared to success standards. Quantitative monitoring should be conducted once per maintenance year during the spring or summer (April – August) and at approximately the same month of each year in order to provide a consistent comparison of data between years.

Methodology will consist of counting container plants and cutting survival and conducting 50-meter point-intercept transects. All point-intercept transects will follow the vegetation sampling protocol outlined by the California Native Plant Society (Sawyer and Keeler-Wolf 1995). Photographic documentation of site progression will also be a component of quantitative monitoring. Data collected during quantitative assessments will be summarized in an annual report, specifics of which are provided in Section 9.1.2.3 below.

#### **9.1.2.1 Point-Intercept Transects**

A total of six permanent 50-meter point-intercept transects will be determined prior to the start of installation. Of the six transects, two transects will occur within each Project zone; (1) habitat creation, (2) habitat restoration and (3) habitat enhancement (i.e., two transects in southern riparian scrub transition and four transects in southern riparian scrub). The start and end points of each permanent transect will be recorded with a global positioning system (GPS), documented on the Mitigation Site map and staked in the field. Photographs will be taken at the start point of each transect, facing toward the end point. Photographs will aid in relocating permanent transects in the event that stakes are lost and will also provide a visual comparison of vegetative characteristics of the start of each transect.

Point-intercept transect sampling is intended to provide an estimate of native species cover within the Mitigation Site that can be compared to the success standards. Additionally, the use of three height classes at each point-intercept also provides information about habitat strata. As this method determines native species cover from six linear subsamples of the Mitigation Site, there is the potential for data bias with this estimate. For years 1 through 4, point-intercept data will act as a general reference to inform restoration activities and maintenance. At the end of year 5 (or earlier if all success criteria are met), point-intercept data will be utilized to provide an inferred comparison of the native species cover to the Project success standards.

Point-intercept data will be collected using the following methodology:

- At each 0.5-meter interval, a vertical line will be used perpendicular to the transect. Every species that intersects the vertical line will be recorded.



- Species will be recorded in three height classes:
  - 0–0.5m = herb
  - 0.5–2m = shrub
  - >2.0m = tree
- Absolute native cover will be calculated for each transect by adding the number of points intercepted by native species within any height class on each transect where at least one native species was recorded to intercept the transect within any height class. Total absolute native cover will be calculated as the average native cover of all six study transects.

Non-native cover will be calculated in the same manner as native cover for each transect and averaged. Species that are observed during sampling that are outside of the 0.5-meter transect sampling intervals will be included in the list of species observed on the Mitigation Site.

Total absolute cover of native species will be calculated from a weighted average of native cover in the riparian transitional scrub and southern riparian scrub habitats. Southern riparian scrub accounts for 69.4 percent of the Mitigation Site (restoration and enhancement areas), and the riparian transitional scrub accounts for 30.6 percent of the Mitigation Site (creation area). The following calculation can be used to determine the weighted average absolute cover:

**Overall Absolute Cover** = [(0.306 \* % cover in riparian transitional) + (0.694 \* % cover in southern riparian scrub)]

#### 9.1.2.2 Cuttings and Container Plant Survival Counts

During monitoring, container plants and cuttings will be counted to the greatest extent feasible. Plant counts should occur once per year in the spring or summer and can be conducted concurrently with point-intercept transects. Quantitative container plant counts are in addition to general survivorship evaluations that will occur as a component of Qualitative Monitoring (see Section 9.1.1 above). This approach has a tendency to be more successful during year 1 and 2 while container plants and cuttings can be easily identified and distinguished from volunteers of the same species. As the Mitigation Site progresses, it can become difficult to differentiate planted species versus those that have naturally established within the Mitigation Site. Therefore, all planted cuttings and container plants will be demarcated with pin flags or an alternative method in order to aid in identifying individuals.

During annual quantitative monitoring efforts, demarcation of planted specimens should be refreshed to aid in subsequent annual monitoring efforts. All container plants and cuttings will be inspected, and a list of dead plants will be provided. The Restoration Specialist will determine if dead or damaged plants require replacement based on surrounding cover of native vegetation. In general, if native plant recruitment is observed within approximately 3 feet of a dead container plant and providing a similar ecological value, dead plants may not require replacement.

#### 9.1.2.3 Photographic Documentation

Photographic documentation of Mitigation Site progression will also be a component of quantitative monitoring. As described above, photographs will be taken for each transect, and an additional six permanent photograph points will be recorded to be repeated each year.

Permanent photograph points should be placed at locations within or adjacent to the Mitigation Site that provide the best general overview of each Project area and recorded with a GPS for reference. Permanent markers can be installed at each photograph point to improve photograph replication. Photograph points will be taken at the same vantage point and in the same direction to provide a visual comparison of site characteristics over time. In addition to photographic documentation, high-resolution imagery may also be used to document progress and can provide annual comparison of vegetative properties of the Mitigation Site from year to year.

**Table 8. Monitoring Schedule**

<b>Monitoring Year<sup>1</sup></b>	<b>Time Period<sup>1</sup> (months)</b>	<b>Qualitative Monitoring Frequency</b>	<b>Quantitative Monitoring Frequency</b>
<b>Year 1</b>	1 – 6	once per month	once per year
<b>Year 2</b>	6 – 24	every two months	once per year
<b>Years 3 – 5</b>	24 – 60	quarterly	once per year

<sup>1</sup> Beginning at completion of 120-day plant establishment period.

## 10.0 MONITORING AND PERFORMANCE STANDARDS

Performance standards provide a means of assessing the progress of the Mitigation Site toward intended conversion of degraded habitat into a native-dominated ecosystem within the five-year period. Performance standards are based on the typical composition of native habitats and realistic expectations of the restored habitat in relation to comparable native habitats within the geographical region. Performance standards are also designed to be consistent with the requirements of habitat mitigation required by Project permits and City guidelines for Environmentally Sensitive Lands. By achieving these performance standards, intended species composition and density is expected to provide a net improvement of habitat function.

Annual performance standards are provided as target measures to determine if the Mitigation Site is progressing toward the overall goal of providing adequate mitigation to offset impacts from development of the Alvarado Creek Affordable Housing Project. Performing periodic evaluation of the Mitigation Site toward success standards will aid in determining if remedial measures are necessary to meet final performance standards. Performance standards outlined for each phase of the Project are provided below in Table 7.

The Project will be considered successful at the end of year 5 maintenance period once the following performance standards have been met:

- Total absolute cover of native species is equal to, or greater than 75 percent, calculated from a weighted average of 65 percent native cover in the riparian transitional scrub (habitat creation; 30.6 percent of total area) and 80 percent native cover in the riparian scrub (habitat restoration and enhancement areas; 69.4 percent of total area).
- Each wetland vegetation community will contain at least four species from the corresponding plant palette (container plants, cuttings, and/or seeding), excluding western ragweed; and the combined relative cover these four species will be equal to or greater than 45 percent of the relative native vegetation cover of that community.

- All container plant species from the corresponding plant palette will be present in each wetland vegetation community.
- Contain less than 15 percent total relative cover of non-native species.
- Contain less than 1 percent of noxious invasive species (as defined by the California Department of Food and Agriculture – California Noxious Weeds List).
- Native habitats are self-sufficient without the use of supplemental irrigation (Absolute native cover is sustained and/or expanding during years 4 and 5 without supplemental watering).
- Vegetation on site is expanding by the end of year 4 without additional seeding or planting.



1720 Midvale Drive  
 San Diego, CA, 92105  
 Phone: 619.972.7932  
 Phone: 619.972.8714  
[www.blackhawkenv.com](http://www.blackhawkenv.com)

**Table 7. Restoration Performance Standards**

Target Period	Performance Standards	Remedial Measures
Site preparation – removal of seed and plant installation	<ul style="list-style-type: none"> <li>- All noxious weeds have been treated and or removed</li> <li>- Site is free of debris</li> <li>- Site is decompacted and clean topsoil has been installed</li> </ul>	<ul style="list-style-type: none"> <li>- Control remaining non-native species</li> <li>- Remove remaining trash/debris</li> <li>- Adapt erosion control methods if necessary</li> </ul>
120-day plant establishment period	<ul style="list-style-type: none"> <li>- 95% of container plants have survived</li> <li>- All noxious weeds have been treated and/or removed</li> <li>- All initial seeding, container planting, or cutting installation has been completed</li> <li>- Erosion control measures are in place</li> </ul>	<ul style="list-style-type: none"> <li>- Continued weed control</li> <li>- Replace dead or diseased plants as prescribed by Restoration Specialist</li> <li>- Adapt erosion control methods if necessary</li> </ul>
Year 1	<ul style="list-style-type: none"> <li>- Absolute cover of natives is greater than 25%</li> <li>- Relative cover of planted wetland species is greater than 10 - 15% (seed, poles, or container plants in combination).</li> <li>- Control non-natives and maintain relative cover at less than 15%</li> <li>- No significant erosion or trash.</li> <li>- 85% of container plants and cuttings have survived</li> <li>- Germination of seeded species is evident in seeded areas</li> </ul>	<ul style="list-style-type: none"> <li>- Focus on weed control</li> <li>- Replace dead or diseased plants as prescribed by Restoration Specialist</li> <li>- Adapt erosion control methods if necessary</li> </ul>
Year 2	<ul style="list-style-type: none"> <li>- Absolute cover of natives is greater than 30%</li> <li>- Relative cover of planted wetland species is greater than 15 – 20%.</li> <li>- Control non-natives and maintain relative cover at less than 10%</li> <li>- No significant erosion or trash</li> <li>- 85% of container plants and cuttings have survived</li> <li>- Germination of seeded species is evident in seeded areas</li> </ul>	<ul style="list-style-type: none"> <li>- Focus on weed control</li> <li>- Perform supplemental seeding, if germination of seeded species is absent</li> <li>- Adapt erosion control methods if necessary</li> <li>- Perform container plant or cuttings installation if site is underperforming native cover standards</li> </ul>



Target Period	Performance Standards	Remedial Measures
Year 3	<ul style="list-style-type: none"> <li>- Absolute cover of natives is greater than 45%</li> <li>- Relative cover of planted wetland species is greater than 25 - 35%</li> <li>- Control non-natives and maintain relative cover at less than 10%</li> <li>- No significant erosion or trash</li> <li>- Germination of seeded species, including volunteers, is evident in seeded areas</li> </ul>	<ul style="list-style-type: none"> <li>- Continued focus on weed control</li> <li>- Adapt erosion control methods if necessary</li> <li>- Turn off irrigation at end of year 3</li> </ul>
Year 4	<ul style="list-style-type: none"> <li>- Absolute cover of natives is greater than 60%</li> <li>- Relative cover of planted wetland species is greater than 25 – 35%.</li> <li>- Control non-natives and maintain relative cover at less than 10%</li> <li>- Noxious weed species controlled to less than 5%</li> <li>- No significant erosion or trash</li> <li>- Supplemental watering is no longer required</li> </ul>	<ul style="list-style-type: none"> <li>- Same measures as prescribed for year 3</li> </ul>

Target Period	Performance Standards	Remedial Measures
Year 5	<ul style="list-style-type: none"> <li>- Total absolute cover of native species is equal to, or greater than 75%, calculated from a weighted average of 65% native cover in the southern riparian scrub – transition areas (habitat creation) and 80% native cover in the southern riparian scrub areas (habitat restoration and enhancement areas).</li> <li>- Each wetland vegetation community will contain at least four species from the corresponding plant palette (container plants, cuttings, and/or seeding), and the combined relative cover these four species will be equal to or greater than 45% of the relative native vegetation cover of that community.</li> <li>- Contain less than 10 percent total relative cover of non-native species.</li> <li>- Contain less than 1 percent of noxious invasive species</li> <li>- All container plant species from the corresponding plant palette will be present in each wetland vegetation community.</li> <li>- Vegetation is self-sufficient without the use of supplemental irrigation</li> <li>- No significant erosion or trash</li> </ul>	<ul style="list-style-type: none"> <li>- Same measures as prescribed for year 3</li> </ul>

Remedial measures may be altered at the direction of the Restoration Specialist to achieve success standards.

## **11.0 REPORTING PROGRAM**

Following each qualitative monitoring visit, the Restoration Specialist will provide a memorandum summarizing conditions of the Mitigation Site and maintenance recommendations. An annual monitoring report will be provided after each monitoring year. Both the qualitative monitoring memoranda and annual reports will be submitted to the City Development Services Department - Mitigation and Monitoring Coordination (City DSD-MMC) and Owner and once approved, the annual report will be submitted to applicable agencies. Qualitative memoranda will be included as an appendix to each annual report.

### **11.1 Maintenance Monitoring Memoranda**

Within one month of each maintenance and monitoring visit, the Project Restoration Specialist will provide a memorandum to the City that summarizes site progress and is intended to help identify any remedial actions required to maintain the trajectory of the restoration effort. Each memorandum will focus on general survivorship of all plantings, estimate percentage of non-native and native plant species, diversity and overall ecological health of the Mitigation Site, and provide representative photographs of site conditions.

Determinations made by the Restoration Specialist will be coordinated with the maintenance contractor and the City in order to provide recommendations for weed treatment, remedial planting/seeding and focus areas/species for weed treatment, assess impacts to the Mitigation Site from erosion, vandalism, or littering, assess irrigation schedule and maintenance needs. All remedial measures will be developed with oversight from the City DSD-MMC.

Any time-sensitive corrective measures must be communicated with the maintenance contractor and the City DSD-MMC as soon as possible and ideally within less than two weeks of the visit to ensure issues are remediated prior to becoming a more serious threat to the Mitigation Site's success.

### **11.2 Annual Reporting**

Annual monitoring reports will include both a quantitative and qualitative summary of the Mitigation Site and will be submitted to the owner, City DSD-MMC and applicable agencies. The report will include transect monitoring results, photographic documentation, cuttings and container plant survival assessment, a horticultural checklist, a performance evaluation and a summary of maintenance activities and remedial measures performed during the year. A key component to this report will be the performance evaluation that provides an assessment of site progress toward performance standards of the Plan. The report will identify key recommendations from the Restoration Specialist to address any potential issues such as pests, native cover deficiencies, non-native cover growth/control, vandalism, erosion, or any other issues that may hinder the success of the Mitigation Site. Monitoring and maintenance memorandums shall be included as attachments to each annual report along with transect sampling results and photographic documentation.

## **12.0 COMPLETION OF MITIGATION**

### **12.1 Notification of Completion**

The Project proponent will coordinate and notify the City DSD-MMC and all applicable resource agencies in order to gain concurrence that final performance standards have been met. This will be accomplished through the submittal of a final monitoring report (end of year 5, or sooner if success criteria thresholds have been met) and a request for Notification of Completion. An analysis of quantitative sampling data will be included in the report to demonstrate that the Mitigation Site has met year-5 success standards. At this point, all temporarily installed materials such as staking, fencing, irrigation and erosion control must be removed prior to receiving the Notification of Completion. Applicable agencies that are required to provide concurrence that the Mitigation Site has met performance standards have not yet been determined; however, it is anticipated that concurrence from the City DSD-MMC, U.S. Army Corps of Engineers and Regional Water Quality Control Board will be required.

### **12.2 Agency Confirmation**

Following the submission of the final annual report and receipt of the Notification of Completion, the City DSD-MMC and the resource agencies may visit the Mitigation Site for confirmation. Maintenance and monitoring of the Mitigation Site will cease once the City DSD-MMC and the agencies confirm the completion of the mitigation program in writing.

### **12.3 Long-Term Management**

Specifics of long-term management of the Mitigation Site have not yet been coordinated with the appropriate resource agencies (CDFW, CCC, USFWS, USACE, RWQCB). Once coordination with applicable agencies has been completed, a separate long-term management plan will be provided for the Project and will supersede measures outlined in this section once approved.

Pacific West Communities is the current owner of the property used as mitigation for Project implementation. All restoration, enhancement and creation areas are part of the MSCP and are within the City's preserved MHPA lands. As such, applicable regulations include required development restrictions. Once the Mitigation Site has met the five-year success standards and has been signed by all applicable regulatory agencies, the owner will review the final annual report and accept long-term management responsibility. The owner will manage the 0.616-acre Mitigation Site which will include long-term maintenance and monitoring, non-native vegetation control, wildlife habitat monitoring, and trash removal as listed below as required by the MSCP Subarea Plan (City 1997).

The Mitigation Site owner will provide long-term protection of the Mitigation Site through a real estate instrument or other long-term protection mechanism, partially or fully funded through HOA fees. The owner is responsible for protection and management of the Mitigation Site for the purposes of native habitat and species conservation in accordance with the MSCP Implementing Agreement, which requires the City to preserve lands within the MHPA.



According to the City of San Diego MSCP, Section 21.3 of the Implementing Agreement states that “notwithstanding the stated term as herein set forth, the Parties agree and recognize that once Take of a Covered Species has occurred and/or their habitat modified within the Subarea, such Take, and habitat modification will be permanent. The Parties, therefore, agree that the preservation and maintenance of the habitat provided for under this Agreement shall likewise be permanent and extend beyond the term of this Agreement.” Though the MSCP term is from 1997 to 2047, preservation of lands within the MHPA is defined as permanent and will extend in perpetuity beyond 2047.

The Mitigation Site will be maintained in conformance with the Implementing Agreement of MSCP which will ensure long-term sustainability for the Mitigation Site and will act as a conservation easement or deed restriction. The Mitigation Site owner will be required to provide a report summary of management actions completed each year. This report will be submitted to the City for review and approval. If management actions are determined to be insufficient to address long-term management of the Mitigation Site under requirements of the MSCP, the City may request additional remedial actions. Long-term management will include the following:

### **12.3.1 Non-native and Invasive Species Control**

Non-native species will be controlled through a variety of methods that may include hand removal, herbicide treatment, and/or mechanical removal. A particular focus of non-native control will focus on species known to occur within the Mitigation Site and vicinity that are listed as highly invasive by the CAL-IPC. All herbicide applications will be under the supervision of a Qualified Applicator (QAL) or under the direction of a Pest Control Advisor (PCA). Herbicide application must adhere to all local, state and federal regulations. Debris from removal of non-native species must be removed from the Mitigation Site and disposed of at approved facilities. Non-native removal activities will be conducted in a manner to prevent spreading of seed, roots, and shoots around the Mitigation Site or adjacent areas. Non-native biomass may only be temporarily stored onsite if contained within a fully sealed containers; however, generally speaking all non-native biomass should be removed at the end each workday whenever feasible.

Habitat management within created, enhanced or restored habitat that has the potential to effect special status wildlife will be evaluated prior to initiating maintenance activities. This may include pre-activity surveys for MBTA-covered, nesting birds during the breeding season (March 1 through September 1).

### **12.3.2 Access**

Personnel requiring access to the Mitigation Site for the purposes of implementing long-term management (biologists, restoration ecologists, City staff, etc.) will have access to the Mitigation Site. Staff hired by Ascent will be responsible for conducting long-term monitoring and provide direction for potential remedial actions that may be required. All remedial actions conducted must be consistent with MSCP and MHPA guidelines.

### **12.3.3 Trash Removal**

At least annually, trash and inorganic debris will be removed from the Mitigation Site. All materials removed from the Mitigation Site must be disposed of offsite at appropriate facilities per local, state

and federal regulations. Materials from native species (leaf litter, dead branches, etc.) can be beneficial for habitat function of the Mitigation Site and is not considered trash. All debris from native plant species will be left onsite.

#### **12.3.4 Unforeseen Environmental Impacts**

Additional remediation measures may be required in addition to management activities listed above if determined at the discretion of the monitoring team. Potential unforeseen impacts to the site could occur in the form of flooding, fire, erosion, or effects from adjacent land uses. Monitoring will identify if unforeseen impacts are causing habitat degradation within the Site. If identified, additional remedial actions may be required and, in some cases, may require coordination regulatory agencies to resolve.

### **13.0 CONTINGENCY MEASURES AND ADAPTIVE MANAGEMENT**

Contingency measures may be necessary if the all or a portion of the Mitigation Site does not meet performance standards in any given year of the 5-year maintenance period. In the event that performance standards are not met, maintenance and monitoring requirements will continue until standards are met and the resource agencies issue final Project approval.

#### **13.1 Initiating Procedures**

In the event that performance standards are not met, the Project proponent will consult with the Restoration Specialist and maintenance contractor to determine additional remedial measures that can be implemented to further promote the success of the Project. If the City and applicable resource agencies do not accept that wetland enhancement, creation and restoration has been sufficiently conducted, the Restoration Specialist will provide an analysis of the cause(s) of Site deficiencies and develop a supplemental mitigation strategy. This analysis should be coordinated with applicable City staff (DSD and MMC) and the resource agencies, and the supplemental strategy should be approved prior to implementation.

#### **13.2 Funding Mechanism**

The Project owner is responsible for all costs associated with the planning, implementation and monitoring of contingency measures, if required due to failure of the Site to meet success standards. Long-term maintenance will be funded through HOA fees collected annually.

## 14.0 REFERENCES

- Blackhawk Environmental, Inc.  
2020 Alvarado Creek Affordable Housing Project: Biological Survey Report. San Diego, San Diego County, CA. January 2021.
- Blackhawk Environmental, Inc.  
2020 Alvarado Creek Affordable Housing Project: Jurisdictional Delineation Report. San Diego, San Diego County, CA. January 2021.
- Calflora  
2021 Information on California plants for education, research and conservation. [web application]. Berkeley, California: The Calflora Database [a non-profit organization]. Available: <http://www.calflora.org/>. Accessed February 2021.
- City of San Diego's Environmentally Sensitive Lands Regulations (ESL) and San Diego Land. Land Development Manual – Biological Guidelines, 2012. Vegetation community classifications are described according to Holland (1986) and Oberbauer (2008).
- City of San Diego. Multiple Species Conservation Program – City of San Diego MSCP Subarea Plan. March 1997. Accessed at <http://www.sandiego.gov/planning/programs/mscp/pdf/subareafullversion.pdf>
- California Department of Fish and Game (CDFG)  
1994 Environmental Services Division (ESD). A Field Guide to Lake and Streambed Alteration Agreements, Sections 1600-1607, California Fish and Game Code.
- DiTomaso, J.M., G.B. Kyser et al. 2013. Weed Control in Natural Areas in the Western United States. Weed Research and Information Center, University of California. 544 pp.
- Hoag, C. J. 2007. Technical Note – How to Plant Willows and Cottonwoods for Riparian Restoration. USDA Natural Resources Conservation Service. 2-18 pp.
- Sawyer, J. O. and T. Keeler-Wolf. 1995. A Manual of California Vegetation. California Native Plant Society. 472 pp.
- URS. 2014. Final El Cuervo Del Sur Wetland Habitat Mitigation and Monitoring Plan. 14-62pp.