COMPENSATORY MITIGATION AND MONITORING PLAN FOR THE CITY OF CHULA VISTA'S WILLOW STREET BRIDGE REPLACEMENT PROJECT

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1.0 INTRODUCTION

1.1 Overview and Purpose

The City of Chula Vista (City) proposes to replace the existing two-lane Willow Street Bridge with a four-lane bridge where Willow Street crosses the Sweetwater River (project). Willow Street Bridge is located in the lower Sweetwater Valley and connects Sweetwater Road with Bonita Road in Chula Vista, California (Figures 1 and 2).

The City is coordinating with the California Department of Fish and Game (CDFG), U.S. Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and U.S. Fish and Wildlife Service (USFWS) to obtain permits and approval for temporary and permanent impacts to jurisdictional waters of the U.S. and state. The City is the project proponent and lead agency under the California Environmental Quality Act (CEQA). The project has a City-approved CEQA document; the Final Initial Study/Mitigation Negative Declaration, Willow Street Bridge Replacement Project, IS-10-006 (AECOM 2011).

The proposed bridge replacement project would consist of the construction of a new four-lane bridge with shoulders, Americans with Disabilities Act (ADA)-compliant sidewalks, and extension of Class II bike lanes. The superstructure would have a variable depth, ranging from 3.5 to 5.75 feet, and an overall width of 82 feet, 8 inches. Additional project components include roadway and traffic signal construction improvements, continuation of existing equestrian trail crossings, relocation of two existing waterlines, relocation of an existing open channel that is tributary to the Sweetwater River, and temporary realignment of an existing multipurpose path and footbridge. The project includes temporary encroachment and impacts within the County of San Diego's (County) Sweetwater Off-site Mitigation Area (SWOMA)[1] and the Chula Vista Municipal Golf Course. This temporary construction encroachment is needed to allow for construction access, staging, and storage of materials during construction of the bridge within the existing right-of-way.

The purpose of this Compensatory Mitigation and Monitoring Plan (CMMP) is to identify the proposed mitigation locations and describe the methodologies by which the City will mitigate for project impacts, pursuant to the standards set by the resource agencies (USFWS, CDFG,

[1] The SWOMA is located within the Sweetwater Regional Park, which is under the jurisdiction of the County. The SWOMA is owned and managed by the County's Department of Parks and Recreation and includes approximately 60 acres of riparian habitat along the Sweetwater River. The SWOMA was developed to mitigate for impacts to riparian habitat associated with maintenance for existing storm water facilities owned by the County.

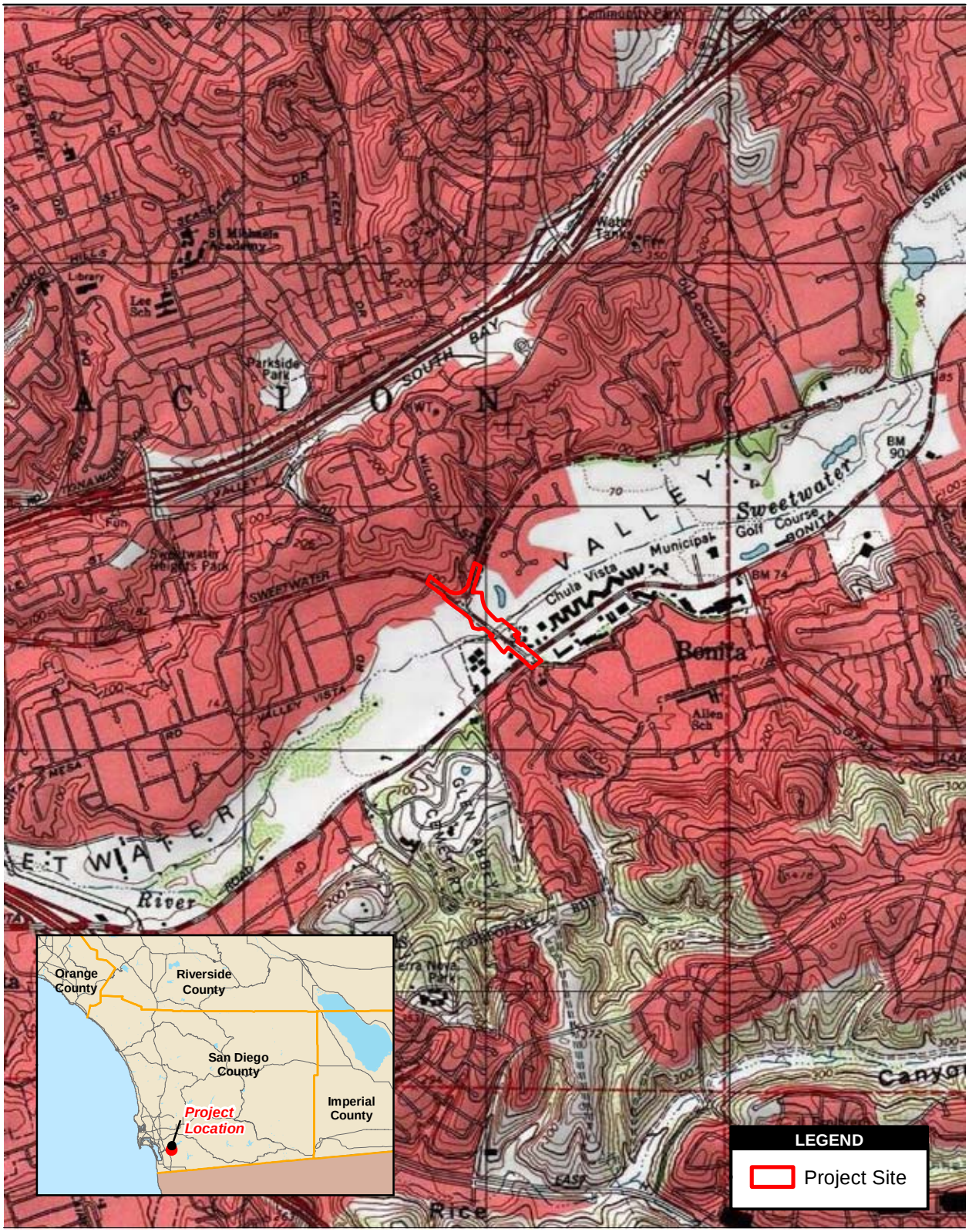
Source: ESRI 2012; SANGIS 2012

12 6 0 12 Miles

Scale: 1:760,320; 1 inch = 12 miles

Figure 1
Regional Map

Path: P:\2004\04080084 Willow Street Bridge\5GIS\Mxd\JDR\Fig1_Regional_Map.mxd, 10/12/2012, augellop



Source: ESRI 2012; SANGIS 2012; USGS Topo 7.5' Quad National City, CA 1975

2,000 1,000 0 2,000 Feet

Scale: 1:24,000; 1 inch = 2,000 feet

Figure 2
Vicinity Map

Path: P:\2004\04080084 Willow Street Bridge\5GIS\Mxd\CMMP\Fig2_Vicinity_Map.mxd, 10/12/2012, augellop

USACE, and RWQCB). This CMMP is presented in response to projected project impacts to jurisdictional habitats and in accordance with anticipated regulatory agency permit conditions.

The project site, which encompasses approximately 9.80 acres, is located in the City of Chula Vista and is bordered by the Chula Vista Municipal Golf Course to the east, the SWOMA to the west, Sweetwater Road to the north, and Bonita Road the south (Figure 2). The Sweetwater River flows west through the project site, with the width of the river reaching the entire length of the Willow Street Bridge and beyond into Bonita Road. The low-flow channel of the Sweetwater River is currently located under the south end of the existing bridge. All proposed project activities associated with the replacement of Willow Street Bridge will be contained within the project site.

1.2 Projected Jurisdictional Impacts and Compensatory Mitigation

The project has an approved Initial Study/Mitigation Negative Declaration (IS/MND) (AECOM 2011) that discusses project impacts and mitigation requirements. The exact impact acreages and mitigation ratios included in the IS/MND have been updated to reflect the final project design, an addendum to the MND including updated vegetation mapping (AECOM 2012a), and negotiations with the resource agencies regarding the need for additional mitigation for temporary impacts within the SWOMA. These updates are reflected in Tables 1 and 2, below. Table 1 summarizes the types and amounts of impacts to sensitive habitats and mitigation required. Table 2 summarizes the types and amounts of project impacts to jurisdictional wetland and other waters of the U.S. and state, and mitigation required.

Mitigation for permanent, direct project impacts to sensitive habitats and jurisdictional waters will occur off-site, through the purchase of mitigation credits at the Rancho Jamul Mitigation Bank. ***<<Number and type of credits being purchased>>***

Mitigation for temporary project impacts will be provided through revegetation of the temporary impact areas with native vegetation (at a 1:1 ratio) upon completion of bridge replacement construction. The temporary impact areas to be restored total 1.123 acres (Table 1).

Per direction from the resource agencies, additional mitigation for temporary impacts to habitat within the SWOMA, over and above the 1:1 restoration mitigation in-place, will also be provided through the purchase of mitigation credits at the Rancho Jamul Mitigation Bank. ***<<Number and type of credits being purchased>>***

Table 1. Project Impacts to Sensitive Habitats and Mitigation Required

Sensitive Natural Community	Permanent Impacts (acres)	Temporary Impacts (acres)	Mitigation Ratio[1]	Mitigation Required
City of Chula Vista				
Southern Cottonwood-Willow Riparian Forest	0.387	0.159	3:1 for permanent impacts; 1:1 for temporary impacts	Permanent Impacts: Enhancement/Creation of 1.161 acres (3:1) of wetland mitigation with at least 0.387 acre (1:1) of creation. Temporary Impacts: Restoration of 0.159 acre (1:1) on-site.
Southern Willow Scrub	0.270	0.235	3:1 for permanent impacts; 1:1 for temporary impacts	Permanent Impacts: Enhancement/Creation of 0.810 acre (3:1) of wetland mitigation with at least 0.270 acre (1:1) of creation. Temporary Impacts: Restoration of 0.235 acre (1:1) on-site.
Coastal and Valley Freshwater Marsh	0.000	0.005	1:1 for temporary impacts	Temporary Impacts: Restoration of 0.005 acre (1:1) on-site.
Nonnative Riparian	0.049	0.002	1:1 for permanent and temporary impacts	Permanent Impacts: Creation of 0.049 acre (1:1) of wetland mitigation. Temporary Impacts: Restoration of 0.002 acre (1:1) of native riparian on-site.
County of San Diego				
Southern Cottonwood-Willow Riparian Forest[2]	0.029	0.037	3:1 for permanent impacts; 1:1 for temporary impacts	Permanent Impacts: Enhancement/Creation of 0.087 acre (3:1) of wetland mitigation with at least 0.029 acre (1:1) of creation. Temporary Impacts: Restoration of 0.037 acre (1:1) on-site.
Southern Willow Scrub[3]	0.054	0.409	3:1 for permanent impacts; 1:1 for temporary impacts	Permanent Impacts: Enhancement/Creation of 0.162 acre (3:1) of wetland mitigation with at least 0.054 acre (1:1) of creation. Temporary Impacts: Restoration of 0.409 acre (1:1) on-site.
Nonnative Riparian[3]	0.063	0.099	1:1 for permanent and temporary impacts	Permanent Impacts: Creation of 0.063 acre (1:1) of wetland mitigation. Temporary Impacts: Restoration of 0.099 acre (1:1) of native riparian on-site.
Nonnative Grassland	0.086	0.177	0.5:1 for permanent and temporary impacts	Permanent and Temporary Impacts: Restoration of 0.177 acre (1:1) of NNG on-site.
TOTAL	**0.938**	**1.123**		

[1] Mitigation ratios for wetland impacts are consistent with the City's Wetland Protection Program, the County of San Diego's Biological Mitigation Ordinance, and state and federal guidelines pertaining to "no net loss."

[2] The southern cottonwood-willow riparian forest within the County's jurisdiction that would be impacted by the project is located to the east of the Willow Street Bridge and is not located within the SWOMA.

[3] Some southern willow scrub and nonnative riparian habitats within the County's jurisdiction that would be impacted by the proposed project are located within portions of the SWOMA identified for recruitment. Depending upon negotiations with the wildlife agencies, mitigation for impacts to these habitats within the SWOMA may be as high as 6:1.

Table 2. Project Impacts to Jurisdictional Wetlands and Other Waters and Mitigation Required

Jurisdictional Wetlands and Other Waters	Amount within Project Area (acres)	Permanent Impacts (acres)	Temporary Impacts (acres)[1]	Mitigation Ratio Required	Mitigation Required
City of Chula Vista					
USACE/CDFG Jurisdictional Wetlands and Other Waters[2]					
Southern Willow Scrub		0.077	0.066	3:1 for permanent impacts; 1:1 for temporary impacts	Permanent Impacts: Enhancement/Creation of 0.231 acre (3:1) of federal wetlands mitigation with at least 0.077 acre (1:1) of creation. Temporary Impacts: Restoration of 0.066 acre (1:1) on-site.
Mulefat Scrub		0.074	0.068	1:1 for permanent and temporary impacts	Permanent Impacts: Creation of 0.074 acre (1:1) of federal wetlands mitigation. Temporary Impacts: Restoration of 0.068 acre (1:1) on-site.
Coastal and Valley Freshwater Marsh		0.000	0.011	1:1 for temporary impacts	Temporary impacts: Restoration of 0.011 (1:1) acre on-site.
Freshwater		0.068	0.080	1:1 for permanent and temporary impacts	Permanent Impacts: Creation of 0.068 acre (1:1) of federal wetlands mitigation. Temporary Impacts: Restoration of 0.080 acre (1:1) on-site.
Nonvegetated Channel		0.019	0.419	1:1 for permanent and temporary impacts	Permanent Impacts: Creation of 0.019 acre (1:1) of federal wetlands mitigation. Temporary Impacts: Restoration of 0.419 acre (1:1) on-site.
CDFG Jurisdictional Waters Only[3]					
Nonwetland Riparian Habitat		0.254	0.121	1:1 for permanent and temporary impacts	Permanent Impacts: Creation of 0.254 acre (1:1) of federal wetlands mitigation. Temporary Impacts: Restoration of 0.121 acre (1:1) on-site.

Jurisdictional Wetlands and Other Waters	Amount within Project Area (acres)	Permanent Impacts (acres)	Temporary Impacts (acres)[1]	Mitigation Ratio Required	Mitigation Required
County of San Diego[4]					
USACE/CDFG Jurisdictional Wetlands and Other Waters[2]					
Southern Willow Scrub		0.010	0.060	3:1 for permanent impacts; 1:1 for temporary impacts	Permanent Impacts: Enhancement/Creation of 0.030 acre (3:1) of federal wetlands mitigation with at least 0.010 acre (1:1) of creation. Temporary Impacts: Restoration of 0.060 acre (1:1) on-site.
Mulefat Scrub		0.000	0.126	1:1 for temporary impacts	Temporary Impacts: Restoration of 0.126 acre (1:1) on-site.
Freshwater		0.000	0.015	1:1 for temporary impacts	Temporary Impacts: Restoration of 0.015 acre (1:1) on-site.
CDFG Jurisdictional Waters Only[3]					
Nonwetland Riparian Habitat		0.025	0.032	1:1 for permanent and temporary impacts	Permanent Impacts: Creation of 0.025 acre (1:1) of federal wetlands mitigation. Temporary Impacts: Restoration of 0.032 acre (1:1) on-site.
TOTALS		**0.527**	**0.998**		

[1] Temporary impacts to waters of the U.S. and riparian habitat will be due to construction activities associated with the bridge replacement.
[2] Jurisdictional areas included in USACE, RWQCB, and CDFG permitting.
[3] Jurisdictional areas including in CDFG permitting only.
[4] Temporary impacts to waters of the U.S. and riparian habitat within the County of San Diego's jurisdiction occur within an existing mitigation area and, depending upon negotiations with the wildlife agencies, mitigation for those impacts could be as high as 6:1.

In addition, six special-status species are reported from the project site (Section 2.2.4), including the federally listed least Bell's vireo (*Vireo bellii pusillus*) and coastal California gnatcatcher (*Polioptila californica californica*). Habitat for some of these species will be directly impacted by the project. These species may also be indirectly impacted by project construction activities. Mitigation for project impacts to special-status species' habitat will occur through the habitat mitigation measures discussed above. Indirect impacts will be avoided through the implementation of mitigation measures described in the IS/MND (AECOM 2011), including the preparation of this CMMP. The purchase of mitigation credits and preservation of native habitat at the Rancho Jamul Mitigation Bank, and the revegetation of the temporary impact areas will provide high-quality habitat for least Bell's vireo, coastal California gnatcatcher, and other sensitive species. This will adequately mitigate for potential impacts to special-status species caused by permanent, temporary, and indirect impacts to habitat types due to the project.

2.0 PROPOSED MITIGATION SITES

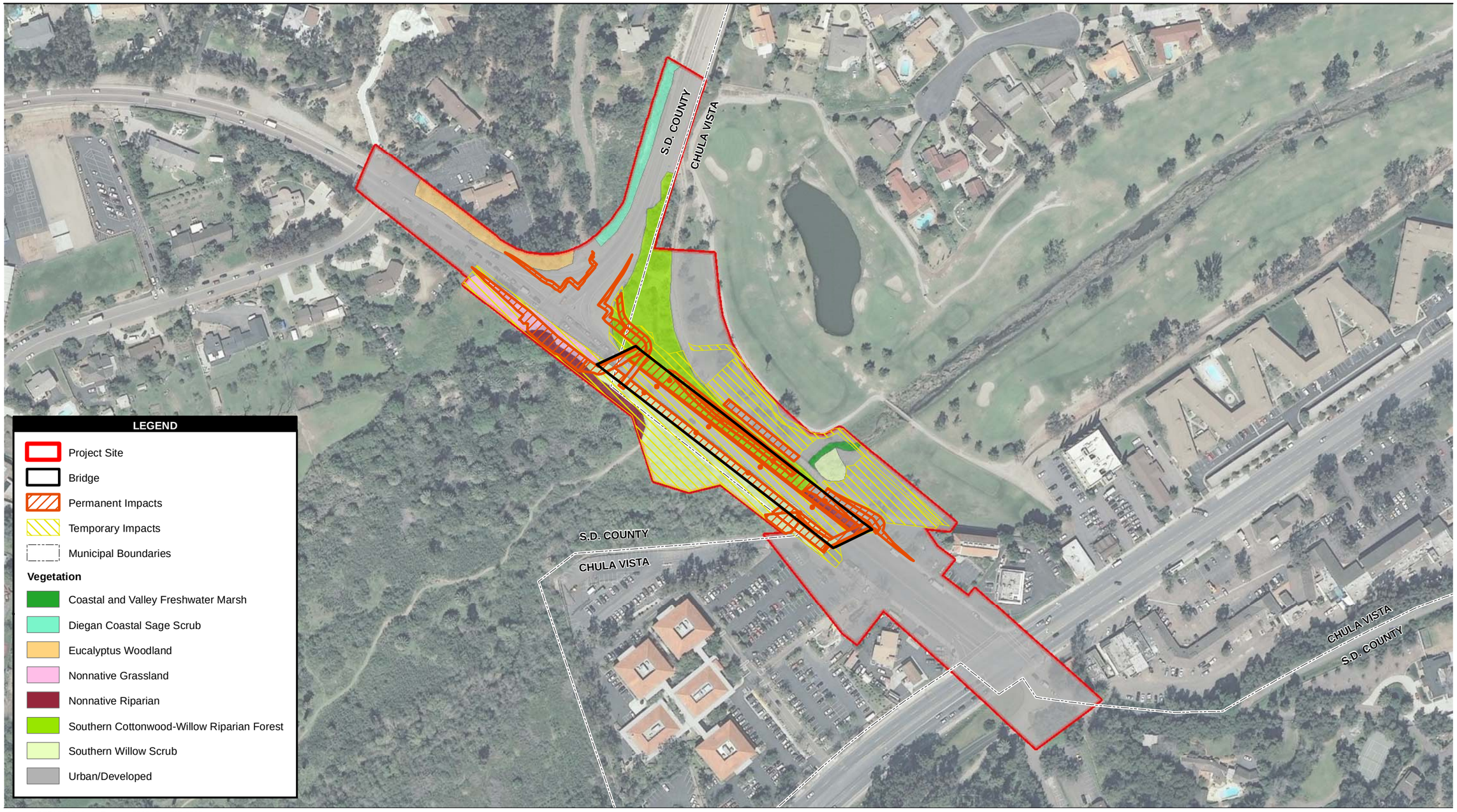
2.1 Location and Size

Mitigation for permanent, direct project impacts to sensitive habitats and jurisdictional waters will occur off-site, through the purchase of mitigation credits at the Rancho Jamul Mitigation Bank. This bank is located approximately 12 miles east of Chula Vista, with a primary service area including the Sweetwater, Otay, and Pueblo San Diego Hydrologic Units. ***<<Number and type of credits being purchased>>***

Mitigation for temporary project impacts will be provided through revegetation of the temporary impact areas (Figures 3 and 4) with native vegetation (at a 1:1 ratio) upon completion of bridge replacement construction. The temporary impact areas will be restored with the habitat types that these areas supported prior to project impacts. The temporary impact areas to be restored total 1.123 acres (Table 1).

Additional mitigation for temporary impacts to habitat within the SWOMA, over and above the 1:1 restoration mitigation in-place, will also be provided through the purchase of mitigation credits at the Rancho Jamul Mitigation Bank. ***<<Number and type of credits being purchased>>***

In general, the temporary impact areas consist of those areas of project impacts outside of the proposed new bridge footprint. The temporary impact areas include a section of the Sweetwater River, which flows west through the project site. The portion of the Sweetwater River that will be temporarily impacted is located within the Chula Vista Municipal Golf Course. This very small area (0.005 acre) is the location where the footbridge associated with the multipurpose path



Source: ESRI 2012; AerialExpress 2010; SanGIS 2012

200 100 0 200 Feet

Scale: 1:2,400; 1 inch = 200 feet

Figure 3
Permanent and Temporary Project Impacts to Sensitive Habitats

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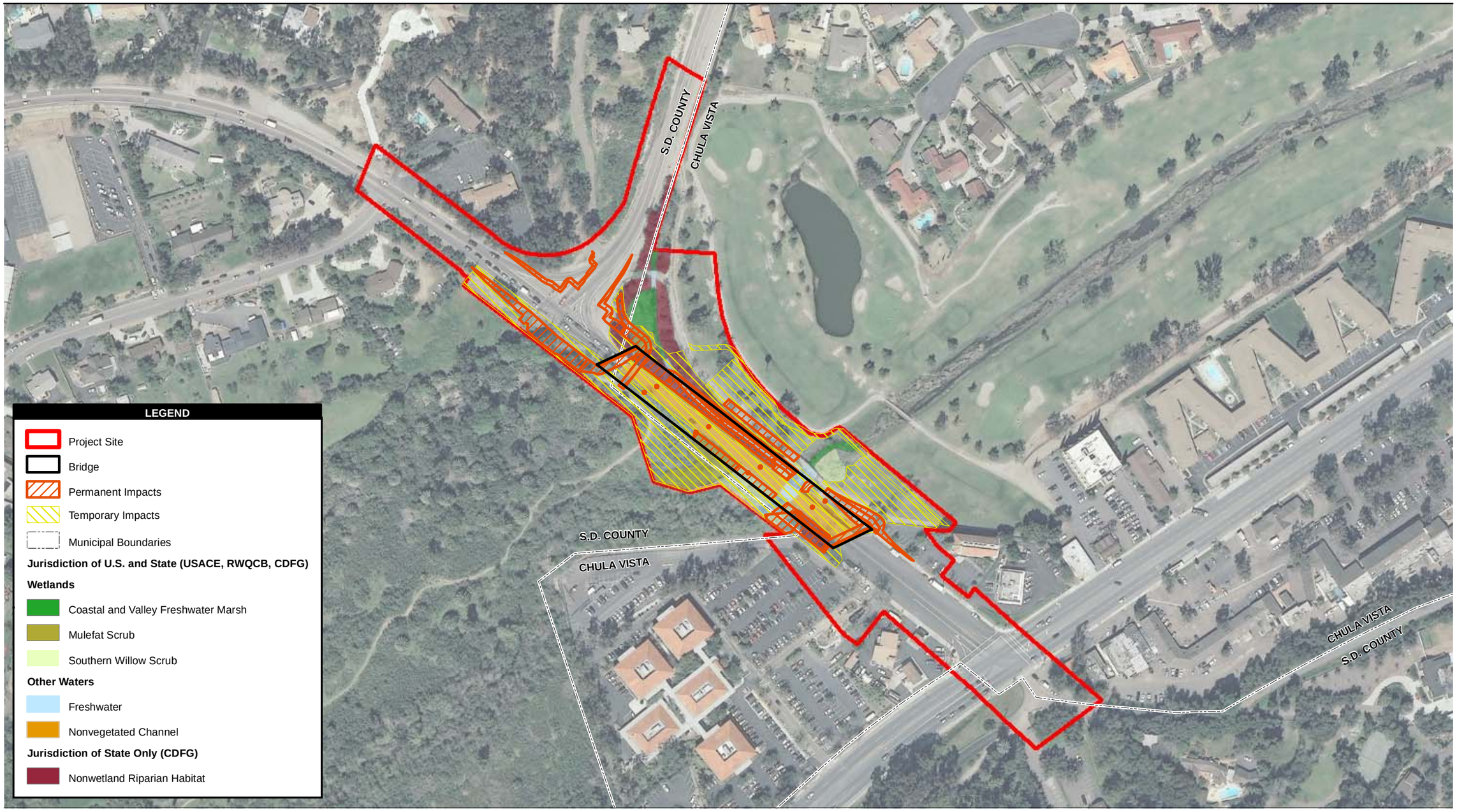

Source: ESRI 2012; AerialExpress 2010; SanGIS 2012

200 100 0 200 Feet

Scale: 1:2,400; 1 inch = 200 feet

Figure 4
Permanent and Temporary Project Impacts to Jurisdictional Wetlands and Waters

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will be temporarily relocated during construction. The majority of the temporary impact areas support native riparian habitat that includes varying amounts of nonnative species. The northernmost portion of the temporary impact areas supports nonnative riparian habitat and nonnative grassland. The temporary impact areas are flanked by the Chula Vista Municipal Golf Course to the east, the SWOMA to the west, Sweetwater Road to the north, and Bonita Road to the south.

2.2 Existing Conditions

Sections 2.2.1 through 2.2.5 provide a discussion on the existing ecological conditions of the temporary impact areas. Note that these areas will be cleared and grubbed during project implementation, although some large trees may be cut at the base and their stumps left in the ground. However, for the most part, it is assumed that the areas will consist of bare dirt when revegetation implementation begins.

2.2.1 Topography and Soils

The temporary impact areas are located in the floodplain of the Sweetwater River, and a portion of the river's primary channel crosses the project site. The site is relatively flat, although it generally slopes upward on both banks of the river. Elevations on-site range from approximately 57 to 70 feet above mean sea level (MSL) (AECOM 2011).

Soil types found within the temporary impact areas include Riverwash; Olivenhain cobbly loam, 9 to 30 percent slopes; Terrace escarpments; Diablo clay, 2 to 9 percent slopes; and Tujunga sand, 0 to 5 percent slopes (AECOM 2012b). The majority of the temporary impact areas support Riverwash, Olivenhain cobbly loam, and Tujunga sand soils. Riverwash occurs in intermittent stream channels and is typically composed of sandy, gravelly, or cobbly material. It is excessively drained and rapidly permeable. Olivenhain soils are well-drained, moderately deep to deep cobbly loams that have a very cobbly clay subsoil. These soils formed in old gravelly and cobbly alluvium, and are found on dissected marine terraces with slopes of 2 to 50 percent. Olivenhain soils are used mainly for range and watershed. Tujunga soils are very deep, excessively drained sands derived from granitic alluvium. They occur on alluvial fans and floodplains with slopes of 0 to 5 percent. This soil is susceptible to short periods of flooding (USDA 1973).

Given that the temporary impact areas will be restored with the habitat types that they supported pre-construction, the topography and soils within the temporary impact areas should be suitable to support the revegetation project as planned.

2.2.2 Hydrology

The Sweetwater River is the only U.S. Geological Survey blue line stream that crosses the temporary impact areas. The river flows from east to west and parallels the southern boundary of the site. The headwaters of the Sweetwater River begin in the Cuyamaca Mountains. The river flows west through unincorporated San Diego County, the City of Bonita, the City of National City, and the City of Chula Vista. The river empties into San Diego Bay via the Sweetwater Marsh.

The Sweetwater River is classified as an intermittent stream/river in the National Hydrography Dataset and is considered a relatively permanent water, indicating that the waterbody typically flows year-round or has continuous flow at least seasonally. Specific segments of the river reach coincident with the survey area contain either flowing or standing water through at least the winter months and the majority of the dry season, which is evidenced by signs of frequent flooding and permanently inundated areas occupied by emergent, persistent wetland habitat (AECOM 2012b).

Two separate and discreet hydrologic inputs to the Sweetwater River are present within the project site. An excavated channel that flows west along the south side of Sweetwater Road and toward Willow Street Bridge bends south just north of the existing Willow Street Bridge and continues south along the east side of the bridge until it forms a confluence with Sweetwater River. This channel likely remains inundated throughout the year. The second discreet input originates from a quadruple culvert located east of Willow Street Bridge at its southern terminus. Hydrologic inputs from the culvert have created an ephemeral unvegetated channel that continues north under the existing Willow Street Bridge until the bridge's northern terminus. Two other culverts are located within the survey area but do not form discreet hydrological connections with Sweetwater River or the excavated channel. Other surface water inputs into the temporary impact areas include overland sheetflow from surrounding impervious surfaces and irrigation runoff from the Chula Vista Municipal Golf Course (AECOM 2012b).

Geocon Inc. prepared a geotechnical investigation of the project site. Groundwater was not directly observed during the field investigation due to the use of drilling fluids for mud rotary borings. However, saturated soil samples encountered in the borings taken at the project site indicated that the groundwater surface elevation is near the water level in the active river channel of about 58 feet MSL. The groundwater levels are expected to fluctuate seasonally with the water level in the river (AECOM 2011). Portions of the project site are designated as high risk flood areas (Federal Emergency Management Agency Flood Zone Designations A and AE). Portions

of the project site are also determined to be within the 100- and 500-year floodplains (AECOM 2012b).

Given that the temporary impact areas will be restored with the habitat types that they supported pre-construction, the hydrology within the temporary impact areas should be adequate to support the restoration project as planned.

Additional information regarding hydrology is provided in the jurisdictional delineation report for the project site (AECOM 2012b).

2.2.3 Existing Vegetation

The descriptions of the existing vegetation within the temporary impact areas are based on updated habitat mapping completed in September 2012 and are summarized in the addendum to the MND (AECOM 2012a). Vegetation community classification follows Holland (1986) as modified by Oberbauer et al. (2008).

Southern cottonwood-willow riparian forest (SCWRF) is found to the north and east of the existing bridge, in association with a minor drainage channel that drains into the Sweetwater River. This habitat supports Fremont cottonwood (*Populus fremontii*), black willow (*Salix gooddingii*), arroyo willow (*S. lasiolepis*), red willow (*S. laevigata*), and occasional western sycamores (*Platanus racemosa*). The understory is composed of shrubby willows and mulefat (*Baccharis salicifolia*). A number of nonnative, ornamental tree species were noted within the SCWRF, including Canary Island date palm (*Phoenix canariensis*), Brazilian pepper tree (*Schinus terebinthifolius*), Peruvian pepper tree (*Schinus molle*), river red gum (*Eucalyptus camaldulensis*), and Ngaio (*Myoporum laevis*).

Southern willow scrub (SWS) is present on-site in association with the portion of the Sweetwater River to the west of the bridge. This dense, broad-leaved, winter-deciduous riparian habitat is dominated by black willow, arroyo willow, red willow, narrow-leaf willow (*S. exigua*), and mulefat. Understory species include natives, such as western ragweed (*Ambrosia psilostachya*), Douglas mugwort (*Artemisia douglasiana*), and stinging nettle (*Urtica dioica*), and nonnative species, including wild celery (*Apium graveolens*), ripgut brome (*Bromus diandrus*), bull thistle (*Cirsium vulgare*), and others.

Coastal and valley freshwater marsh (CVFM) is found in the temporary impact areas within the small section of the Sweetwater River within the Chula Vista Municipal Golf Course that will be temporarily impacted by shading due to temporary relocation of the footbridge. The CVFM is

dominated by common bulrush (*Schoenoplectus acutus* var. *occidentalis*), Olney's three-square bulrush (*S. americanus*), and broad-leaf cattail (*Typha latifolia*).

A strip of nonnative riparian (NNR) vegetation is present along the western side of the temporary impact areas. This habitat is dominated by nonnative, invasive species, which account for greater than 50 percent of the total vegetative cover within the mapping unit. Indicator species in the NNR habitat on-site include Canary Island date palm (*Phoenix canariensis*), Brazilian peppertree (*Schinus terebinthifolius*), Peruvian peppertree (*Schinus molle*), and eucalyptus (*Eucalyptus* sp).

Nonnative grassland (NNG) is found at the northwestern end of the temporary impact areas, abutting the intersection of Willow Street and Sweetwater Road. This habitat is characterized by a dense to sparse cover of annual grasses and forbs often with native and nonnative annual forbs of Mediterranean origin (Oberbauer 2008). Dominant species in the NNG include various brome grass (*Bromus* spp.), wild oats (*Avena* spp.), wild radish (*Raphanus sativus*), prickly lettuce (*Lactuca serriola*), and other nonnative grasses and forbs.

The project site is bordered to the east (upstream) by the Chula Vista Municipal Golf Course. Riparian vegetation associated with the SWOMA adjoins the project site to the west (downstream). The project site is bordered to the north by the intersection of Sweetwater Road and Willow Street and residential development. A shopping center and Bonita Road abut the project site to the south (Figure 2).

2.2.4 Sensitive Species

The federally and state endangered least Bell's vireo was detected within the project site during focused surveys conducted during the 2010 and 2005 breeding seasons. During the surveys in both years, a single least Bell's vireo was detected on-site late in the breeding season. Therefore, the least Bell's vireos heard during the protocol surveys are believed to be immature birds dispersing after the breeding season (AECOM 2011).

Coastal California gnatcatcher is a threatened species under the federal Endangered Species Act and is considered a California Species of Concern by CDFG (2009). A pair of California gnatcatchers was noted just outside of the project site during a reconnaissance survey conducted in 2009. They were observed on the slopes above Sweetwater Road covered with coastal sage scrub to the northeast of the project site (AECOM 2011).

Additional sensitive species found on the project site include the following (AECOM 2011):

- Orange-throated whiptail (*Aspidoscelis hyperythra*)
- Cooper's hawk (*Accipiter cooperii*)
- Yellow warbler (*Setophaga petechia*)
- Yellow-breasted chat (*Icteria virens*)

Implementation of restoration activities will follow measures to protect adjacent native habitat and will be timed to avoid direct and indirect impacts to sensitive species during their breeding seasons. The on-site restoration of native habitat and control of nonnative species will have a direct benefit to sensitive species by increasing their potential foraging and nesting habitats.

2.2.5 Jurisdictional Delineation

A jurisdictional delineation was completed for the project site (AECOM 2012b). Figure 4 illustrates the findings of the jurisdictional delineation. These findings are discussed in more detail in the jurisdictional delineation report (AECOM 2012b).

3.0 GOAL OF MITIGATION PROGRAM

The goal of this mitigation program is to successfully revegetate and restore the temporary impact areas to the native habitats and jurisdictional resources that were originally present in these areas prior to bridge replacement. Any portions of the temporary impact areas that were disturbed prior to bridge replacement will be revegetated with appropriate native habitat. The temporary impact areas will be temporarily impacted by project implementation and would likely persist in a disturbed state following these impacts in the absence of a focused habitat restoration effort. The temporary impact areas will require planting and seeding, and will be subject to a maintenance and biological monitoring period for a minimum of 5 years, unless the success criteria discussed in Section 6.6 are met earlier. Successful implementation of the mitigation program will provide appropriate compensatory mitigation for temporary project impacts to sensitive habitats and jurisdictional resources, and will restore the functions and services of the habitats and jurisdictional waters that will be temporarily impacted by the project.

3.1 Types of Habitat to Be Restored

The types of habitats proposed for restoration within the temporary impact areas consist primarily of those habitats that were present in these areas prior to bridge replacement. Any

portions of the temporary impact areas that supported nonnative habitats prior to bridge replacement will be planted and revegetated with appropriate native plant species.

The habitats to be restored consist of 0.196 acre of SCWRF, 0.644 acre of SWS, 0.005 acre of CVFM, 0.101 acre of NNR, and 0.177 acre of NNG (Table 3). All areas of sensitive vegetation communities and jurisdictional wetlands and other waters that will be temporarily impacted will be revegetated with native habitat. Therefore, the proposed restoration will provide adequate in-kind mitigation for temporary project impacts.

Table 3. Summary of Temporary Impact Areas to Be Restored

Current Habitat	Pre-Impact Acreage	Restored Habitat	Restored Acreage
SCWRF	0.196	SCWRF	0.229
SWS	0.644	SWS	0.644
CVFM	0.005	CVFM	0.005
NNR	0.101	Native riparian habitat[1]	0.101
NNG	0.177	Native upland habitat[1]	0.177
TOTAL	**1.123**		**1.156**

[1] Appropriate habitat types for the temporary impact areas that are currently disturbed with nonnative species will be determined by the restoration ecologist based on the ecological conditions and the immediately adjoining habitat types.

3.2 Functions and Values to Be Restored

Habitat functions are defined as the normal or characteristic activities that take place in a particular habitat. Wetland/riparian areas perform a wide variety of functions, in a hierarchy from simple to complex, as a result of their physical, chemical, and biological attributes. At the highest level of this hierarchy is the maintenance of ecological integrity, the function that encompasses all of the structural components and processes in a wetland/riparian ecosystem (Smith et al. 1995). Example wetland functions that may be provided by the temporary impact areas include water quality improvement, floodwater storage, fish and wildlife habitat, aesthetics, and biological productivity. Upland habitats also perform ecological functions, such as providing habitat for wildlife species and buffer habitat for wetlands.

The mitigation program is intended to restore all habitat functions and values that will be temporarily impacted by bridge replacement by restoring the temporary impact areas with native habitat. In addition, because the temporary impact areas are degraded to a certain extent by edge effects (including the presence of nonnative plant species) associated with the surrounding urban development, their restoration provides an opportunity to increase the ecological functions within

these areas. Therefore, restoration of the temporary impact areas with native habitat is expected to provide a "lift" to biotic and abiotic processes and functions within the temporary impact areas (e.g., improved and expanded habitat for sensitive species such as least Bell's vireo).

3.3 Rationale for Expecting Success

The majority of the temporary impact areas previously supported the habitat types with which they will be restored, indicating that these areas are suitable for those habitat types. The habitat types for temporary impact areas that were disturbed with nonnative species before project impacts will be decided based on ecological conditions and adjacent habitat types, which will ensure that these areas are restored with appropriate habitats. Given the observed hydrological patterns and riparian vegetation within the majority of the temporary impact areas, there is a high confidence that the site hydrology will successfully support the planned habitats after completion of the restoration program. It is expected that once the restored habitat is established, it will be healthy and self-sustaining.

Based on the site conditions, it is expected that temporary irrigation would only be needed for 2 (or 3) years to help establish container plants and seeded species. After that, irrigation use would be permanently discontinued.

The mitigation program is also expected to be successful because of the location of the temporary impact areas within and adjacent to the SWOMA, which already supports wetland restoration and mitigation areas. The project's location lends high confidence that directly adjacent land uses will remain compatible with the habitat restoration.

3.4 Time Lapse

Construction of the proposed project is anticipated to last approximately 27 months and would be conducted in stages to maintain vehicle access during construction. Implementation of the restoration program will occur after the conclusion of bridge replacement activities, once the temporary impact areas are no longer needed for construction staging. The mitigation and monitoring program will take place over a 5-year period following restoration installation. The success standards described in Section 6.6 are intended to be met at the end of this period. Establishment of multi-canopy and high-quality riparian habitats may take longer than 5 years. Specifically, willows and other tree species can take 10 to 15 years to mature, depending on environmental factors such as water availability and soil conditions. Therefore, the 5-year success standard represents an intermediate stage in the long-term succession of the restored habitat.

4.0 IMPLEMENTATION PLAN

Provided below is a review of responsible parties and information about access and staging areas, implementation steps and schedule, nonnative species removal protocols, site preparation, temporary irrigation, and the planting plan.

4.1 Responsible Parties

Project Proponent. The City is responsible for financing installation, maintenance, and monitoring in accordance with this CMMP to successfully complete the mitigation program. The City's project manager will be responsible for coordinating project progress and ensuring that the details in this plan are successfully carried out.

Restoration Specialist. Overall supervision of the installation, maintenance, and monitoring of this mitigation program will be the responsibility of a qualified restoration ecologist. The restoration ecologist will be an individual or team of individuals with a degree in botany, ecology, or related field, and a minimum of 5 years of successful experience in Southern California with wetland and riparian restoration. The restoration ecologist will educate all participants about mitigation goals and requirements, and oversee protection of existing biological resources; nonnative plant removal; erosion control; site preparation; planting and seeding; and maintenance, monitoring, and reporting.

Landscape Architect. Any landscape construction plans for the on-site revegetation program will be prepared by a licensed landscape architect. This task may be completed by the restoration ecologist if that individual(s) is in possession of the appropriate qualifications.

Installation Contractor. The City will retain a qualified landscape installation contractor with demonstrated experience in successfully installing and maintaining wetland restoration projects. The contractor will be responsible for implementing the mitigation program and providing maintenance for the 120-day plant establishment period (PEP). The contractor will be a firm (or firms) holding a contractor's license (C-27). The responsibility of the contractor will be complete when the City's project manager agrees that the implementation and initial maintenance phases of work are completed, per the plan specifications. As determined by the City, the installation landscape contractor may continue after installation to maintain the temporary impact areas parcel for 5 years, or the City may retain a separate qualified landscape contractor to perform the 5-year post-installation maintenance period.

Maintenance Contractor. The City will retain a qualified landscape maintenance contractor with demonstrated experience in successfully maintaining wetland restoration projects. The contractor will be responsible for maintaining the mitigation program, beginning with the approval of the 120-day PEP and ending with mitigation program sign-off. The contractor will be a firm (or firms) holding a contractor's license (C-27). The responsibility of the contractor will be complete at the end of the 5-year maintenance period or when the mitigation program receives sign-off from the City and the resource agencies, whichever occurs first.

4.2 Access and Staging

Access to the portion of the temporary impact areas within Chula Vista will be granted temporarily by the City to the contractors who will be conducting habitat restoration installation, maintenance, and monitoring activities. Access will be allowed during daylight working hours on days approved by the City. The County will temporarily grant access to the contractors to those temporary impact areas within the County limits. Access will be allowed during daylight working hours on days approved by the County.

Access and staging will be conducted in a manner that avoids direct or indirect impacts to adjacent native habitat areas. Vegetation trimming will not be needed to allow access to the temporary impact areas, and foot access should be via established paths (e.g., the County's equestrian trail or the City's multipurpose path) whenever possible.

To protect against contaminant leakages during access and staging, the contractor will be responsible for taking measures to prevent chemicals, fuels, oils, and other hazardous materials from entering public water, air, and soils. Disposal of any materials, wastes, effluent trash, garbage, oil, grease, and chemicals will be done in accordance with federal, state, and local regulations.

4.3 Implementation Steps and Schedule

Implementation of the mitigation program will include demarcation of the temporary impact area limits, demarcation of the access and staging areas, site preparation, and container planting and seeding. Implementation of the restoration program should follow the schedule presented in Table 4. All work except planting, seeding, and maintenance activities will be completed outside of the breeding season (January 15 through September 15) to avoid potential impacts to raptors, and migratory birds, including least Bell's vireo.

Table 4. Anticipated Restoration Implementation Schedule

Task	Completed By
Preparation of Mitigation Construction Documents (grading, planting/seeding, and irrigation plans)	March 2013
Retainment of a Restoration Ecologist and Contractor(s)	May 2015
Initiation of Container Plant and Seed Acquisition	June–September 2015
Demarcation of the Temporary Impact Area Limits and Access/Staging Areas	June–September 2015
Exotics Treatment and Biomass Removal	July–October 2015
Decompaction of Temporary Impact Areas	August–September 2015
Container Planting and Seeding	December–January 2016
Implementation Monitoring	February 2016
Conduct 120-Day Plant Establishment Period (PEP)	February–April 2016
Conduct 5-Year Maintenance and Monitoring Period	5 years from successful installation (2021)

4.4 Site Preparation

Site preparation will include decompaction of the temporary impact areas (as necessary), removal of any remaining debris (concrete, trash, etc.), installation of erosion control and site protection materials, and eradication and removal of any nonnative species present within the temporary impact areas.

4.4.1 Site Protection and Species Conservation Measures

Prior to commencement of restoration activities, the limits of the temporary impact areas will be surveyed and marked in the field. The temporary impact will be protected from public access with temporary fencing and/or signs prohibiting trespassing. The temporary fencing and/or signs will be installed in a manner that does not impact sensitive habitats to be avoided. The temporary impact area limits and temporary fencing will be checked and confirmed by the restoration ecologist and City before the contractor begins the installation phase.

To avoid potential impacts to listed species associated with the restoration program, certain measures to protect these species must be observed. These should include the following:

- Avoid work during bird breeding season (January 15 through September 15), except for planting, seeding, and maintenance activities.
- The restoration ecologist will conduct a training session for all personnel prior to the initiation of site preparation. At a minimum, the training will include a description of the listed and sensitive species in the area (including photographs), their general ecology, sensitivity of the species to human activities, legal protection afforded these species,

penalties for violations of federal and state laws, reporting requirements, and the conservation measures designed to avoid potential impacts to these species.

- The restoration ecologist will be on-site at least once a day during site preparation activities, planting, and seeding to check on the restoration and provide guidance to the field crews.
- No work will occur immediately prior to or during rain events.
- Project landscaping separate from the native habitat restoration areas will not include exotic plant species listed on California Invasive Plant Council's (Cal-IPC) "Invasive Plant Inventory" list (Cal-IPC 2006).

4.4.2 Native Species Salvage and Exotics Treatment

After bridge construction, site preparation will include the avoidance and protection of any salvageable native species and the removal and disposal of all nonnative vegetation. Prior to the initiation of exotics treatment, the restoration ecologist will determine if any native species are growing within the temporary impact areas that may be salvaged. Because the temporary impact areas will be used for construction access, staging, and material storage during bridge replacement, it is not expected that many, if any, native species will resprout or germinate on-site. However, during restoration site preparation activities, any salvageable native species identified by the restoration ecologist will be marked for protection via flagging and staking. These plants will be protected and avoided by the installation contractor during site preparation and installation activities.

In addition, all nonnative vegetation within the temporary impact areas will be removed and properly disposed of off-site. Initial removal of vegetation during the installation phase will occur primarily through physical and mechanical means (i.e., brushing and cutting), although perennial invasive exotics[2] will be treated with herbicide. Once decompaction of the site is completed, nonnative control during the planting and seeding phase and post-installation maintenance period will occur primarily through hand pulling and herbicide treatment. All nonnative seed heads and plant debris will be removed from the temporary impact areas and properly disposed of off-site. Perennial invasives should be treated using the "cut and daub" method, which may be conducted with chainsaws or handsaws. Any resulting material will be

[2] For the purposes of this CMMP, invasive exotic plants are those species recognized by the California Invasive Plant Council (Cal-IPC 2006) as "high" and "moderate" threats to California wildlands and those recognized on-site as potentially inhibiting the establishment and development of native plant species.

removed from the site and disposed of properly off-site. The remaining stumps may be left on-site to decompose, although they may require occasional herbicide re-treatment.

Herbicide application will be accomplished by licensed contractors using the herbicide Aquamaster (or equivalent aquatic-approved herbicide). Herbicide will be tinted with a biodegradable dye to facilitate visual control of spray. Herbicide reporting forms will be prepared and submitted to the City following application. Herbicide use should be limited to localized applications, rather than foliar applications, to limit the possibility for drift and impacts to neighboring native species.

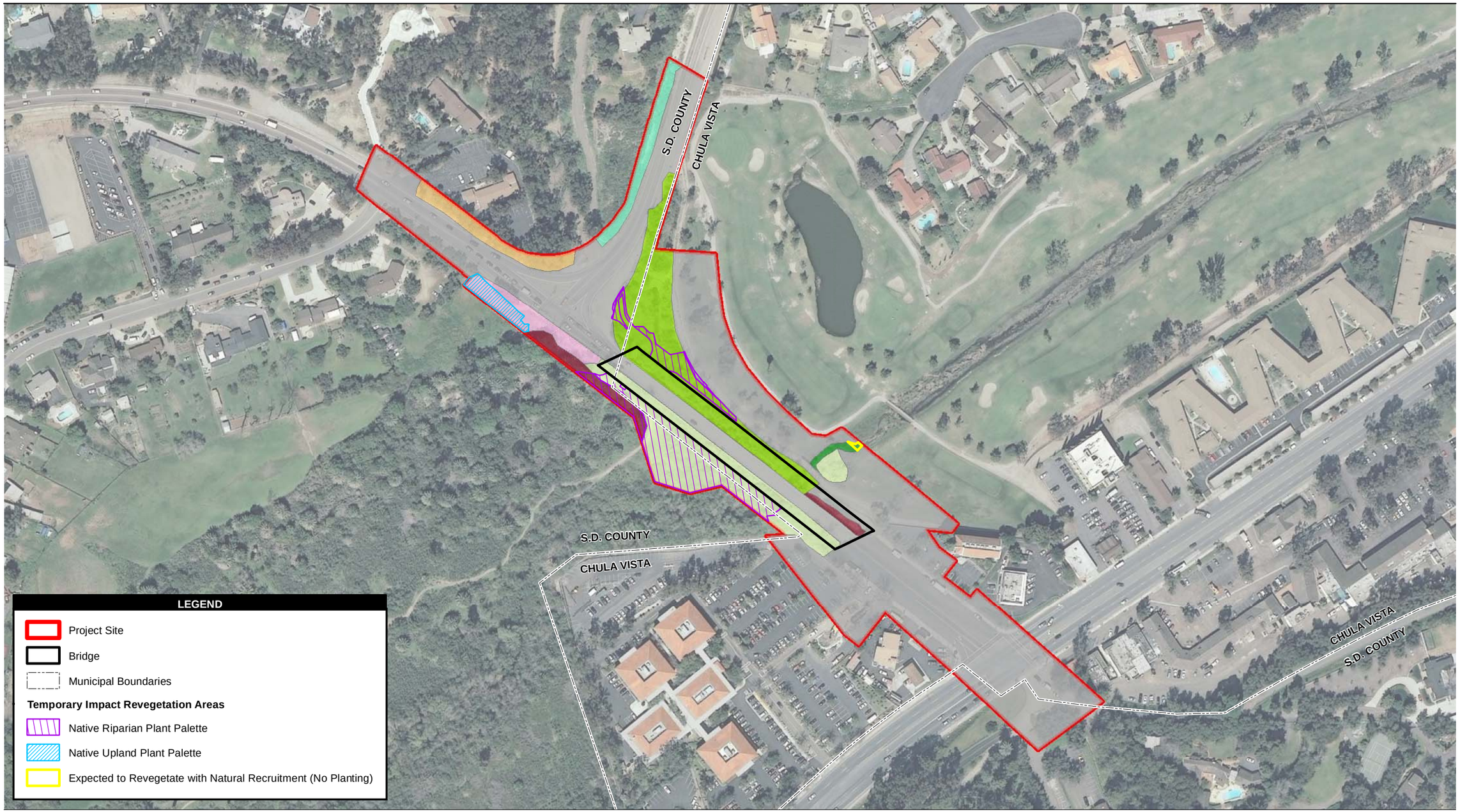
4.4.3 Decompaction and Erosion Control Measures

Following nonnative species removal, any portions of the temporary impact areas that have been compacted by construction activities will be decompacted. The restoration ecologist and installation contractor will determine which areas require decompaction. Decompaction will occur by ripping to a depth of 18 inches two times in a perpendicular pattern. Any resulting soil clods will be reduced in size to reestablish nature soil conditions on-site. The soil surface should be left in a roughened condition appropriate for promoting seed germination and establishment. Decompaction should occur immediately prior to planting and seeding, and appropriate erosion control materials will be installed following decompaction to avoid runoff and potential water quality issues.

Erosion control materials may consist of boundary silt fencing, gravel bags, fiber rolls, bonded fiber matrix, weed-free straw wattles, and mulch, as needed. These siltation and erosion control measures will be made from biodegradable materials and will have no plastic mesh, to avoid creating a wildlife entanglement hazard. Appropriate erosion control measures will be installed and maintained in areas of the site as determined by the restoration ecologist and the City.

4.5 Planting and Seeding Plan

Following completion of site preparation, container plants will be installed within the temporary impact areas (Figure 5). Planting should occur in the late fall, immediately concurrent with the onset of the winter rainy season, to take advantage of the full growing season and allow the planted species to become well established.



Source: ESRI 2012; AerialExpress 2010; SanGIS 2012

150 75 0 150 Feet

Scale: 1:1,800; 1 inch = 150 feet

Figure 5
Planting and Seeding Plan

Path: P:\2004\04080084 Willow Street Bridge\5GIS\Mxd\CMMP\Fig5_PlantingSeedingPlan.mxd, 12/13/2012, conradm

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Two site-specific container plant palettes and seed mixes were developed for application within the temporary impact areas. Native riparian and upland plant palettes and seed mixes are provided in Tables 5 and 6, respectively. A plant palette for CVFM is not provided, as the amount of this habitat that will be temporarily impacted is very small and will only be impacted by temporary shading caused by the footbridge (no clearing of vegetation). This habitat is expected to passively revegetate following the removal of the footbridge.

The plant selections are based on native plant species observed or known to occur within the vicinity of the site. These plant palettes are based on intentionally overplanting the temporary impact areas to a small degree to allow for some mortality while still achieving the restoration program goals. The restoration habitat types for the temporary impact areas that were disturbed with nonnative species before being impacted will be determined in the field by the restoration ecologist, based on ecological conditions and adjacent habitat types. The majority of these areas are expected to be planted with riparian species. However, the final species numbers installed in the temporary impact areas will be provided with the as-built construction plans prepared at the completion of installation.

Container plants will be installed prior to application of the two seed mixes. Container plants will be installed in a manner that mimics natural plant distribution (e.g., random and/or aggregate distributions rather than uniform rows). Prior to planting, the restoration ecologist will lay out the species and provide appropriate composition layouts within different ecological settings. This is particularly important, as different riparian species are expected to thrive in different portions of the temporary impact areas, based on elevations and distance to groundwater. Generally, wetter areas (those closer to the Sweetwater River) will be planted with different species (e.g., willows, Fremont cottonwood) than those that are not as seasonally wet (e.g., mulefat, western sycamore, coyote brush).

Specific container plant and seed specifications are as follows.

Table 5. Native Riparian Plant Palette and Seed Mix

Species	Common Name	Container Size	Approx. Spacing (feet on center) from Like Species[3]	Number per Acre[4]
CONTAINER PLANTS[1,2]				
Understory and Shrub Species				
Baccharis pilularis	coyote brush	1 gallon	15	50
Baccharis salicifolia	mulefat	1 gallon	20	100
Rosa californica	California rose	1 gallon	12	100
Salix exigua	narrow-leaf willow	1 gallon	20	100
Subtotal				**350**
Trees				
Platanus racemosa	western sycamore	1 gallon	30	50
Populus fremontii	Fremont cottonwood	1 gallon	40	25
Salix gooddingii	black willow	1 gallon	40	100
Salix laevigata	red willow	1 gallon	15	100
Salix lasiolepis	arroyo willow	1 gallon	15	100
Subtotal				**375**
Total				**725**

[1] Plants will be from within 10 miles of the project site or from alternative sources (closest commercially available sources) approved by the restoration ecologist.
[2] Plants will be certified as free of exotic pests (e.g., Argentine ants) prior to delivery on-site.
[3] Any potential substitutions must be approved by the restoration ecologist. The restoration ecologist will lay out the species and will provide appropriate composition layouts within different ecological settings.
[4] The 725 plant-per-acre average equals approximate spacing of 8 feet on center.

Species	Common Name	Minimum Percent Purity/ Germination	Pounds of Pure Live Seed (PLS) per Acre[3]
SEED MIX[1,2]			
Ambrosia psilostachya	western ragweed	85/25	2.0
Artemisia douglasiana	Douglas' mugwort	75/50	0.4
Carex spissa	San Diego sedge	85/75	1.0
Eleocharis macrostachya	pale spike-rush	70/70	1.0
Heliotropium curassavicum	salt heliotrope	8/48	0.5
Leymus condensatus	giant wild-rye	90/80	1.0
Juncus mexicanus	Mexican rush	95/80	0.1
Oenothera elata ssp. *hookerii*	Hooker's evening primrose	98/75	0.8
Pluchea sericea	arrow weed	35/60	0.1
Total			**6.9**

[1] Seeds will be from within 10 miles of the project site or from alternative sources (closest commercially available sources) approved by the restoration ecologist.
[2] Any potential substitutions must be approved by the restoration ecologist.
[3] The contractor will purchase the quantity of bulk seed that provides the specified PLS given the actual purity and germination rates of the seed stock.

Table 6. Native Upland Plant Palette and Seed Mix

Species	Common Name	Container Size	Approx. Spacing (feet on center) from Like Species[3]	Number per Acre[4]
CONTAINER PLANTS[1,2]				
Artemisia californica	California sagebrush	1 gallon	15	200
Baccharis pilularis	coyote brush	1 gallon	15	75
Bahiopsis laciniata	San Diego sunflower	1 gallon	15	120
Eriogonum fasciculatum	California buckwheat	1 gallon	15	245
Isocoma menziesii	coastal goldenbush	1 gallon	15	85
Rhus integrifolia	lemonadeberry	1 gallon	80	5
Salvia mellifera	black sage	1 gallon	15	145
Total				**875**

[1] Plants will be from within 10 miles of the project site or from alternative sources (closest commercially available sources) approved by the restoration ecologist.
[2] Plants will be certified as free of exotic pests (e.g., Argentine ants) prior to delivery on-site.
[3] Any potential substitutions must be approved by the restoration ecologist.
[4] The 875 plant-per-acre average equals approximate spacing of 7 feet on center.

Species	Common Name	Minimum Percent Purity/ Germination	Pounds of Pure Live Seed (PLS) per Acre[3]
SEED MIX[1,2]			
Acmespon glaber	deerweed	90/60	1.0
Artemisia californica	California sagebrush	15/50	0.6
Baccharis pilularis	coyote brush	2/40	0.1
Eriogonum fasciculatum	California buckwheat	10/65	2.0
Eschscholzia californica	California poppy	98/75	1.5
Isocoma menziesii	coastal goldenbush	20/40	0.1
Phacelia cicutaria	caterpillar phacelia	95/80	0.5
Salvia mellifera	black sage	70/50	0.7
Total			**6.5**

[1] Seeds will be from within 10 miles of the project site or from alternative sources (closest commercially available sources) approved by the restoration ecologist.
[2] Any potential substitutions must be approved by the restoration ecologist.
[3] The contractor will purchase the quantity of bulk seed that provides the specified PLS given the actual purity and germination rates of the seed stock.

4.5.1 Container Plant Specifications

The contractor will obtain container plants from a qualified nursery. All plant materials will be locally native species; no cultivars will be used. Plants and seeds should be obtained from the Sweetwater River watershed in San Diego County, to the extent feasible. Plants must be certified by the nursery to be free of exotic pests (e.g., Argentine ants) prior to delivery on-site.

The restoration ecologist will confirm that plants are delivered to the site in a healthy and vigorous condition before they are installed. The restoration ecologist will inspect container

plants and reject plants that are dead, root-bound, stunted, pest-infested, diseased, or unacceptable for other reasons. Prior to planting, the restoration ecologist will lay out the species and will provide appropriate composition layouts within different ecological settings. In addition, the restoration ecologist will be on-site at least once a day during planting of the temporary impact areas to check on planting activities and provide guidance to the field crews. The restoration ecologist will also be present during collection of willow and mulefat cuttings to oversee this process, if cuttings are used to supplement the container plants.

Container plants will be installed in a manner that mimics natural plant distribution (e.g., random and/or aggregate distributions rather than uniform rows).

4.5.2 Container Plant Installation Steps

Following are the steps to take when installing container plants:

- Dig a hole twice as deep and three times as wide as the container. Break up soil clods and avoid a smooth-sided "bathtub" effect in the hole. Fill the planting hole with water and allow the water to drain completely into the soil.
- Partially backfill the hole with native soil to allow planting at the proper depth. Moisten and gently tamp the backfill into place. Remove the plant from its container and place on top of the moistened backfill so that the plant collar is approximately 1 inch above finish grade. Then backfill the remaining hole with native soil.
- Create a planting basin berm, roughly 2 feet in diameter around the plant, and apply 1 to 2 inches of coarse, organic, weed-free mulch inside the berm. Thoroughly water and allow the basin to drain.

Planting will be considered complete when approved by the restoration ecologist and the City.

4.5.3 Seed Specifications

The contractor will obtain seed from a qualified supplier. Seed should originate from within 10 miles of the project site, to the extent feasible. All seed must be delivered to the site in sealed and labeled packaging, along with a California State Agricultural Code seed certification that includes the supplier's name, geographic location, species name, collection date, tested purity and germination percentage rates, percent pure live seed, and bulk weight of the package in pounds. The seeds will be ordered and delivered in separate, original containers by species, and inspected by the restoration ecologist. The contractor will be responsible for adjusting bulk

seeding rates, as necessary, based on the tested purity and germination rates for the delivered seed to achieve the specified amount of pure live seed. The restoration ecologist will inspect the seed before it is mixed with other species from the seed mix and applied on-site, and will reject seed lacking certified tags or not conforming to specifications.

4.5.4 Seed Application Methods

- Seed application rates are provided in Tables 5 and 6. The contractor is responsible for adjusting bulk seeding rates as necessary, based on the tested purity and germination rates for the delivered seed, to achieve the specified amount of pure live seed.
- The seed mixes may be applied in one of two ways:

  1. Hydroseed application: Create slurry with seed (at specified rates per acre), 2,000 pounds/acre of organic fiber mulch, and 150 pounds/acre of organic tackifier. Evenly apply and spray hydroseed slurry from at least two directions to help interlock mulch fibers.

  2. Hand broadcasting: The seed mix will be combined with sand and hand broadcast throughout the temporary impact areas. It will then be raked into the top ¼ to ½ inch of topsoil.

- Care must be taken during seed application to avoid damaging the container stock.

The restoration ecologist and City will determine when the planting and seeding phase is successfully completed. Completion of this phase will mark the beginning of the 120-day PEP.

4.6 Temporary Irrigation

Prior to container planting and seeding, the contractor will install a temporary irrigation system to provide water to the container plants and seeded areas during their establishment phase. A temporary drip irrigation system is recommended. The system should be designed to last several years under harsh weather conditions. The system will include temporary PVC irrigation pipes, with main lines and valves installed below-grade and delivery lines installed on-grade. The system will be designed to irrigate the entire site, but will be zoned to allow for control of delivery to each area individually. Through the installation of a master header, water can be delivered in greater quantities to supply the drip irrigation system.

It is expected that the temporary irrigation system will be used for the first 2 years of the scheduled 5-year maintenance and monitoring program. If necessary, irrigation may be used

during the third year. A goal of the mitigation program is for the temporary impact areas to persist without irrigation for at least 2 years before the mitigation program is considered complete. Operation, maintenance, and removal of this system are reviewed in Section 5.5.

4.7 Final Landscape Construction Plans and As-Built Conditions

The restoration ecologist and the City will determine when the installation phase is successfully completed. Completion of this phase will mark the beginning of the 120-day PEP. Once the installation phase is complete, the installation contractor will prepare a set of as-built construction plans that will detail any changes in the temporary impact area limits and acreage, and any changes to planting or seeding (i.e., species and quantities) compared to the original planting and seeding plans. The as-built plans will also include specific numbers of species installed. The installation contractor will submit the as-built plans electronically to the City within 30 days of the installation being complete. The restoration ecologist and City will review the as-built plans and determine if the installation contractor needs to make any revisions before they are finalized.

5.0 MAINTENANCE

The installation contractor will be responsible for maintenance after installation for the first 120 days of Year 1. After the initial 120-day PEP, the maintenance contractor (which may be the same firm as the installation contractor or a separate firm) will take over responsibility for the remainder of the scheduled 5-year maintenance period.

The maintenance contractor will perform maintenance visits and activities in accordance with the restoration goals presented in this CMMP. The number of maintenance visits will vary depending on the amount of work necessary for the temporary impact areas to meet success standards on schedule. The intensity of maintenance over the 5-year period is expected to subside each year as native plants become established and competition from nonnative plants is reduced through removal of these species. As a guideline, the maintenance contractor is expected to perform maintenance monthly during Years 1 and 2 and quarterly during Years 3 through 5. The frequency of maintenance may be increased if needed, as determined by the restoration ecologist. For example, exotics treatment may occur more frequently in the spring to adequately control germinating annual exotics. The maintenance contractor will coordinate with the restoration ecologist on a regular basis to determine priority maintenance activities during different periods of the project. All maintenance work will be completed by crews on foot. Access to the temporary impact areas will follow the access routes flagged by the restoration ecologist prior to site preparation.

Maintenance activities will include the small area of CVFM and the areas under the new Willow Street Bridge, although these areas will not be planted or seeded. Weed control of the area under the new bridge is particularly important. Because this area will be shaded by the new bridge, it is not expected to support substantial amounts of native riparian vegetation and thus will not be targeted for planting. However, this area could provide a nonnative seed source if not properly maintained.

The primary maintenance obligations are reviewed below.

5.1 Site Protection and Erosion Control

Unauthorized foot traffic and vandalism have potential to occur within the temporary impact areas. Therefore, the site will be protected for the duration of the 5-year maintenance and monitoring period by temporary fencing and/or signs prohibiting trespassing installed prior to restoration program installation. The maintenance contractor will be responsible for maintaining and repairing/replacing the site protection measures, as necessary. If vandalism does occur, the need for additional site protection measures will be evaluated to determine the best approach to protect the site. This may include consultation with the City.

During the maintenance period, the temporary impact areas will be evaluated on a regular basis to determine if erosion control materials need to be added or repaired/maintained. Erosion control materials may include silt fencing, straw wattles, or natural fiber matting. Any siltation and erosion control measures will be made from biodegradable materials and have no plastic mesh, to avoid creating a wildlife entanglement hazard.

5.2 Weed Control

Nonnative species control during the 5-year maintenance and monitoring period will consist mainly of hand pulling, weed whipping, and herbicide treatment. Invasive exotics[3] will be eradicated wherever they occur within the temporary impact areas. During site monitoring visits (Sections 6.1 – 6.3), the restoration ecologist will create a list of exotic species that need to be removed. Less problematic weeds will be controlled when they proliferate beyond acceptable levels and are inhibiting the development of native plants. The need for control of these species will be determined by the restoration ecologist. Nonnative plant species will also be removed

[3] For the purposes of this CMMP, invasive exotic plants are those species recognized by Cal-IPC 2006 as "high" and "moderate" threats to California wildlands and those recognized on-site as potentially inhibiting the establishment and development of native plant species.

from container plant basins until the container plants are established. Nonnative plants will be removed before they become 12 inches high or they set seed.

Hand pulling should focus on small occurrences of annual weeds and seedlings of perennial species that can be completely removed (including the root system). Hand pulling is especially effective in the winter and early spring, when annual weeds have just germinated and are fairly small, and when wet soils allow easy removal of the entire plant. No mechanical methods or hand tools (such as a shovel) will be used to excavate nonnative species. If root systems of particular nonnative plants that are in a young/small stage cannot be feasibly removed with hand pulling, herbicide may be applied (see below for guidelines regarding herbicide use). Mechanized weed control may be conducted using either a high-deck mower and/or string trimmers. A high-deck mower may be used where large, flat areas have heavy weed cover and little or no native growth. The mowers can be set at different heights to target weed inflorescences (flower stalks) but to leave native inflorescences unmowed. String trimmers are especially useful in areas that support too many native species to use a mower, or that are isolated in patches. Weed debris will be properly disposed of off-site.

Herbicide application will be accomplished by licensed contractors using the herbicide Aquamaster (or equivalent aquatic-approved herbicide). Herbicide will be tinted with a biodegradable dye to facilitate visual control of spray. Herbicide reporting forms will be prepared and submitted to the City following application. Herbicide use should be limited to localized applications, rather than foliar applications, to limit the possibility for drift and impacts to neighboring native species.

5.3 Trash Removal

Trash and debris will be removed from the temporary impact areas during regular maintenance visits and properly disposed of off-site. Organic debris, such as dead limbs, provides habitat value for wildlife and may be left in place.

5.4 Plant Care and Supplemental Planting/Seeding

Container plant care will be performed as necessary to assist with plant survival and establishment. Plant care includes controlling competing weeds within plant basins, watering the container stock (using a temporary automated irrigation system or other methods), and replacing any diseased or dead plants as needed. Plant care will also be provided for native species that are seeded and volunteer on-site by removing competing nonnative species. All dead container plants will be replaced at the first and second anniversary of plant installation, unless their

function has been replaced by natural native plant recruitment. Also at the first and second anniversary of plant installation, the restoration ecologist will determine if the small CVFM temporary impact area requires supplemental planting and/or seeding.

5.5 Temporary Irrigation

The contractor will be responsible for operation and maintenance of the temporary drip irrigation system, including the replacement of nozzles, broken lines, and other issues. The contractor and restoration ecologist will agree on an irrigation schedule during different times of the year. The need for any supplemental irrigation will be determined by the restoration ecologist during site monitoring visits. It is the intent of this CMMP that irrigation be used judiciously and only when needed. Minimal use of irrigation will promote the establishment of hearty plants with well-developed root systems. In general, infrequent deep watering will be performed to promote deeper root development, as compared to frequent surface watering. Irrigation use will be adjusted accordingly during the maintenance period, depending on factors such as plant size and health, and weather conditions. Generally, irrigation will be used to supplement rainfall during the winter and spring, and will be used as modestly as possible during the summer months.

It is expected that supplemental watering with the irrigation system will be needed for the first 2 years of the scheduled 5-year maintenance and monitoring program. If necessary, irrigation may be used during the third year. As the container plants become established, the contractor and restoration ecologist will agree on a reduced irrigation schedule, and will eventually phase out irrigation. A goal of the mitigation program is for the temporary impact areas to persist without irrigation for at least 2 years before the mitigation program is considered complete. Once irrigation is no longer needed, as determined by the restoration ecologist, the contractor will remove the irrigation system without damaging native plants.

6.0 MONITORING AND SUCCESS STANDARDS

The restoration ecologist will perform monitoring during the restoration installation phase and for 5 years after installation (or until success criteria have been met) to verify that functioning, self-sustaining native habitat is established. The restoration ecologist will perform post-installation qualitative and quantitative monitoring to track the progress of the temporary impact areas relative to success standards, and to determine, in a timely manner, whether remedial measures are needed.

6.1 Implementation Monitoring

The restoration ecologist will monitor the implementation phase to verify that initial exotics treatment and biomass removal, site preparation, and native planting and seeding are performed in accordance with this CMMP. Monitoring will include establishing permanent photo points to be used for implementation monitoring and subsequent qualitative and quantitative monitoring (see Sections 6.2 and 6.3). Once installation has been successfully completed, as determined by the restoration ecologist and the City, the restoration ecologist will write a post-installation letter report, which will be provided to the City and resource agencies (Section 6.5).

6.2 Qualitative Monitoring

Qualitative monitoring will focus on soil conditions, container plant health, seed germination rates, presence of native and nonnative species, any significant disease or pest problems, and any erosion problems. Qualitative monitoring will be performed monthly during Year 1, quarterly during Years 2 and 3, and semiannually during Years 4 and 5. In addition, the restoration ecologist may visit the site more frequently, if necessary. An important feature of this monitoring is to coordinate with the contractor to exchange information, provide feedback, and agree on priority maintenance items and remedial measures, if needed, during different stages of the mitigation program. The restoration ecologist will use the results of the qualitative monitoring to determine whether maintenance weed control is needed, whether the container plants require supplemental water, and whether replacement planting is needed.

Qualitative monitoring will include vegetation monitoring and photo-documentation. Vegetation monitoring will include an assessment of the presence and approximate cover of exotic species, general health and approximate cover of native plant species, survivorship and condition of the container stock, erosion problems, and unauthorized site access.

For the first 2 years of the 5-year maintenance and monitoring period, photos will be taken at established photo-documentation points on a quarterly basis. Thereafter, photos will be taken at these points on an annual basis, in association with annual botanical monitoring. At least six permanent photo stations are recommended to adequately capture the temporary impact areas. Photo stations will be established immediately prior to site preparation and will be used to document the conditions of the temporary impact areas prior to restoration. The locations of the photo stations and direction in which the photos are taken (compass bearing) will be mapped in the field and displayed on an aerial photograph to be included in each annual monitoring report. Photos taken at the end of each year of monitoring will be included in the annual monitoring

reports (Section 6.5). The quarterly photos taken during Years 1 and 2 will be included in the qualitative monitoring memorandums (Section 6.5).

6.3 Annual Quantitative Monitoring

Annual quantitative monitoring will be completed in the late spring/early summer (i.e., May or June) of each year to quantify new annual growth. Year 1 monitoring will be conducted during the spring/summer following site preparation activities. Annual quantitative monitoring will include photo-documentation and vegetation transects. These data allow for a quantitative assessment of the species composition, percent cover for native and nonnative species, and an evaluation of the project success compared to established performance standards.

As mentioned above, at least six permanent photo stations will be established prior to site preparation, and photos will be taken at these points on a quarterly basis for the first 2 years of the maintenance and biological monitoring. Thereafter, photos will be taken at these points on an annual basis. The annual photos will be included in the annual monitoring reports. The photo-documentation record will show the vegetation cover in the temporary impact areas and their progression over time.

Vegetation transect monitoring will include the sampling of 50-meter transects placed in the temporary impact areas to determine relative and absolute cover of each plant species present. Depending on the extent of the final temporary impact areas, the length of the transects may need to be adjusted. Vegetation transect monitoring will use the California Native Plant Society field sampling protocol (Sawyer and Keeler-Wolf 1995). Transects will also record the presence and condition of organic matter on the soil surface. Randomly located permanent transects will be established during the first year of annual monitoring. These transects will be used as the basis for quantitative monitoring throughout the life of the restoration program. At least two line-intercept transects will be established in the temporary impact areas. The transects located within the SWS will be established perpendicular to the Sweetwater River. Transect locations will be recorded using Global Positioning System (GPS) technology. In addition to the photo stations noted above, photos will be taken from each end of every transect during each quantitative monitoring event.

6.4 Adaptive Management

Adaptive management, also known as adaptive resource management, is a structured, iterative process of optimal decision-making in the face of uncertainty, with an aim of reducing uncertainty over time via site monitoring. As part of this process, it is important to anticipate

potential (unforeseen or unpredictable) problems, and also to use formal and informal monitoring information to learn and adapt so that maintenance (remedial measures) and management decisions can be tailored to address specific site conditions. This form of management will allow the City to respond to unforeseen or unpredictable problems early and to maintain progress toward the required success criteria. For example, an anticipated solution to a problem in Year 2 of the mitigation program may be adjusted or replaced with another solution in Year 4 as monitoring results provide new insight into the root causes of the problem. If the temporary impact areas are not on track to meet the success criteria, adaptive management will be implemented to return the temporary impact areas to their desired condition.

Provided below is a review of some potential problems and solutions that may be implemented during the maintenance and monitoring program. Although potential solutions are listed below, monitoring results and an evolving understanding of the site during the monitoring program will be the basis of identification of problems and implementation of solutions. The need for additional planting and/or seeding will be determined by the restoration ecologist, in consultation with the City and the resource agencies. Any additional planting or seeding considered to be necessary should be consistent with Tables 5 and 6 of this CMMP.

- *Potential Problem*: Poor native seed germination and establishment
  Potential Solutions: Adjust irrigation schedule, apply additional or alternative native seed
- *Potential Problem*: Poor native plant survival, growth, and establishment
  Potential Solutions: Improve soil conditions, adjust species planting based on observation of hydrologic conditions, adjust irrigation schedule, install additional or alternative native plants
- *Potential Problem*: Herbivory
  Potential Solutions: Allow herbivory to continue for certain species if it will not result in plant mortality; provide temporary cages around species that are being adversely affected
- *Potential Problem*: Invasion by exotic species
  Potential Solutions: Increase frequency of exotic plant control, improve native plant cover on-site to lessen exotic plant invasion locations, address off-site exotic plant population(s)
- *Potential Problem*: Extended drought
  Potential Solutions: Temporarily increase irrigation frequency, adjust native species composition

- *Potential Problem*: Flood impacts
  Potential Solutions: Address significant erosion problems and modify site grades if appropriate, monitor degree of natural plant recruitment (which is typically positive after flood events), conduct supplemental native planting and seeding if needed

6.5 Reporting

Once installation of the mitigation program is successfully completed, as determined by the restoration ecologist and the City, the restoration ecologist will prepare a post-installation letter report. The letter report will include photos taken from the permanent photo points and an aerial photograph showing the locations of the permanent photo stations and the directions in which the photos were taken (compass bearing). It will also describe the timing and methods of the implementation activities and the condition of the temporary impact areas at the end of the installation period, including presence and approximate cover of exotic species, general health and approximate cover of native plant species, survivorship and condition of the container stock, erosion problems, and unauthorized site access. The post-installation letter report will be submitted to the City project manager and the resource agencies.

The restoration ecologist will prepare brief qualitative monitoring memorandums to summarize the results of the qualitative monitoring visits discussed in Section 6.2. Qualitative monitoring memorandums will be prepared quarterly during Years 1 and 2, and semiannually during Years 3, 4, and 5. Qualitative monitoring memorandums will discuss the presence and approximate cover of exotic species within the temporary impact areas, general health and approximate cover of native plant species, survivorship and condition of the container stock, erosion problems, unauthorized site access, and any other issues requiring attention or remediation. The quarterly photos taken from the photo-documentation points during Years 1 and 2 will also be included in the memorandums. Qualitative monitoring memorandums will be submitted to the City project manager and maintenance contractor.

The restoration ecologist will also prepare annual monitoring reports that will contain the results of the qualitative and quantitative monitoring, including the following:

- An assessment of presence and approximate cover of exotic species, general health and approximate cover of native plant species, survivorship and condition of the container stock, evidence of natural recruitment, erosion problems, and unauthorized site access. This information may be provided via attachments that include all of the qualitative monitoring memos prepared for that year.

- An aerial photograph showing the locations of any sensitive species or their signs observed within the temporary impact areas during that year.
- Photographs taken from the permanent photo points during annual monitoring and the accompanying aerial photograph with locations and photo directions.
- Results and analysis of the vegetation transect monitoring and comparison to that year's success standards.
- A description of the restoration activities, including supplemental planting or seeding and exotic species removal, that were completed on-site that year and when they were conducted.
- A discussion of any problems noted in the temporary impact areas during that year and proposed activities for the upcoming year of monitoring, including any adaptive management activities deemed necessary.

Draft reports will be submitted to the City project manager for review. Final reports will be submitted to the City and the resource agencies. The first annual monitoring report will be submitted in the fall following completion of Year 1 annual monitoring. Annual reports will be submitted to the agencies by October 30 of each year, or no more than 4 months after the end of the restoration year.

6.6 Success Standards and Remedial Measures

Success standards are provided to assess the progress of the temporary impact areas so that the desired native habitat characteristics are achieved within 5 years. The success standards are based on observations of existing good-quality, similar habitats in the project site's vicinity. Yearly botanical success standards are provided as milestones to help determine whether the temporary impact areas are on track to meet the final success standards, or if additional planting, seeding, and/or other remedial measures may be necessary. A combination of qualitative and quantitative monitoring results will determine if success standards are being met.

Establishment of a multi-canopy, high-quality wetland/riparian habitat within the temporary impact areas may take longer than 5 years. Specifically, willows and other tree species can take 10 to 15 years to mature. Therefore, after 5 years, the temporary impact areas are expected to be on a trajectory toward a mature habitat, and 5-year success standards represent an intermediate stage in the long-term succession of the restored habitat.

If necessary, appropriate remedial measures will be determined by the restoration ecologist in consultation with the maintenance contractor. If significant problems arise, the restoration ecologist and the City project manager will consult with the resource agencies to agree on appropriate remedial measures. Success standards and potential remedial measures for the temporary impact areas are presented in Table 7. Botanical success standards include no supplemental watering for at least 2 years before the mitigation is considered complete by the resource agencies to help verify that native habitat is established and self-sustaining.

Table 7. Restoration Program Success Standards and Remedial Measures

Milestone	Success Standards[1]	Remedial Measures
Site Preparation and Plant and Seed Installation	Soil in temporary impact areas decompacted; exotics and nonnatives removed; erosion control in place as needed; no trash	Conduct additional decompaction; remove remaining exotics and nonnatives; install erosion-control measures; remove trash and debris
Year 1 (includes 120-day PEP)	90% survival of container plants; control of all invasive exotics[2] and overall nonnative cover less than 15%; total native cover (from container plants, seeded species, and natural recruitment) no less than 20%; no erosion or trash	Install replacement container plants and increase plant care (e.g., watering); reseed if necessary; intensify control of exotic and nonnative species; repair erosion; remove trash
Year 2	85% survival of container plants; control of all invasive exotics and overall nonnative cover less than 15%; total native cover no less than 30%; no erosion or trash	Same as above, as necessary
Year 3	80% survival of container plants; control of all invasive exotics and overall nonnative cover less than 10%; total native cover of 45%; species "richness" of at least 18 native species (divided between annuals and perennials)[3]; no erosion or trash	Same as above, as necessary
Year 4	80% survival of container plants; control of all invasive exotics and overall nonnative cover less than 10%; total native cover of 60%; no supplemental watering; no erosion or trash	Same as above, as necessary (except no watering)
Year 5	80% survival of container plants; annual nonnative cover less than 10% and cover of invasive exotics at 0%; total native cover of at least 75%; species "richness" of at least 18 native species (divided between annuals and perennials); no supplemental watering; no erosion or trash	Same as above, as necessary (except no watering)

[1] The native cover success standards mainly apply to the temporary impact areas being revegetated with riparian habitat. The temporary impact areas being revegetated with upland habitat will be held to the nonnative cover, erosion, and trash success standards.

[2] For the purposes of this CMMP, invasive exotic plants are those species recognized by the California Invasive Plant Council (Cal-IPC 2006) as "high" and "moderate" threats to California wildlands, and those recognized on-site as potentially inhibiting the establishment and development of native plant species. The restoration ecologist will provide guidance on the priority exotic species that need to be controlled at any given time during the 5-year

maintenance and monitoring program. This list of high-priority species may change over the course of the program, as different nonnative species potentially volunteer within the temporary impact areas, although it will be consistent with the references cited above.

[3] Species "richness" is the number of species noted on-site. Attainment of this success standard will be verified in post-installation monitoring Years 3 and 5 through the compilation of a detailed species list from the temporary impact areas. Native species total will include species planted and seeded, and volunteers.

7.0 NOTICE OF COMPLETION

Once the temporary impact areas have met final success standards (as documented in the final report), and the restoration ecologist, City, and resource agencies concur with this determination (in writing via email or letter), the scheduled 5-year maintenance and monitoring program will be complete. Maintenance and monitoring may be extended beyond 5 years, if necessary, to achieve final success standards.

8.0 REFERENCES

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Holland, R. F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. State of California, The Resources Agency.

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