ATTACHMENT 13

Wetland Mitigation Plan for the Nakano Project

Wetland Mitigation Plan for the Nakano Project San Diego, California

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ATTACHMENT

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Acronyms and Abbreviations

Cal-IPC	California Invasive Plant Council
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CNPS	California Native Plant Society
CRAM	California Rapid Assessment Method
DSD	Development Services Department
I-805	Interstate 805
LTMP	Long Term Management Plan
MHPA	Multi-Habitat Planning Area
MSCP	Multiple Species Conservation Program
PEP	Plant Establishment Period
plan	Wetland Mitigation Plan
project	Nakano Project
RECON	RECON Environmental, Inc.
RWQCB	Regional Water Quality Control Board
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 Introduction

This mitigation plan (plan) details the process for mitigating impacts to wetlands resulting from construction of the Nakano project (project). The project proposes a residential development with supporting recreational amenities and infrastructure. While the project is currently located within the City of Chula Vista, the site is anticipated to be annexed into the City of San Diego with mitigation being implemented within the City of San Diego. Project impacts to jurisdictional resources were analyzed in the project-specific biological technical report (RECON Environmental, Inc. [RECON] 2023). As currently planned, the project would permanently impact 0.40 acre of wetland habitat including the following jurisdictional resources:

- Regional Water Quality Control Board (RWQCB): Wetland Waters of the State
- California Department of Fish and Wildlife (CDFW): Riparian
- City of San Diego and City of Chula Vista: Wetland

This plan is prepared in accordance with the California Environmental Quality Act (CEQA), both the City of Chula Vista's Multiple Species Conservation Program (MSCP; City of Chula Vista 2003) and the City of San Diego MSCP (City of San Diego 1997), as implemented through the Land Development Code – Biology Guidelines (City of San Diego 2018), and in conformance with RWQCB guidelines on mitigation and monitoring plans. Impacts to RWQCB and CDFW waters would require a Waste Discharge Requirement from the RWQCB and a 1602 Streambed Alteration Agreement from the CDFW.

Impacts to 0.4 acre of City of San Diego and City of Chula Vista wetlands shall be mitigated through the restoration of 0.8 acre of wetland habitat within Tri Pointe Homes property along Spring Canyon, in the Otay Mesa area, approximately three miles southeast of the project site. Restoration would consist of the conversion of 0.8 acre of disturbed habitat and non-native grassland to native riparian habitat and would be consistent with the priorities set forth in the City of San Diego MSCP Subarea Plan for Southern Otay Mesa, which includes the prioritization of restoration of disturbed areas in Spring Canyon, which is a regional corridor identified by the MSCP. Although the mitigation is proposed within the City of San Diego, the mitigation would also be consistent with the City of Chula Vista MSCP Subarea Plan as the proposed mitigation location would be located close to the impact location within an area suitable for mitigation, contributing to the overall goals of the 1998 MSCP Plan for the region.

The wetland mitigation would restore degraded areas of Spring Canyon currently supporting large stands of invasive species such as tamarisk (*Tamarix ramosissima*), castor bean (*Ricinus communis*), pepper trees (*Schinus* spp.) and non-native grasses to high quality mule fat scrub habitat with diverse native wetland vegetation layers and plant diversity. Native plantings would include riparian species that would expand and restore potentially suitable habitat to support least Bell's vireo (*Vireo bellii pusillus*) and yellow warbler (*Setophaga petachia*), which are known to occur in Spring Canyon. The project also proposes project design features intended to support the long-term viability of the mitigation effort, as follows: (1) in addition to the minimum 0.8 acre of required restoration, the mitigation area would re-establish/enhance an additional 0.4 acre of non-native riparian to native riparian (for a total of 1.2 acres); (2) the mitigation area would also incorporate an additional

2.13 acres of additional adjacent areas of riparian scrub and riparian buffer where weed control would be conducted; and (3) the project would pursue invasive species removal in upstream locations off-site on publicly owned lands.

This plan includes a presentation of the project location, mitigation locations, and mitigation requirements, a discussion of existing conditions, a rationale for expecting success, mitigation roles and responsibilities, an implementation and 5-year maintenance plan, ecological performance standards, monitoring requirements, an approach to adaptive management, and discusses long-term management and funding.

The purchase of mitigation credits at an approved wetland mitigation bank would not be required to satisfy City of Chula Vista or City of San Diego mitigation requirements. However, to ensure no net loss of wetlands subject to the jurisdiction of the RWQCB, the project would provide an additional 0.40 acre of wetland establishment credits from a mitigation bank (anticipated to be either Otay River or Rancho Jamul; to be determined based on the approval schedule for each of these pending mitigation banks within the project's service area).

1.1 Project Location and Mitigation Area Location

The project is located east of Interstate 805 (I-805), northwest of Dennery Road, and south of the Otay River (Figure 1). The project is currently located in the City of Chula Vista, but the area is planned to be annexed into the City of San Diego. The biological resources report addresses impacts and mitigation for both agencies, considering an Annexation Scenario and a No Annexation Scenario. More information about the project location and annexation is provided in the biological technical report (RECON 2023a). Regardless of whether annexation proceeds, this mitigation plan addresses mitigation that would satisfy the requirements of either agency.

The mitigation area is located off-site, in the city of San Diego, south of State Route 905 and east of I-805 (see Figure 1). The mitigation area is approximately three miles southeast of the project, within Township 19 South, Range 01 West, of the U.S. Geological Survey 7.5-minute topographic map, Imperial Beach, California quadrangle (Figure 2; U.S. Geological Survey 1996) and is presented on City 800-foot-scale map numbers 138-1749 and 138-1761 (Figure 3). The mitigation would occur within Spring Canyon, in the City of San Diego Multi-Habitat Planning Area (MHPA) Preserve, on Tri Pointe Homes property (Figure 4). The mitigation area is surrounded by open space and occurs within existing riparian and disturbed habitat. A portion of City of San Diego Vernal Pool Habitat Conservation Plan MHPA is also located nearby, to the west of the mitigation area (see Figure 4).



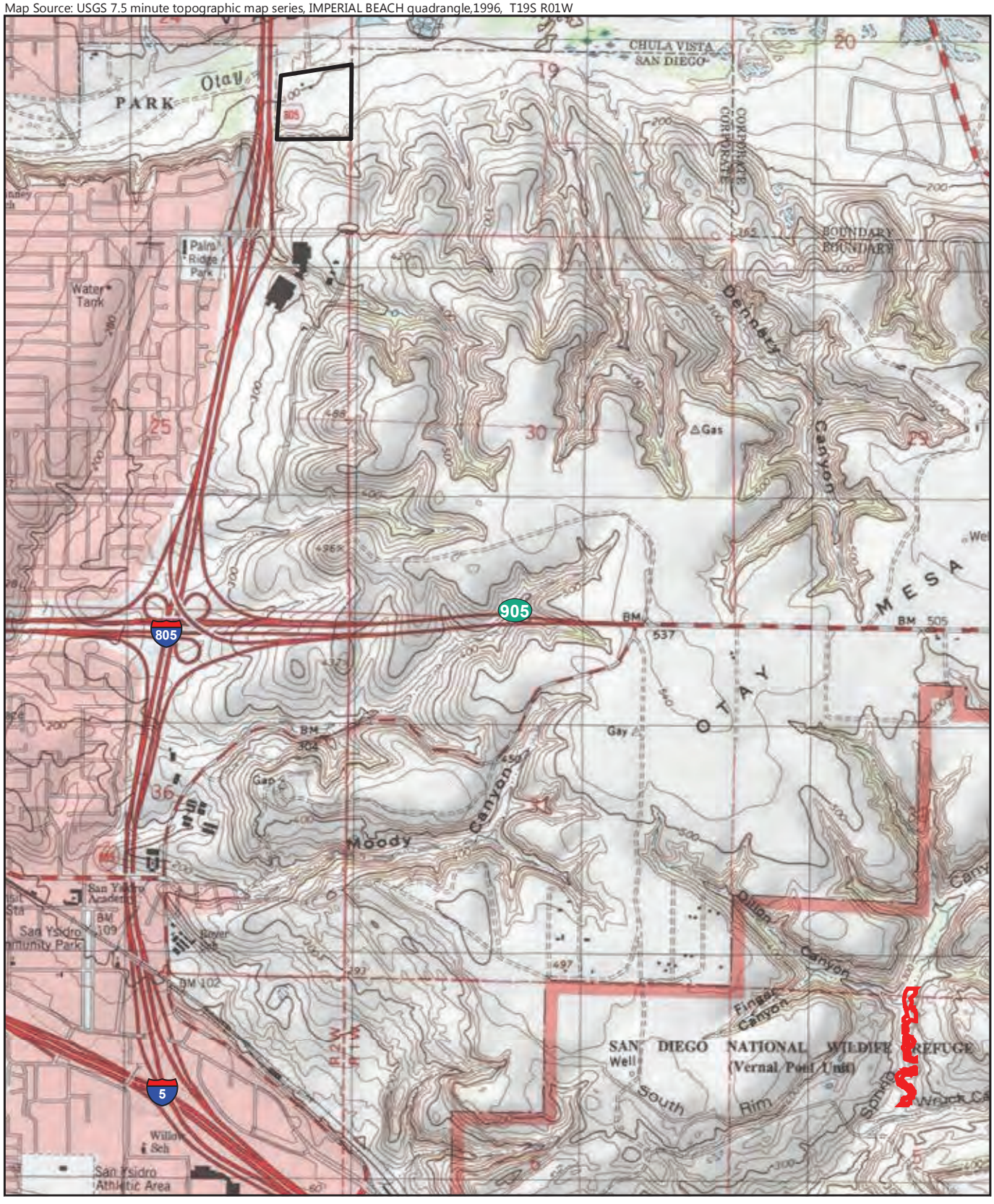
Project Location

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FIGURE 1
Project Location

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



0 Feet 2,000

Nakano Project Boundary

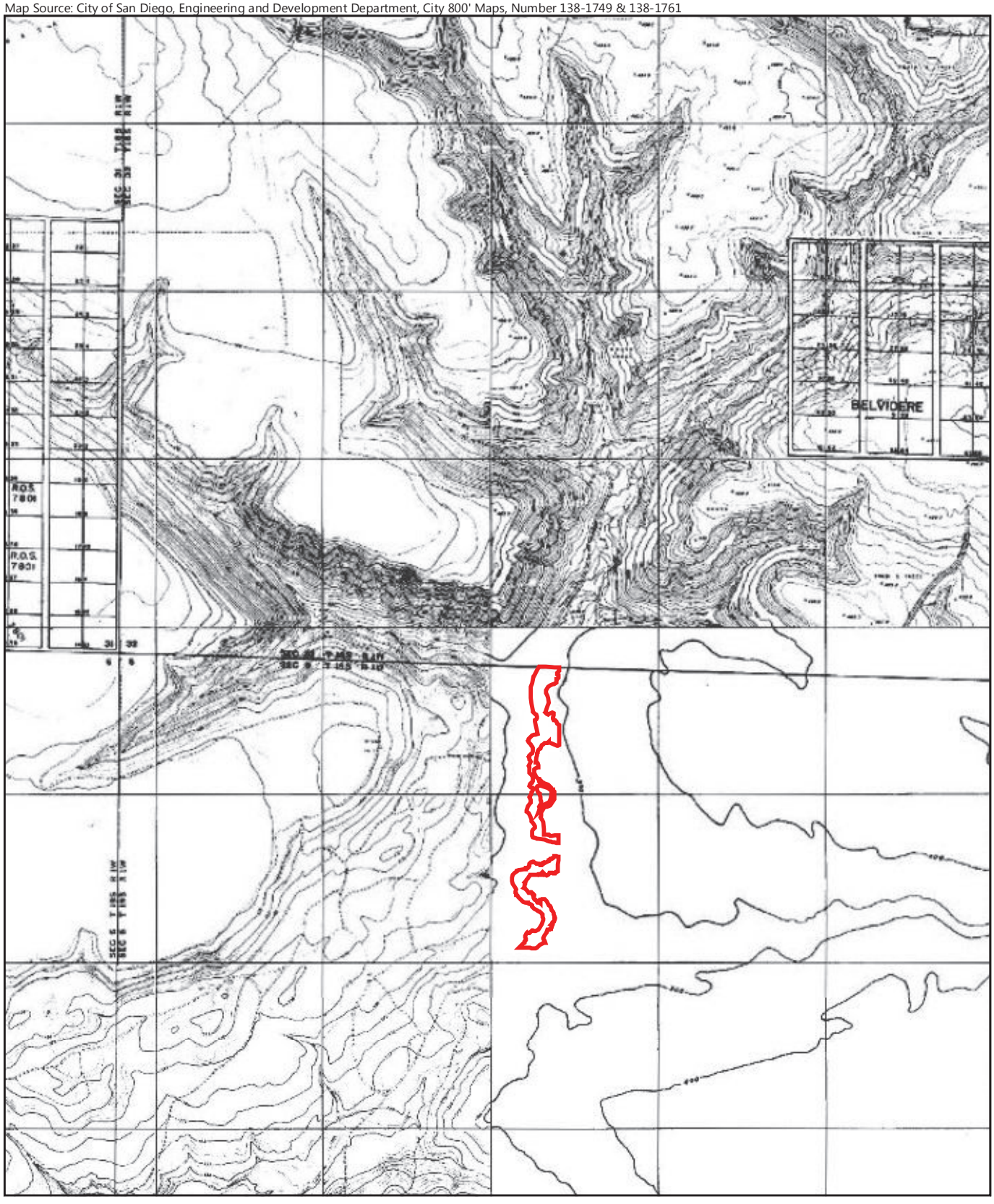
Wetland Mitigation Area

FIGURE 2
Project and Mitigation Area
Location on USGS Map

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



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FIGURE 3
Mitigation Area Location on City 800' Map

Image Source: NearMap (Flown May 2023)



Wetland Mitigation Area
Upstream Invasive Weed Location
Mitigation Parcel
City of SD MHPA
VPHCP MHPA

0 Feet 600

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FIGURE 4
Mitigation Area on Aerial Photograph

The mitigation area consists of (1) the mitigation acreage required for the project impacts, and (2) as-needed invasive species removal within additional acreage contiguous with the mitigation proposed as a project design feature. The project would also pursue invasive species removal in upstream tributaries to the mitigation area to support the long-term viability of the restoration effort. In coordination with the City of San Diego, 1,000 feet upstream was determined to be an appropriate distance for invasive species removal; however, as a project design feature, the applicant would conduct invasive treatment from all publicly owned lands upstream of the mitigation area (City of San Diego, Customs and Border Protection, and the California Department of Transportation), to the maximum extent feasible. Figure 4 presents the locations of invasive weeds within all public lands upstream of the mitigation area as observed during a project planning visit in 2023.

1.2 Mitigation Requirements

The project would impact 0.40 acre of wetland waters under the jurisdiction of RWQCB, CDFW, City of San Diego and City of Chula Vista. These impacts to jurisdictional waters are summarized in Table 1. Per the City of San Diego's Biology Guidelines (City of San Diego 2018) and requirements of the City of Chula Vista Subarea Plan (City of Chula Vista 2003), the project's impacts to jurisdictional resources must be mitigated at a minimum ratio of 2:1, with at least one component of the wetland mitigation effort (at a minimum 1:1 ratio) consisting of wetland creation or wetland restoration; the remaining balance may occur either as wetland restoration or as wetland enhancement. Per the U.S. Army Corps of Engineers (USACE) Compensatory Mitigation Standard Operating Procedures (USACE 2016) and based on RWQCB comments to the project's draft 401 permit application, an additional 1:1 ratio of restoration is anticipated to be required because the mitigation is occurring outside the project's watershed, resulting in a total minimum mitigation ratio of 3:1. Table 1 presents the total mitigation required for each wetland type based on the impact acreage and the 3:1 mitigation ratio.

Table 1
Mitigation for Significant Impacts to Jurisdictional Resources

Vegetation Community	Impacts in Acres	City of San Diego and City of Chula Vista Minimum Required Mitigation Ratio[1]	Additional RWQCB Mitigation Ratio for Out of Watershed Mitigation and No Net Loss (Via Mitigation Bank Wetland Credit Purchase)[2]	Total Mitigation Ratio	Proposed Mitigation[3] (Acres)
Mule fat scrub	0.03	2:1	1:1	3:1	
Southern willow scrub	0.15	2:1	1:1	3:1	
Emergent wetland	0.18	2:1	1:1	3:1	
Disturbed wetland	0.04	2:1	1:1	3:1	
Total	**0.40**	—	—	—	**1.2 acres**

[1]Consistent with the City of San Diego Biology Guidelines (Section III. B. 1. (a) Table 2a) and City of Chula Vista MSCP Subarea Plan, the project's impacts to jurisdictional resources must be mitigated at a minimum ratio of 2:1, with at least one component of the wetland mitigation effort (at a minimum 1:1 ratio) consisting of wetland creation or wetland restoration; the remaining balance may occur either as wetland restoration or as wetland enhancement.
[2]Consistent with USACE Compensatory Mitigation Standard Operating Procedures (USACE 2016) and RWQCB comments to the project's draft 401 permit application.
[3]Mitigation would be accomplished through 0.8 acre of wetland restoration and 0.4 acre of wetland creation purchased through a mitigation bank. An additional 0.40 acre of wetland enhancement/re-establishment and 2.13 acres of weed control buffer are included as a project design feature.

The project's mitigation requirements would be achieved through 0.8 acre of wetland restoration, with an additional 0.4 acre of enhancement/re-establishment as a project design feature within Spring Canyon. Wetland enhancement/re-establishment would include the conversion of non-native riparian habitat into native riparian habitat, while wetland restoration would include the conversion of disturbed habitat and non-native grassland habitat to native riparian habitat. These activities would restore the wetland functions and values within the mitigation area through re-establishment of wetland habitat, in line with City of San Diego and USACE definitions of wetland restoration, which are provided as follows:

- Per the City of San Diego's Biology Guidelines Section III. B. 1. (a), wetland restoration is an activity that re-establishes the habitat functions of a former wetland (City of San Diego 2018).

- Per the USACE Compensatory Mitigation Standard Operating Procedures, restoration is the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. The USACE divides restoration into two categories: re-establishment, and rehabilitation, whereby,

    - Re-establishment is the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

    - Rehabilitation is the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function but does not result in a gain in aquatic resource area.

The proposed restoration will create hydrological and morphological changes to the creek through the removal of non-native grasslands and dense stands of perennial invasive plant species, namely tamarisk, located within the floodplain. Removal of non-native grasslands in the floodplain will facilitate the establishment and recruitment of native wetland species. The installation of diverse native wetland plants within former non-native grassland areas is also anticipated to improve wetland hydrology by increasing the drainage's hydraulic roughness and by supporting the development of wetland micro-topography, such as braiding and meandering, over time. By removing tamarisk, hydraulic resistance values will be reduced for improved hydrologic function and soil salinity will be reduced for improved recruitment of native wetland vegetation and establishment of native wetland plantings. During tamarisk removal, the creek system will be modified by hand to improve the functions and services of the creek.

2.0 Existing Conditions

2.1 Mitigation Area Description

The mitigation area is located within Spring Canyon, in the City of San Diego MHPA Preserve, on land owned by Tri Pointe Homes (see Figure 4). Stands of invasive non-native species have also been

identified upstream of the mitigation area, off-site on publicly owned lands, where weed removal is recommended and would provide long-term benefits to the mitigation area (see Figure 4).

2.1.1 Topography and Soils

The mitigation area is located within a riparian corridor and the surrounding topography consists of mesa tops and canyons. According to the U.S. Department of Agriculture's (USDA) Soil Survey (USDA 2020a), two soil types were mapped in the mitigation area: Linne clay loam, 30 to 50 percent slopes, and Olivenhain cobbly loam, 30 to 50 percent slopes (Figure 5). The Linne series is the dominant soil type within the mitigation area and consists of well-drained soil, with very high runoff with moderately deep clay loam derived from soft calcareous sandstone and shale. The Olivenhain series occurs in a single small area at the southern end of the mitigation area and consists of well-drained, moderately deep to deep clays derived from soft, calcareous sandstone, and shale with rapid runoff.

2.1.2 Hydrology

The mitigation area is located within Spring Canyon, with additional nearby tributaries including Dillon Canyon Finger Canyon and Wruck Canyon (see Figure 4). City of San Diego waters are mapped throughout Spring Canyon based on vegetation composition, which consists of a high concentration of mule fat scrub and are found within the mitigation area and directly upstream of the mitigation area (Figure 6). These waters would also be considered CDFW riparian. A hydraulic analysis was performed by Rick Engineering identifying the limits of inundation for selected storm events (see Figure 6; Attachment 1). The hydraulic analysis indicates that most of the wetland mitigation area lies within the 2-year floodplain. The watershed immediately surrounding the canyon is largely undeveloped and provides upland buffers that protect water quality.

2.1.3 Biological Conditions

The mitigation area's existing biological resources are shown on Figure 7. The mitigation area consists of mule fat scrub with stands of non-native grassland, tamarisk, and disturbed maritime succulent scrub, disturbed habitat and disturbed land (i.e., unpaved access routes), with a natural channel meandering from the upstream end to the downstream end. The existing riparian habitat within the mitigation area ranges from approximately 70 to 150 feet in width, with adjacent uplands and conserved lands owned by the City of San Diego to the east providing a buffer greater than 400-feet in width.

Mule fat scrub is a depauperate, tall, herbaceous riparian scrub strongly dominated by mule fat. This early seral community is maintained by frequent flooding. Site factors include intermittent stream channels with fairly coarse substrate and moderate depth to the water table (Oberbauer et al. 2008). This community type is widely scattered along intermittent streams and near larger rivers. Within the mitigation area, this community is dominated by mule fat with instances of riparian trees including black willow (*Salix gooddingii*) as well as non-native invasive species.

Image Source: Nearmap (flown May 2023)



Wetland Mitigation Area

Soil Type

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

0 Feet 200

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FIGURE 5
Mitigation Area on Soils Map

Image Source: NearMap (Flown May 2023)



Wetland Mitigation Area
Mitigation Parcel
Culvert
Natural Flood Channel
2-year Floodplain

City of San Diego Wetlands

Wetland

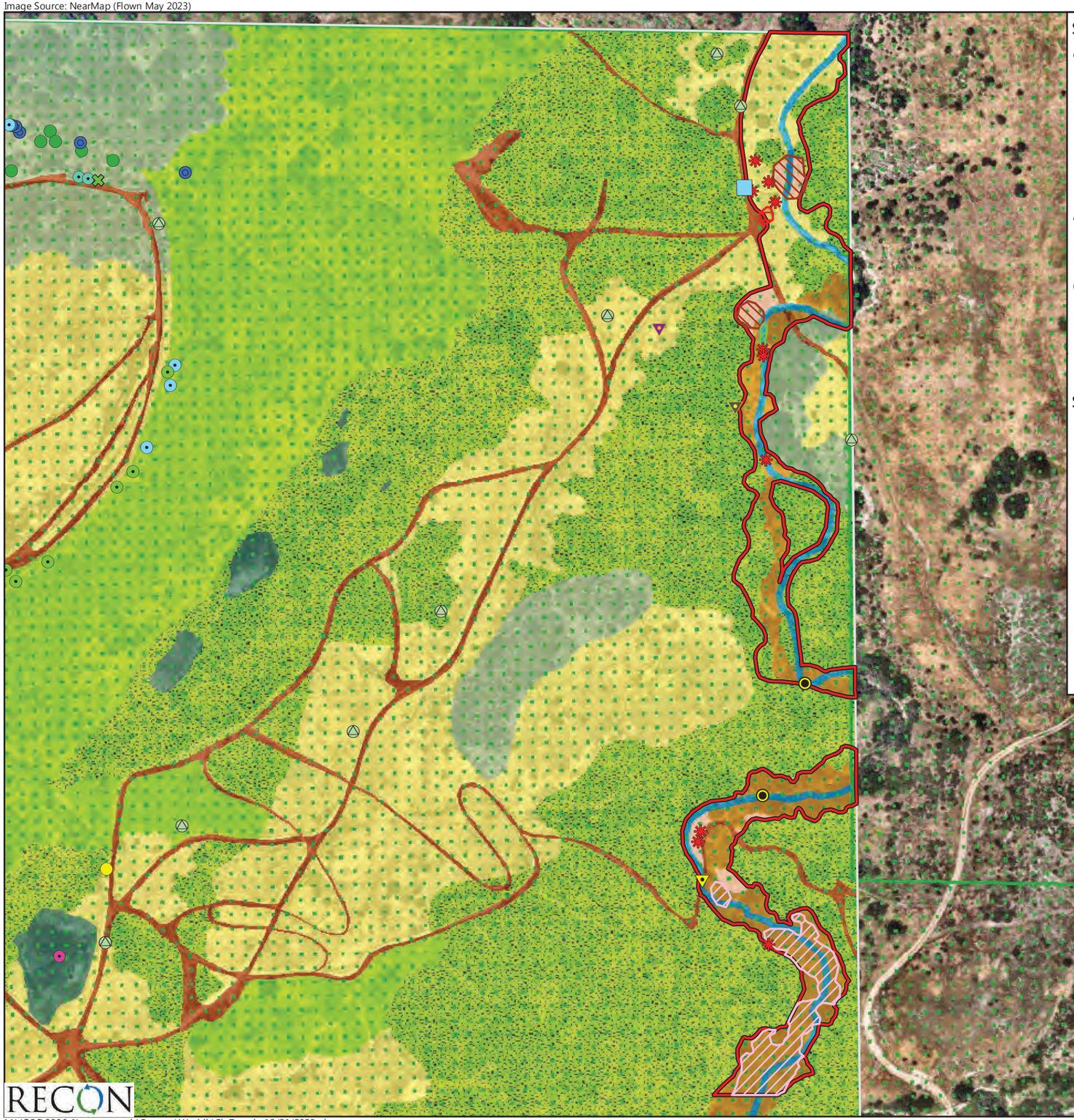
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FIGURE 6
Mitigation Area Existing Hydrology

Image Source: NearMap (Flown May 2023)



Sensitive Animals

Birds

- Coastal California Gnatcatcher (*Polioptila californica californica*)
- Yellow Warbler (*Setophaga petechia*)
- (Yellow-breasted Chat (*Icteria virens*)

Reptiles

- Western Spadefoot (*Spea hammondii*)

Crustaceans

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

Sensitive Plants

- San Diego Bur-sage (*Ambrosia chenopodiifolia*)
- Ashy Spike-moss (*Selaginella cinerascens*)
- San Diego Barrel Cactus (*Ferocactus viridescens*)
- San Diego County Viguiera (*Bahiopsis laciniata*)
- Palmer's Grapplinghook (*Harpagonella palmeri*)
- Variegated Dudleya (*Dudleya variegata*)

- Wetland Mitigation Area
- City of SD MHPA
- Culvert

Vegetation Communities

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

Invasive Plants

- Castor Bean (*Ricinus communis*)
- Fennel (*Foeniculum vulgare*)
- Peruvian Pepper Tree (*Schinus molle*)
- Tamarix (*Tamarix* sp.)
- Tree Tobacco (*Nicotiana glauca*)

0 Feet 170

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FIGURE 7
Mitigation Area
Existing Biological Resources

The non-native grassland and disturbed habitat within the mitigation area consist primarily of tamarisk, pepper trees, tree tobacco (*Nicotiana glauca*), non-native grasses, garland daisy (*Glebionis coronaria*), castor bean, bull thistle (*Cirsium vulgare*), and fennel (*Foeniculum vulgare*). Cover of invasive species within the mitigation area and upstream tributaries was determined through analysis of aerial photographs (Nearmaps 1 inch = 50 feet) combined with ground surveys. Aerial photographs were used to determine non-native species polygons based on the spectral signature and color in the photograph. Photographs 1 through 3 provide representative overviews of the existing native vegetation and non-native weed infestations.

Upstream tributaries within public property were surveyed on foot and instances of invasive species mapped as points using GPS (see Figure 4).

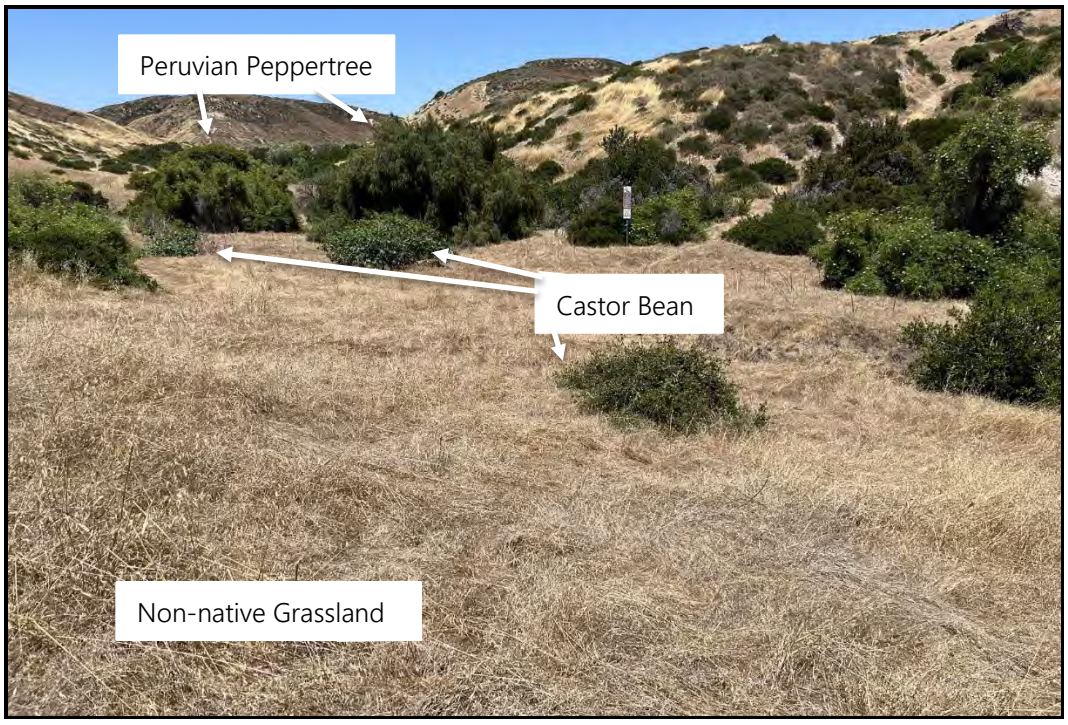
The mitigation area is occupied by several sensitive and special status species. During surveys conducted by RECON in 2018, a least Bell's vireo was observed downstream of the mitigation area within the section of Spring Canyon planned as part of the Southwest Village wetland mitigation. A yellow warbler was observed within the southern portion and yellow-breasted chats (*Icteria virens*) have also been observed throughout the mitigation area. San Diego bur-sage (*Ambrosia chenopodifolia*) is mapped in the uplands to the west and east of the mitigation area. Other vegetation communities and sensitive animals have been observed and mapped in the Tri Pointe Homes property surrounding the mitigation site and are shown on Figure 7.

2.2 Rationale for Expecting Success

2.2.1 Mitigation Goals

The goal of this mitigation effort is to restore a minimum of 0.8 acre of wetlands as mitigation for 0.4 acre of impacts resulting from the project to wetlands subject to the jurisdiction of the City of San Diego, the City of Chula Vista, CDFW, and RWQCB (see Table 1). This includes 0.8 acre of restoration to satisfy City of San Diego and City of Chula Vista wetland mitigation requirements under the MSCP, as well as an additional 0.4 acre of enhancement/re-establishment as a project design feature, for a total of 1.2 acres. Figure 8 depicts the mitigation area in relation to existing site conditions and Figure 9 depicts the mitigation area and the target vegetation communities.

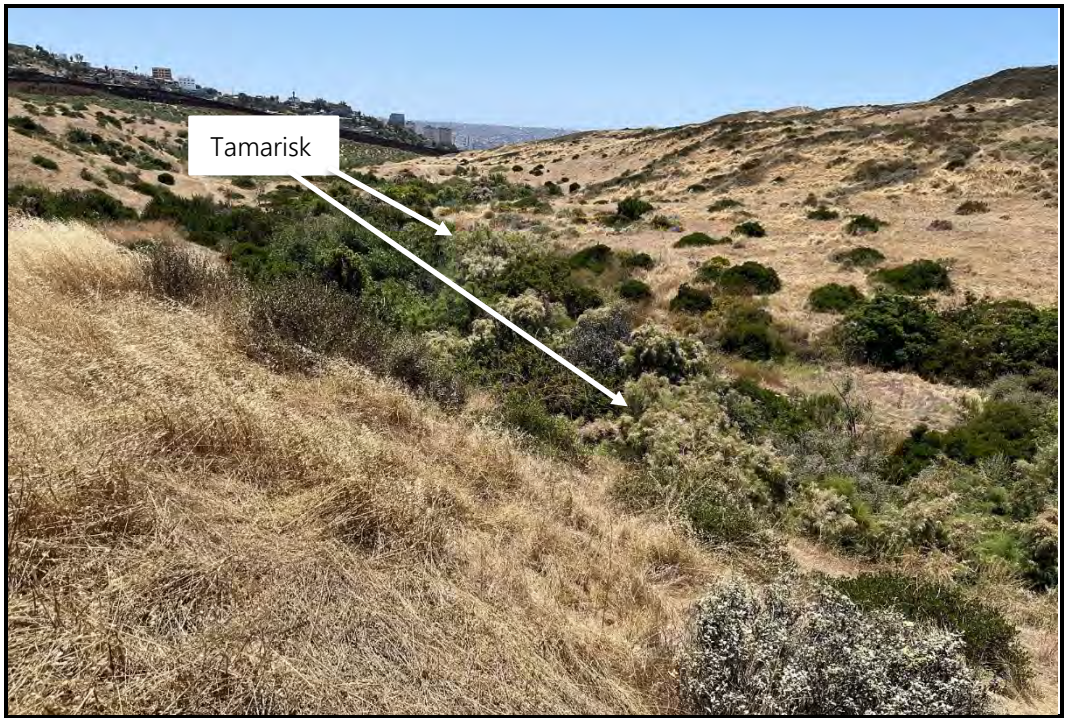
The implementation activities will be the same in the restoration areas as the enhancement/re-establishment areas (i.e., invasive species removal, channel recontouring with hand tools, and native seed and container plant installation); the 0.8 acre of restoration is distinguished from the 0.4 acre of enhancement because it would occur in portions of the mitigation site that do not contain existing City of San Diego wetlands, whereas the 0.4 acre of enhancement/re-establishment would convert stands of invasive non-native species to stands of native species within areas mapped as existing City of San Diego wetlands (see Figure 8).



PHOTOGRAPH 1
Northern/Upstream Portion of Wetland Mitigation Area with Castor Bean (*Ricinus communis*), Peruvian Peppertree (*Schinus mole*), and Non-native Grassland, Facing North, June 2023



PHOTOGRAPH 2
Central Portion of Wetland Mitigation Area with Peruvian Peppertree (*Schinus mole*), Facing South, June 2023



PHOTOGRAPH 3
Southern/Downstream Portion of Mitigation Area with Instances of Tamarisk (*Tamarix ramosissima*) and Disturbed Habitat, Facing South, June 2023

This plan also includes additional project design features aimed at reducing the impact of edge effects on the mitigation area and increasing the overall amount of restoration beyond the minimum required mitigation. Edge effects would be reduced through additional invasive species control proposed in portions of the mitigation area totaling 2.13 acres (see Figures 8 and 9), and by pursuing the removal of perennial invasive non-native plant species within publicly owned land in tributaries upstream of the mitigation area (see Figure 4). These project design features are intended to support the long-term viability of the mitigation effort and are not part of the required compensatory mitigation.

Following mitigation implementation and five years of maintenance and monitoring, the mitigation area would consist of diverse native wetland vegetation structure indicative of mule fat scrub, supporting mule fat, blue elderberry (*Sambucus nigra* ssp. *caerulea*) and Goodding's willow with a native understory consisting of western ragweed (*Ambrosia psilostachya*), mugwort (*Artemisia douglasiana*), California rose (*Rosa californica*), and wild grape (*Vitis girdiana*). It is anticipated that the diversity of native plants introduced through restoration would provide greater functions and values than those currently occurring on-site and would support a greater number and diversity of wildlife, including sensitive riparian bird species such as least Bell's vireo and yellow warbler.

2.2.2 Mitigation Area Suitability

The proposed mitigation area is located in an area of Spring Canyon where portions of the wetland habitat have become degraded by a high cover of non-native invasive species but otherwise support wetland hydrology. The degraded areas would be restored to native wetland habitat through removal of non-native vegetation and installation of native wetland species and would be contiguous with existing areas of mule fat scrub. Because of its existing hydrology, the mitigation area is appropriate for restoration to high quality wetland habitat with diverse native wetland vegetation layers and plant diversity which would provide potential habitat for wildlife, including sensitive wildlife species that are present in the area and depend on wetland habitat. The mitigation area would be reached via dirt roads accessible from Calle De Linea, near Britannia Boulevard. No utility easements are present within the mitigation area and potential future development in adjacent areas was taken into consideration when identifying the mitigation area.

The 1.2 acre of mitigation would be achieved by converting mature stands of perennial invasive plants and a stand of non-native grassland to mule fat scrub habitat using restoration methods including removal of listed high and moderate invasive species (California Invasive Plant Council [Cal-IPC] 2023), including stands of tamarisk, fennel, and pepper tree, the treatment and removal of non-native grasses, and through the installation of native species indicative of native riparian habitat. The historic conversion of the original native riparian habitat to disturbed habitat dominated by Cal-IPC high and moderate invasive species and non-native grasses has degraded the wetland's functions and values, because the spread of invasive species has decreased the cover of native wetland vegetation and altered the wetland hydrology and soils. The proposed restoration activities, including the conversion of disturbed and non-native habitat to native riparian habitat via invasive species removal and the installation of native wetland species would thus improve the wetland functions and values within the mitigation area and qualify as wetland restoration per the City of San Diego's Biology Guidelines and the USACE Standard Operating Procedures for Compensatory Mitigation (see Section 1.2; City of San Diego 2018 and USACE 2016).

Additionally, although some of the restoration areas currently consist of non-native grassland, which would be indicative of upland habitat conditions, the hydraulic analysis and preliminary floodplain mapping conducted by Rick Engineering shows that, within Spring Canyon, the 2-year, 5-year, 10-year, and 100-year floodplain limits overlap with the non-native grassland areas. Therefore, the non-native grassland areas are suitable for restoration to native wetland habitat because they currently contain the hydrology necessary to support wetland habitat (see Figures 6 and 7 and Attachment 1).

The proposed mitigation area is suitable for wetland restoration because of the following factors:

- It contains wetland hydrology (see Figure 6).
- It is located within the City of San Diego's MHPA Preserve and is referenced in the City of San Diego MSCP Subarea Plan's Specific Management Directives for southern Otay Mesa as a priority area for restoration (City of San Diego 1997; see Figure 4).
- It would restore degraded areas with invasive species to native wetland habitats, substantially improving the function of the riparian area compared to the existing condition and providing additional riparian habitat for least Bell's vireo, yellow warbler, and yellow-breasted chat, which have been documented south of the mitigation area.
- Native wetland habitats are present within and adjacent to the mitigation area, which is part of a larger contiguous wetland area containing mule fat scrub and southern willow scrub habitat. Outside the immediate flood plain, the mitigation area is surrounded by open space consisting mainly of maritime succulent scrub, a native upland habitat.
- Least Bell's vireo and yellow warbler have been observed within the downstream riparian habitat.
- It is part of a regional network of habitat corridors and conserved open space (wetland buffers). Per the City of San Diego MSCP Subarea Plan's Specific Management Policies and Directives for the Otay Mesa Area, the site provides wildlife connectivity to MHPA lands on the western side of Otay Mesa, including for cactus wren (*Campylorhynchus brunneicapillus*), via a linkage in the southwestern corner of the mesa (City of San Diego 1997). In addition, the Southwest Village Wildlife Movement/Crossing Study Spring Survey Report identifies the Spring Canyon as supporting diverse wildlife species, including dominant carnivores such as bobcat (*Lynx rufus*) and coyote (*Canis latrans*), with coyote movement and several high activity bobcat hotspots document throughout Spring Canyon (Wildlife Tracking Company 2020). Native wetland habitats are present adjacent to the mitigation area, which is part of a larger contiguous wetland area containing mule fat scrub and southern willow scrub habitat. Outside the immediate flood plain, the mitigation area is surrounded by open space consisting mainly of maritime succulent scrub, a native upland habitat that provides wetland buffers to minimize edge effects.
- There is adequate site access via dirt roads and city streets connecting to Britannia Boulevard (see Figure 7).
- The mitigation area lacks utility or other easements (see Figure 4).

2.2.3 Mitigation Area Viability

The viability of the proposed mitigation was assessed during the preparation of this plan per the City of San Diego's Land Development Code–Biology Guidelines (City of San Diego 2018) and the City of Chula Vista Subarea Plan (Chula Vista, 2003). The assessment included consideration of the site's connectivity to larger planned open space, the surrounding land uses, and sensitivity of wetland habitat to change.

While development is anticipated within the Southwest Village Specific Plan Area located approximately 0.3 mile northwest of the mitigation area, no future development is planned in the open space surrounding the mitigation area, which is part of the City of San Diego's MHPA (see Figure 4). The development areas associated with the Southwest Village Specific Plan would be separated from the mitigation area by approximately 0.3 mile including rugged topography that keep the mitigation area away from potential human trespass.

In addition, any future development associated with the pending Southwest Village Specific Plan would be required to comply with the Land Use Adjacency Guidelines in the City of San Diego MSCP Subarea Plan (City of San Diego 1997). These guidelines apply to projects that are adjacent to the City of San Diego's MHPA and include restrictions on drainage of urban runoff, release of toxic materials, lighting, noise, public access, invasive non-native species, brush management, and grading within the MHPA. As the proposed mitigation area is located within the MHPA, these guidelines would provide protection for the mitigation area from indirect impacts. The location of the mitigation area within the MHPA would reduce fragmentation of this sensitive vegetation community and increase viability and longevity of the habitat quality.

Finally, the design of the mitigation area includes considerations to minimize the spread of non-native species back into the mitigation area from upstream reaches and surrounding habitats. The mitigation effort would address adjacent and upstream populations of invasive species both within Tri Pointe Homes property and within upstream reaches of the watershed within surrounding public ownerships.

Compared to the impacted wetland habitat, which consists of degraded wetlands in an isolated corridor (RECON 2023a), the proposed mitigation habitat would provide greater functions and values and optimize long-term viability of wildlife such as least Bell's vireo and yellow warbler through higher quality wetlands with connectivity between larger natural open spaces with both wetland and upland habitat.

2.3 Reference Site

The reference site for the proposed mitigation would be chosen from undisturbed mule fat scrub and southern willow scrub habitat also located within Spring Canyon. The most functional reference habitat at the reference site would be chosen at the time of the analysis to include the ranges of both physical and biotic characteristics that meet the performance standard goals. The area to be used as the reference site for this mitigation project must be approved by the City of San Diego or the City of Chula Vista, RWQCB, CDFW, and USFWS.

3.0 Roles and Responsibilities

3.1 Permittee and Financial Responsibility

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

3.2 Agencies

Under the No Annexation Scenario, the City of Chula Vista would be responsible for approving a final restoration plan for the mitigation effort. Under the Annexation Scenario in the event the project is annexed to the City of San Diego, the City of San Diego Development Services Department (DSD) and MSCP staff would be responsible for issuing any necessary permits associated with the proposed restoration effort and approving the final restoration plan for the mitigation effort. The following entities would be responsible for each agency.

City of Chula Vista Contact:
Dai Hoang, Senior Planner
City of Chula Vista
Development Services Department
276 Fourth Avenue
Chula Vista, CA 91910
dhoang@chulavistaca.gov

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

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

3.3 Restoration Specialist

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

3.4 Installation/Maintenance Contractor

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

During the installation, the contractor would be responsible for initial weed treatment and removal, plant installation, as well as maintenance of the restoration site during the 120-day Plant Establishment Period (PEP) and five-year maintenance period.

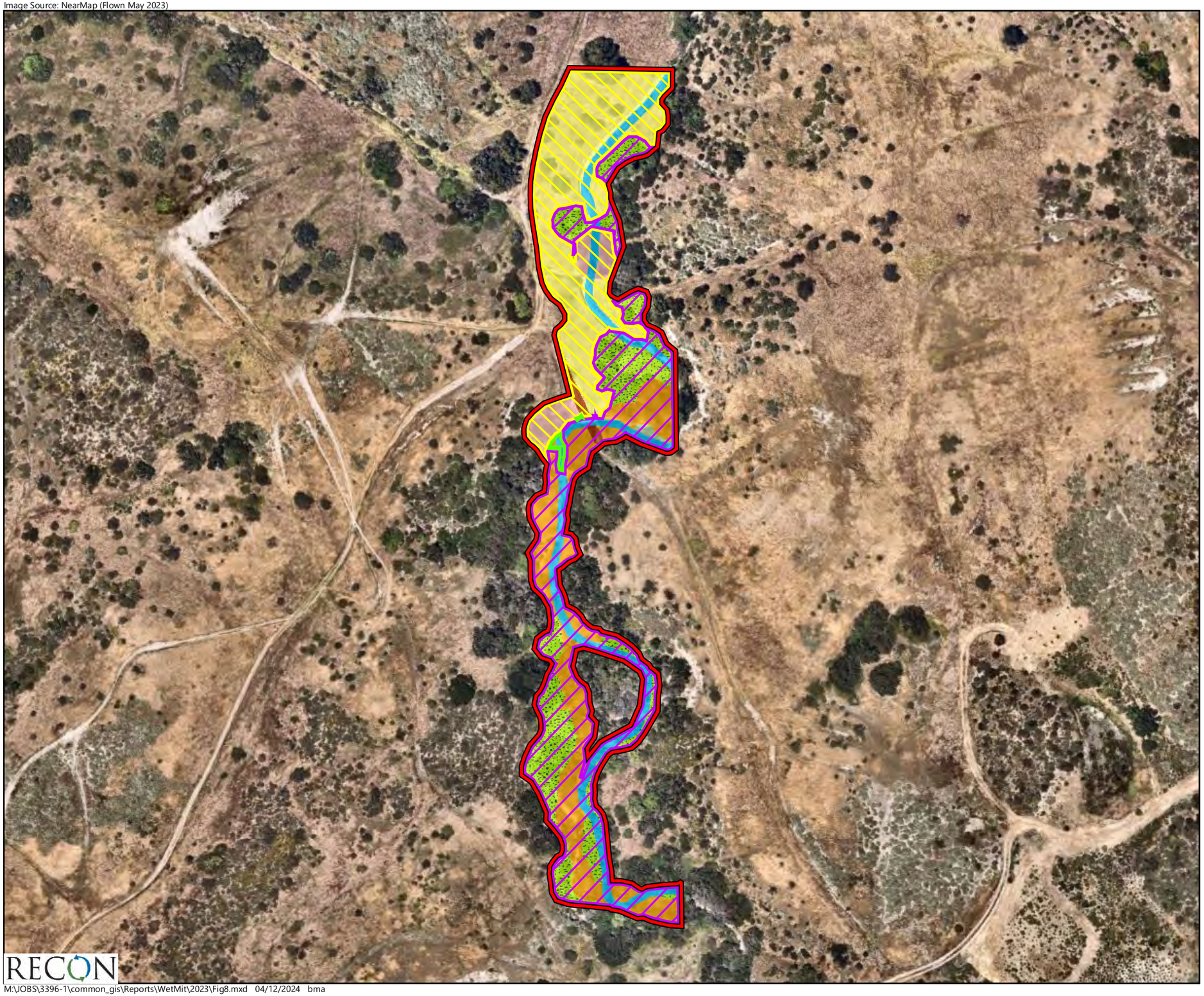
Following installation, the contractor would submit marked up as-builts for all activities that occurred during implementation to the City. Following formal sign-off of the PEP, the contractor would maintain the mitigation area for five years. During this period, the contractor would service the entire mitigation area as well as invasive weed occurrences within the upstream tributaries according to the maintenance schedule (Section 4.5, below). Service would include, but not be limited to, weed control, trash removal, watering, remedial cutting and seeding installation, access control, and pest and disease management. All activities conducted would be seasonally appropriate and approved by the restoration specialist.

4.0 Implementation Plan

This section describes the design of the proposed mitigation and how it would be implemented. Implementation of the mitigation efforts would be conducted under the direction of the qualified restoration specialist. All mitigation activities would commence the first summer-fall season prior to, or concurrently with, construction. The proposed mitigation design is shown on Figures 8 and 9.

Implementation activities include weed treatment and weed dethatching, native container plant and cutting installation, and barrier installation. Weed treatment and dethatching would occur before or concurrently with the start of the project construction. Restoration activities should occur in the order included in the following sections, although seasonal variability should be taken into consideration and the contractor's best professional judgment should be applied. Some activities may be conducted concurrently.

Image Source: NearMap (Flown May 2023)





- Wetland Mitigation Area (3.399 acres)
- Enhancement/Re-establishment (0.416 acre)
- Restoration (0.850 acre)
- Weed Control (2.133 acres)

Vegetation Community

- Mule Fat Scrub
- Natural Flood Channel
- Diegan Coastal Sage Scrub
- Non-native Grassland
- Disturbed Maritime Succulent Scrub
- Disturbed Habitat
- Disturbed Land

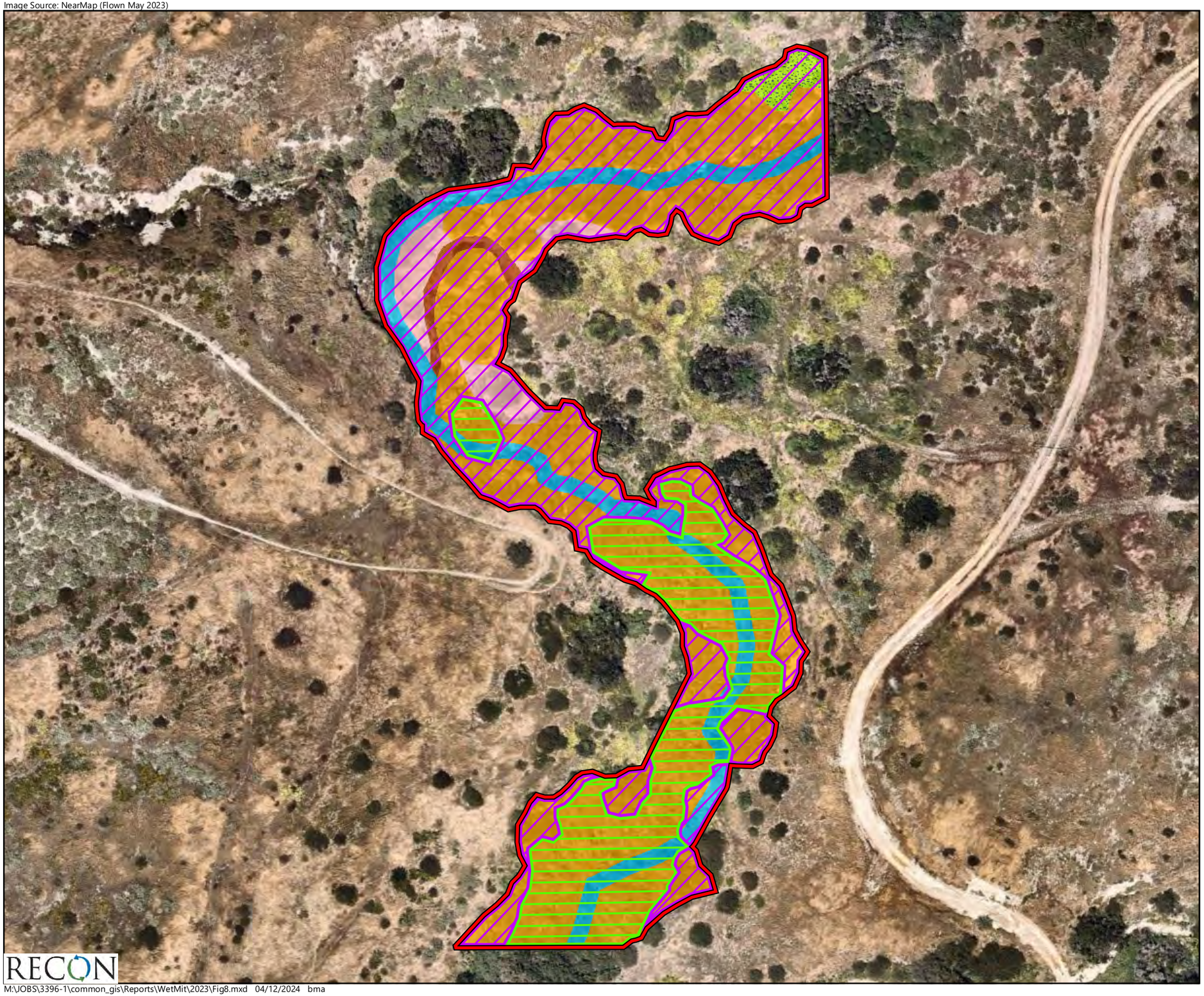
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FIGURE 8.1
Mitigation Area - Existing Conditions

Image Source: NearMap (Flown May 2023)





Wetland Mitigation Area (3.399 acres)
Enhancement/Re-establishment (0.416 acre)
Weed Control (2.133 acres)

Vegetation Community

Mule Fat Scrub
Natural Flood Channel
Disturbed Maritime Succulent Scrub
Disturbed Habitat
Disturbed Land

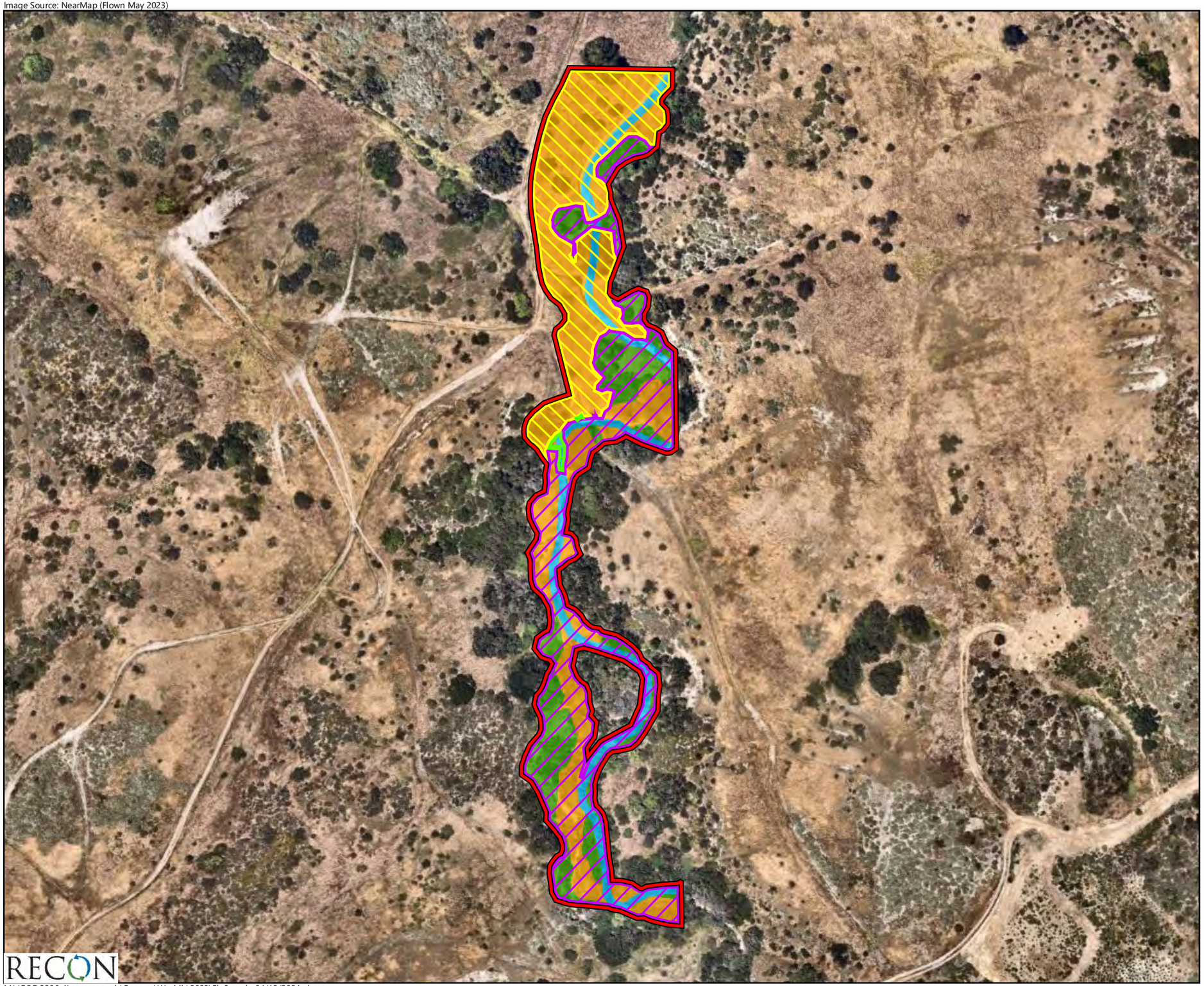
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FIGURE 8.2
Mitigation Area - Existing Conditions

Image Source: NearMap (Flown May 2023)





- Wetland Mitigation Area (3.399 acres)
- Enhancement/Re-establishment (0.416 acre)
- Restoration (0.850 acre)
- Weed Control (2.133 acres)

Vegetation Target

- Mule Fat Scrub
- Natural Flood Channel
- Wetland Buffer

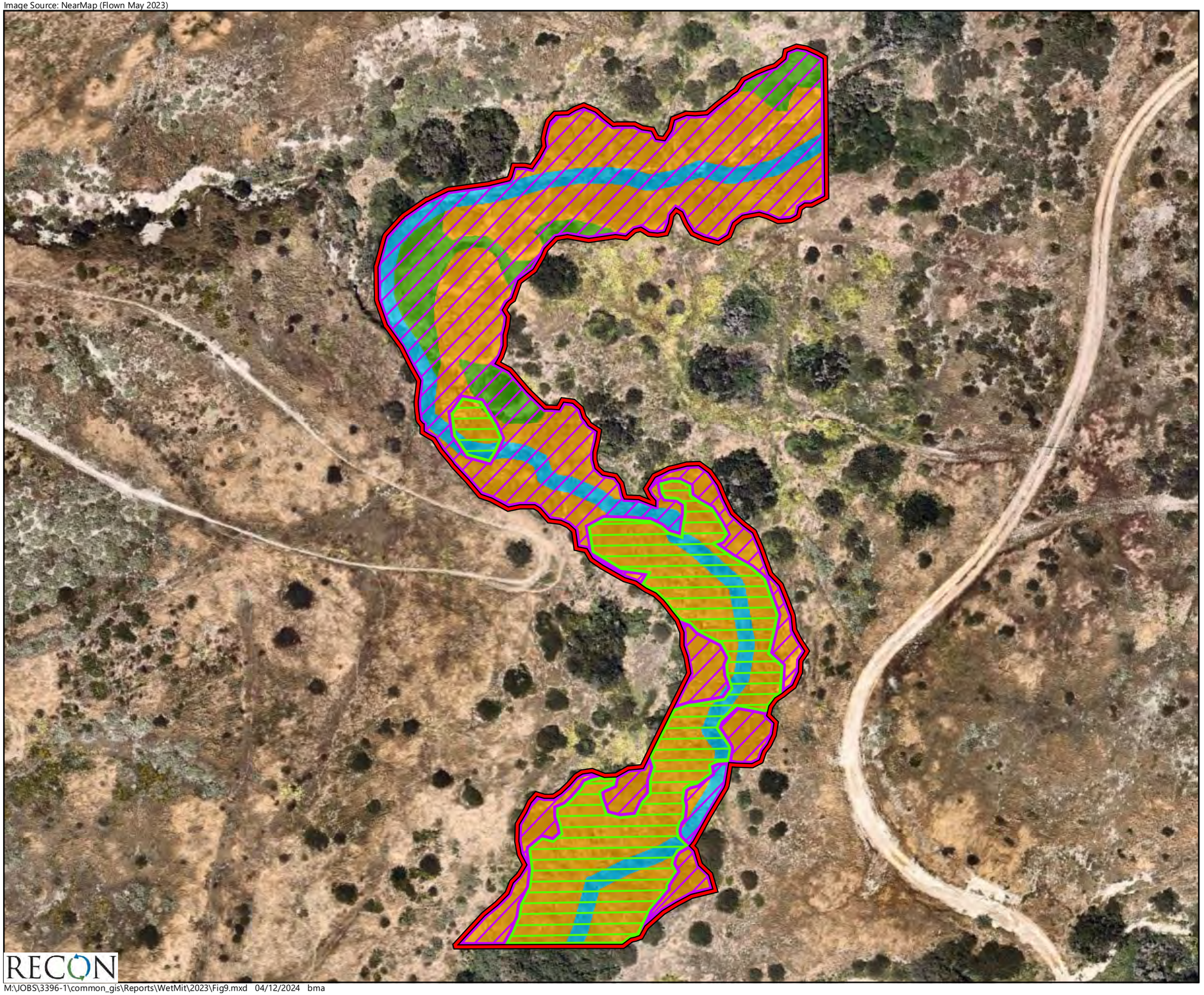
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FIGURE 9.1
Mitigation Area - Target Vegetation

Image Source: NearMap (Flown May 2023)





- Wetland Mitigation Area (3.399 acres)
- Enhancement/Re-establishment (0.416 acre)
- Weed Control (2.133 acres)

Vegetation Target

- Mule Fat Scrub
- Natural Flood Channel
- Wetland Buffer

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FIGURE 9.2
Mitigation Area - Target Vegetation

4.1 Preliminary Design

Mitigation for impacts to wetland habitat would use restoration methods to support establishment of structurally diverse native wetland habitat. The restoration areas would total 1.27 acres and are located within the larger 3.40-acre mitigation area (see Figures 8 and 9). Restoration would involve the removal of annual and perennial non-native species and the installation of native species indicative of native riparian habitat. Non-native species would be removed through chemical and physical removal, as appropriate for the life stage, phenology, and species of the plant. Native plantings would include riparian species that would provide a diverse habitat structure that is appropriate for native wildlife, particularly least Bell's vireo. Decompaction of disturbed areas that are currently unauthorized trails or roads would occur, as needed.

As a project design feature, invasive species management would also occur throughout the remaining portions of the mitigation. In addition, tributaries on publicly owned parcels that are upstream of the mitigation site within Spring Canyon and Wruck Canyon would also be treated for non-native perennial weeds and annual weeds that pose a significant threat to the long-term viability of the mitigation area (see Figure 4). Weed species that are found in upstream tributaries pose a threat to the long-term viability of the mitigation area by their potential to set and deposit seed that may encroach into the mitigation area. The mitigation area would be maintained throughout the five-year maintenance and monitoring period to native wetland habitat, as described in Section 5.0.

4.2 Avoidance and Minimization Measures

During mitigation implementation, avoidance and minimization measures would be implemented to avoid impacts to adjacent habitat, to ensure that the existing hydrology (rainwater runoff and subsurface flows) is maintained, and to avoid impacts to sensitive bird species. General avoidance and minimization measures would be implemented as follows:

Mitigation Area Design

1. Permanent protective fencing and/or use of other measures approved by the City would be implemented, if warranted, to deter human and pet access to on-site habitat. Due to the remote nature of the mitigation area, fencing may not be needed; however, the need would be assessed based on evidence of human use in the surrounding area and coordination with the U.S. Border Patrol . Signage for the mitigation area would be posted and maintained at conspicuous locations. The requirement for fencing and/or other preventative measures is further discussed in Section 4.3.2.

During Mitigation Implementation

1. The qualified restoration specialist that has been approved by the City of San Diego and/or Chula Vista, CDFW, RWQCB, and USFWS would be on-site as needed during implementation activities to ensure compliance with all mitigation measures identified in the CEQA environmental document. The restoration specialist would perform the following duties:

    a. Oversee installation of and inspect the fencing (if needed) and erosion control measures as needed, to ensure that any breaks in the fence or erosion control measures are repaired immediately.

    b. Periodically monitor the work area to ensure that work activities do not generate disturbances to adjacent habitats.

    c. Train all installation/maintenance contractor personnel on the biological resources associated with this project. At a minimum, training would include discussions of (1) the purpose for resource protection; (2) native and non-native species; (3) environmentally responsible restoration practices as outlined in measures 4, 5, and 6 below; (4) the protocol to resolve conflicts that may arise at any time during the restoration process; and (5) the general provisions of the project's mitigation monitoring and reporting program, the need to adhere to the provisions of the federal Endangered Species Act, the Clean Water Act, and CDFW code, and the penalties associated with violating these regulations.

    d. Submit a final as-built report to the City of San Diego and/or the City of Chula Vista, CDFW, RWQCB, and USFWS, within 60 days following completion of implementation. The final report would include as-built drawings with an overlay of habitat that was restored and other relevant summary information documenting that authorized impacts were not exceeded and that general compliance with all conservation measures was achieved.

2. The following conditions would be implemented during project implementation:

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

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

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

3. All equipment maintenance and staging, and any other such activities would occur in designated areas as approved by the project biologist. These designated areas would be in previously compacted and disturbed areas to the maximum extent practicable in such a manner as to prevent any runoff from entering the habitats. Contractor equipment should be checked for leaks prior to operation and repaired, as necessary. A spill kit for each piece of construction equipment should be on-site to be used in the event of a spill.

4. To avoid any direct impacts to any species identified as a listed, candidate, sensitive, or special status species in the MSCP, removal of habitat that supports active nests in the mitigation area should occur outside the breeding season for these species (February 1 to September 15). To avoid indirect impacts to least Bell's vireo nesting within Spring Canyon and coastal California gnatcatcher nesting within the adjacent maritime succulent scrub, any work that may cause noise in excess of 60 A-weighted decibels hourly average, or the ambient if it is greater, shall be avoided during the breeding season for this species (February 1 to September 15). If removal of habitat in the mitigation area must occur during the breeding season, a qualified biologist shall conduct a pre-implementation survey to determine the presence or absence of nesting birds in the proposed area of disturbance. The pre-implementation survey shall be conducted within 3 calendar days prior to the start of restoration activities (including removal of vegetation). The Permittee shall submit the results of the pre-implementation survey to the City of San Diego or Chula Vista, CDFW, RWQCB, and USFWS for review and approval prior to initiating any restoration activities. If nesting birds are detected, a letter report in conformance with the City of San Diego's Biology Guidelines or Chula Vista requirements (i.e., appropriate follow-up surveys, monitoring schedules, work and noise barriers/buffers, etc.) shall be prepared and include proposed measures to be implemented to ensure that take of birds or eggs or disturbance of breeding activities is avoided. The report shall be submitted to the applicable City and CDFW, RWQCB, and USFWS for review and approval and implemented to the satisfaction of the applicable City. The City of San Diego's Mitigation Monitoring Coordinator or the City of Chula Vista and CDFW, RWQCB, and USFWS shall verify and approve that all measures identified in the report are in place prior to and/or during implementation.

5. Per the Addendum to Historical Resources Inventory and Evaluation Report for the Nakano Project (RECON 2023b), impacts to cultural resources associated with the implementation of restoration efforts within the survey area would be less than significant. No additional cultural resources work or monitoring for the wetland mitigation area is recommended.

4.3 Implementation Activities

Implementation activities include invasive weed treatment, non-native weed biomass removal, barrier/signage installation, and native plant installation. The implementation schedule is shown in Table 2. Implementation would commence prior to or concurrently with the start of construction of the project.

Table 2
Restoration Implementation Activities Schedule

Task	Time of Year
1. Initial weed removal	Fall (outside bird breeding season)
2. Barrier/Signage	Fall, immediately following biomass removal
3. Plant installation	Winter

4.3.1 Initial Weed Removal

Mitigation would begin with the initial removal of perennial and annual weed biomass. Perennial weeds present within the mitigation area primarily consist of tamarisk, castor bean, tree tobacco, and pepper trees. Perennial weeds present throughout the mitigation area and upstream tributaries would be removed through a combination of herbicide application, heavy equipment, and hand tools, depending on the life stage and species.

In addition to the removal of perennial weed species, areas of dense non-native annual weed material would be removed throughout the mitigation area. Annual weed material removal would be conducted by personnel familiar with native and non-native plants using mowers, line trimmers, and rakes. Cut material would be raked into piles, removed from the site, and taken to a landfill or put into a green waste dumpster for disposal.

4.3.2 Barrier Installation

After initial weed removal and if warranted based on site conditions, the mitigation area would be fenced with t-posts and rope at all unauthorized access points into the mitigation area to prevent unauthorized access by U.S. Customs and Border Protection operational activities and trespassing by the public. Temporary or movable barriers would be installed at locations where entrance into the site is required by maintenance or water trucks for the purpose of maintaining the mitigation area. Signs would be installed to provide notice that the area is an ecological preserve, notify that trespassing is prohibited, and cite penalties for trespass violation including liability for repair of any damage to soil or biological resources within the barrier. Signs in both Spanish and English would be mounted at approximately 200-foot intervals around the mitigation area on metal t-posts or similar.

4.3.3 Plant and Seed Installation

Planting and seeding would occur after the initial weed removal is complete and after the first significant rainfall of the wet season. The container plant and seed palettes are included in Table 4. All plant and seed material would be placed in locations that mimic natural plant distribution (i.e., plants installed in clusters of the same species and with variable spacing, as seen in natural habitats). In general, plant species would be grouped based upon indicator status, with obligate and facultative wetland species (most hydrophytic) installed in depressional features where water collects and remains for longer durations, and facultative species (less hydrophytic) installed upslope primarily within transitional riparian areas of the site (see Table 3). Native plants would be installed using standard horticultural practices, using a hole at least twice the diameter of the root ball. All plants would be thoroughly watered in their pots before planting, as would the soil in all planting holes. Seed would be distributed by hand and lightly raked into the soil.

Table 3 Target Plant Species List				
Plant Species	Common Name	Arid West Wetland Status[1]	Container Plants per Acre[2]	Pounds per Acre
Ambrosia psilostachya	western ragweed	FACU	50	1.0
Artemisia douglasiana	mugwort	FAC	250	3.0
Baccharis salicifolia	mule fat	FAC	300	1.0
Rosa californica	California rose	FAC	300	2.0
Salix gooddingii	Goodding's black willow	FACW	100	1.0
Salix laevigata	red willow	FACW	150	1.0
Salix lasiolepis	arroyo willow	FACW	150	1.0
Vitis girdiana	wild grape	FAC	150	3.0
[1]Wetland Indicator Status per USDA plant database (USDA 2020): FAC = facultative FACU = facultative upland FACW = facultative wetland [2]All container plants would be one-gallon in size.				

4.4 As-Built Reporting

At the completion of implementation, the installation would be approved by the City of San Diego and/or Chula Vista and CDFW, RWQCB, and USFWS. An as-built report would be submitted that documents implementation activities and the dates they were completed. The report would include but not be limited to dates of on-site work, details of initial weed removal, final plant lists and quantities, and any modifications to the mitigation area design. The report may be a brief letter report with photos of the final site design and figures with locations of site elements.

4.5 120-day Plant Establishment Period

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

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

5.0 Maintenance Plan

Regular maintenance of the mitigation area would be required during the five-year maintenance period to control non-native weeds and establish riparian habitat. The need for weeding is expected to decrease substantially by the end of the maintenance period provided successful habitat restoration has been achieved. Maintenance activities would include weed control, watering, supplemental re-planting/re-seeding of native species, trash removal, and barrier/sign maintenance. Maintenance activities would be conducted in a frequency and duration that ensures attainment of the final success criteria. Maintenance activities would be performed per the schedule in Table 6 or as needed to achieve project success.

5.1 Weed Control

Weed control would be performed consistent with the following:

- All herbicide and pesticide use would be under the direction of a licensed qualified applicator and would be applied by personnel trained to apply herbicide. All weeding personnel would be educated to distinguish between native and non-native species.
- Herbicide would only be applied when wind speed is less than five miles per hour, and spray nozzles would be of a design to maximize the size of droplets, to reduce the potential for drift of herbicide to non-target plants. Application of herbicide would not occur if rain is projected within 12 hours of the scheduled application.
- Herbicide application should consider proximity to known Crotch's bumble bee (*Bombus crotchii*) occurrences or nests (i.e., known occurrences within 1 kilometer of the mitigation site) during the nesting season (February 15 through September 15), and to the extent feasible avoid the peak blooming season when bees are most likely to be foraging.
- Weeding would be done at a frequency and duration to ensure that weeds are not allowed to flower and set seed within the site. During the growing season this may be as frequent as every other week, depending on weather patterns. Any weeds that have set seed would be removed by hand and disposed of off-site.

5.2 Watering

Hand watering would be performed consistent with the following:

- The watering frequency and duration would be done in a manner to mimic natural rainfall and encourage deep root establishment of trees and shrubs, but not enough to create runoff.
- Watering would be carefully tapered off towards the end of summer to allow plants to experience their typical summer dormancy and avoid overwatering or excessive soil shrinking and swelling that can damage plant roots.

5.3 Supplemental Planting

Supplemental planting would be performed consistent with the following:

- Willow and mule fat cuttings would be installed, as needed, within the site to increase vegetative coverage and provide competition for weed growth.
- Containers of riparian plant species may be introduced to increase diversity and vegetative structure, as well as provide competition for non-native weed species.
- Containers of transitional plant species may be introduced to preclude weed encroachment along the mitigation area edges.

5.4 Supplemental Seeding

Remedial seeding would be performed consistent with the following:

- Areas of the site where native plants struggle to recruit would be remedially seeded during Years 1 and 2.
- Remedial seeding of native trees and shrubs would be conducted to improve ontogenetic diversity.
- Remedial seeding of herbaceous species would be conducted to increase species diversity.

5.5 Trash Removal and Barrier/Sign Maintenance

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

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

5.6 Adaptive Management Approach

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

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

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

6.0 Ecological Performance Standards

The performance standards used to determine successful wetland mitigation would include the achievement of standards for California Rapid Assessment Method (CRAM), vegetation cover, plant species richness, and weed tolerance.

The target values for the riparian habitat would be based on a reference site used to define the target vegetation and establish target values for cover, species richness, and weed abundance. A native riparian reference site is identified in Section 6.2.1.

Each of the specified performance standards would be evaluated following the completion of seasonal field monitoring to determine if the final performance standards have been met and to assess the likelihood that any particular standard would ever be met (taking into account the seasonal conditions). The final assessment of success shall be based on the combined achievement of the performance standards over the monitoring period and an analysis of the trends in habitat development established.

6.1 California Rapid Assessment Performance Standards

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

defensible, and offer a window into overall wetland functionality. A search of the CRAM database did not identify any appropriate local CRAM sites that could be used as a suitable reference for this method (California Wetlands Monitoring Workgroup 2018). Therefore, a baseline CRAM assessment of the mitigation area would be conducted prior to the start of restoration activities to demonstrate the functional lift of the mitigation area through the restoration actions.

CRAM metric and sub-metric scores are expected to change from the baseline (pre-implementation condition) as a result of development of mitigation area and the completion of adjacent residential development. CRAM scores for the mitigation area should increase, both by index (or total) scores and by attribute scores, but mostly by physical and biotic attribute scores (Table 5).

A CRAM assessment of the riverine system shall be conducted on the mitigation area prior to implementation of this plan to provide the specific baseline target CRAM metric goals (see Section 8.1.3, CRAM Monitoring).

Table 5
CRAM Metric Goals for Five Years Post-Establishment of Mitigation Area

CRAM Attribute	CRAM Metric and Submetrics	Target CRAM Metric Goal
Buffer and Landscape Context	Stream Corridor Continuity	Attribute rating greater than pre-implementation CRAM
	Percent of AA with Buffer	Attribute rating equal to or greater than pre-implementation CRAM
	Average Buffer Width	Attribute rating at least equal to the pre-implementation CRAM
	Buffer condition	Attribute rating greater than pre-implementation CRAM
Hydrology	Water Source	Attribute rating greater than or equal to the pre-implementation CRAM
	Channel Stability	Attribute rating greater than pre-implementation CRAM
	Hydrologic Connectivity	Attribute rating greater than or equal to pre-implementation CRAM
Physical Structure	Structural Patch Richness	Attribute rating greater than pre-implementation CRAM
	Topographic Complexity	Attribute rating greater than pre-implementation CRAM
Biological Structure	Horizontal Interspersion	Attribute rating greater than pre-implementation CRAM
	Number of Plant Layers	Attribute rating greater than pre-implementation CRAM
	Number of Co-dominant Species	Attribute rating greater than pre-implementation CRAM
	Percent Invasion	Attribute rating greater than pre-implementation CRAM
	Plant Community Composition Metric (average of A–C)	Attribute rating greater than pre-implementation CRAM

6.2 Vegetative Performance Standards

The vegetative performance standards are shown in Table 6 and would be as follows:

- Container plant survival shall be 80 percent of the initial plantings for years 1 through 2, unless their function has been replaced by natural recruitment of native species providing similar habitat structure.
- At the end of the five-year monitoring program, required relative percent cover values shall be 60 percent of the reference site for tree cover and 70 percent of the reference site for shrub and herbaceous cover.

- Overall species richness by taxon shall be evaluated for the reference and mitigation area. The mitigation area shall be considered to meet the species richness performance standard if the number of native species in the mitigation area is at least 85 percent the number of native species in the reference site after the five-year monitoring period.

- The cover of all non-native species within the mitigation area shall not exceed an absolute value of less than 1 percent at the end of the five-year monitoring period, and no Cal-IPC List High or perennial species shall be present for any of the years of the five-year monitoring period.

Table 6
Wetland and Riparian Establishment/Wetland Restoration Performance Standards (percentage)

Year	Container Plant Survival	Percent Cover–Native Tree/Shrub Species[1]	Percent Cover–Native Herbaceous Species[1]	Species Richness[1]	Percent Cover–Non-native Species[2]
1	80	10	30	N/A	10
2	80	20	40	40	5
3	--	30	50	50	5
4	--	50	60	60	<1
5	--	60	70	85	<1

[1]Relative to reference site values.
[2]No Cal-IPC High or perennial species would be present during any monitoring years (Cal-IPC 2023).

6.2.1 Location of Reference Site

A proposed reference site has been identified within the Spring Canyon that mimics the intended habitat composition, topography, and hydrology of the mitigation site after the implementation and maintenance have been successfully completed. The proposed reference site is directly upstream of the wetland mitigation area (Figure 10). The reference site measures approximately 2.55 acres and is on City of San Diego-owned property accessible via public trails. The proposed reference site contains native riparian scrub habitat, diverse native species, and few non-native species. Impacts from unauthorized public uses (i.e., trash, vandalism, and/or unauthorized trails) appear minimal. Adjacent upland communities are in excellent condition. Native species observed within the proposed reference site include black willow, arroyo willow (*Salix lasiolepis)*, mule fat, blue elderberry (*Sambucus nigra* ssp. *caerulea*), lemonade berry (*Rhus integrifolia*), and needlegrass species (*Stipa* sp.). Non-native species cover was low and included fennel and non-native grasses. The use of a reference site will aid in the documentation of annual and seasonal changes that may occur during the mitigation implementation and maintenance. The selection of the reference site will be approved by the City of San Diego DSD and MSCP.

6.3 Photographic Documentation

Permanent photograph location points would be located in strategic areas of the mitigation area. Representative photographs would be taken at each photograph location point to visually document the progress of vegetation cover development over the monitoring period.

Image Source: NearMap (Flown May 2023)





Reference Site
Wetland Mitigation Area
Mitigation Parcel

0 Feet 100

RECON

M:\JOBS\3396-1\common_gis\Reports\WetMit\2023\Fig10.mxd 04/12/2024 bma

FIGURE 10
Wetland Mitigation Reference Site

7.0 Monitoring Requirements

It is anticipated that the riparian habitat would become established within the five-year monitoring period, although full maturation of the community may take longer. Restoration monitoring would include qualitative maintenance monitoring and monitoring for performance standards, including semi-quantitative vegetation monitoring, complete flora and fauna inventories, and photographic documentation. The monitoring schedule is presented in Table 7.

Table 7
Monitoring Schedule

Task	120-day PEP	Year 1	Year 2	Year 3	Year 4	Year 5
Qualitative Monitoring	Weekly	Every other week during the growing season (Jan – May)	Every other week during the growing season (Jan – May)	Monthly	Monthly	Monthly
Photograph Documentation	Monthly	As-needed	Spring	Spring	Spring	Spring
Quantitative Monitoring	None[1]	Spring	Spring	Spring	Spring	Spring
CRAM	None	Spring	None	None	None	Spring

[1]Quantitative monitoring to begin in Year 1.

7.1 Qualitative Monitoring

Qualitative monitoring of the mitigation area would be performed to guide maintenance activities and would be conducted as follows:

- Qualitative monitoring would occur every other week during the growing season in Years 1 and 2 (January–May), monthly thereafter with additional visits conducted during the growing season, as needed to ensure project success (see Table 7). Monitoring would include, but not be limited to, assessment of container plant health, native seed germination, weed presence, and unauthorized trespassing. Monitoring results would be used to determine the timing and frequency of maintenance activities.

7.2 Quantitative Monitoring

Overall native and non-native cover (i.e., trees, shrubs, herbaceous species) and species richness would be evaluated. These parameters would be measured using the point-intercept transect monitoring method to measure development towards the individual performance standards for each habitat type (see Table 7). Transect monitoring methods would follow the protocol published by the California Native Plant Society (CNPS) in *A Manual of California Vegetation* (Sawyer et al. 2009). Due to the increasing density of riparian vegetation over time and the difficulty and resulting destruction that occurs when trying to access vegetation along a 50-meter transect, this method has been revised to employ a 20-meter-long transect centered in a 20-by-5-meter plot. Approximately three transects per every five acres would be randomly positioned throughout the mitigation area; the transects would follow the stratified random sampling method and a map of the transect

locations would be reviewed by the City of San Diego or the City of Chula Vista, and USFWS, CDFW, and RWQCB. Vegetation would be sampled by the point method at every half meter (0.5-meter intervals) along the transect line to determine species and cover. The percent cover of a species would be determined by dividing the number of intercepts by that species by the total number of sample points. The surveyor would note the species encountered and classify their height (i.e., herb, shrub, or tree) at each interval, as described in the CNPS field sampling protocol (CNPS 1995). In addition, native species present within each target habitat type would be counted to determine native species richness. Dead container plants would also be counted to determine container plant survival.

7.3 Wildlife Usage

A list of wildlife species observed using the mitigation area would be prepared and included in the annual reports. Species lists would be compiled annually and would include observations made during qualitative and quantitative monitoring visits. Least Bell's vireo have been observed within the mitigation site, and yellow warblers have been observed upstream, as discussed in Section 2.1.3. The mitigation area would be required to demonstrate that it meets habitat criteria for least Bell's vireo and yellow warbler.

7.4 CRAM Monitoring

As noted above, the newly established mitigation area would have CRAM assessment monitoring conducted twice during the five-year mitigation and monitoring period to inform adaptive management. The CRAM assessments shall also include a pre-construction assessment as a baseline. The two post-implementation assessments shall be conducted in Year 1 and Year 5 of the monitoring period. CRAM assessments would use the Riverine Systems methodology (CRAM 2013, version 6.1 or most recent). The CRAM assessments shall occur in the spring when the native flora is typically at its peak.

7.5 Reporting

An annual report shall be prepared for each year of the monitoring program and submitted to the RWQCB, CDFW, USFWS, and the City of San Diego DSD, Mitigation Monitoring and Coordination section by January 15 of each year. The annual report would assess the mitigation area's attainment of yearly interim performance standards and progress toward the final performance standards. The period covered in the annual report shall be from January 1 to December 31 in any given monitoring year. The reports shall also summarize the project's compliance with all applicable mitigation measures and permit conditions for each agency. A final monitoring report would be prepared and submitted to RWQCB, CDFW, USFWS, and the City of San Diego for use in the notification of completion and final acceptance of the mitigation effort.

8.0 Financial Assurances

The Permittee must post a financial assurance (e.g., letter of credit, performance bond, etc.) to cover the initial implementation, and five-year maintenance and monitoring activities outlined in this plan. The same funding source established by the Permittee would be available to complete the compensatory mitigation project, provide alternative compensatory mitigation, and/or for use by a third party to complete required tasks should the initial mitigation effort fail to be successful.

Furthermore, an endowment fund shall be invested by the applicant to ensure that the mitigation site can be managed by the land manager (i.e., City of San Diego) in perpetuity pursuant to the goals and tasks identified in the Long-Term Management Plan (LTMP; see Section 10).

9.0 Notification of Completion

If the final success criteria have been met at the end of the five-year monitoring program, notification of these events shall be provided with the fifth-year report. If the final success criteria have not been met by the end of the five-year monitoring program, the fifth-year report would discuss the possible reasons and recommendations for remedial measures to cause the site to meet the criteria. If the established wetland habitat has not met the performance standards, the Permittee's maintenance and monitoring obligations would continue, until the RWQCB, USFWS, CDFW, and City of San Diego and/or Chula Vista deem the mitigation program as successful or contingency measures must be implemented (see Section 5.6, Adaptive Management Plan).

Following receipt of the final annual report, the RWQCB, USFWS, CDFW, and the City of San Diego DSD Mitigation Monitoring and Coordination and Parks and Recreation Open Space and/or the City of Chula Vista shall be invited to visit the restoration site to confirm completion of the mitigation effort. The project wetland mitigation requirements shall be deemed complete once the final success criteria are met and after written approval by the RWQCB, USFWS, and the City of San Diego and/or Chula Vista has been received.

10.0 Site Protection Instrument and Long-term Management Plan

The mitigation area is planned to be conveyed to the City of San Diego in fee title. After conveyance, assurance of long-term conservation and management of the mitigation area would be provided by the City of San Diego's MSCP Subarea Plan. Management and monitoring would be provided consistent with the City MSCP Subarea Plan, Section 1.5.2 General Management Directives. In the event the ownership of the mitigation area is not conveyed to the City of San Diego for long term management and the project is not annexed into the City of San Diego, an easement would be dedicated to the City of Chula Vista to ensure protection of the site in perpetuity and a third party land manager authorized by the USFWS, RWQCB, CDFW, and the City of Chula Vista would need to be identified to perform long term management of the mitigation site.

An LTMP would be prepared to identify the habitat manager (i.e., City of San Diego) and management goals and tasks for long-term management of the mitigation site. The LTMP would be submitted to the City of San Diego and regulatory agencies (USFWS, RWQCB, and CDFW) for approval. A non-wasting endowment or similar secure funding method in an amount approved by the RWQCB, USFWS, CDFW, and the City of San Diego and/or Chula Vista based on a Property Analysis Record, or similar cost estimation method, would secure the ongoing funding for the perpetual long-term management, maintenance, and monitoring of the mitigation area. The non-wasting endowment must be established prior to, or concurrently with impacts.

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ATTACHMENT 1

Technical Memorandum for Spring Canyon Hydraulic Analysis and Preliminary Floodplain Mapping

RICK
ENGINEERING COMPANY

December 22, 2023

Ms. Christina Schaefer
Schaefer Ecological Solutions
815 Madison Avenue
San Diego, California 92116

SUBJECT: TECHNICAL MEMORANDUM FOR SPRING CANYON HYDRAULIC ANALYSIS AND PRELIMINARY FLOODPLAIN MAPPING
(RICK ENGINEERING COMPANY JOB NUMBER 15013-CWE)

INTRODUCTION

Spring Canyon is a natural drainage course, located southeast of the Southwest Village master planned community. The canyon provides opportunities for the establishment of wetland species and therefore the environmental consultant, Schaefer Ecological Solutions and RECON Environmental, requested a detailed hydraulic model of the canyon to identify inundation limits, and flow depths, during the 2-year, 5-year, and 10-year storm events to assist in the evaluation of restoration opportunities within Spring Canyon.

To support this request, RICK has prepared this Technical Memorandum. The analyses in this study focus on a detailed Hydrologic Engineering Center's – River Analysis System (HEC-RAS) hydraulic model of the Spring Canyon drainage course and a desktop review of available hydrologic calculations, to estimate anticipated flow rates during the subject storm events. The results are the plotted limits of inundation for the 2-year, 5-year, 10-year, and 100-year storm, detailed HEC-RAS model results output, and a hydraulic work map/exhibit to inform the Environmental Consultant's future restoration alternatives evaluation.

PROJECT BACKGROUND

The subject portion of the Spring Canyon watershed encompasses approximately 3.4 square miles within the City of San Diego limits, in Otay Mesa. The watershed extends roughly from Brown Field to the north, Britannia Boulevard to the east, the mesa (to be developed with the Southwest Village Master Planned Community) to the west, and drains southerly to the United States and Mexico border at an existing cross-border culvert drainage system. The watershed area is largely natural with large commercial and industrial developments located at the north and east extents of the watershed.

Cross-Border Drainage

The Spring Canyon watershed ultimately drains to a box culvert, that conveys storm water flows southerly across the United States-Mexico border. Therefore, it is subject to the 1987 memorandum, entitled *Drainage Requirements for Developments in Otay Mesa* (Cross-Border Memo), distributed by the City of San Diego Engineering and Development Department. This memo requires all developments within the Otay Mesa area to incorporate detention facilities such that all discharge flows from the project sites do not exceed pre-development conditions for the 5-year, 10-year, 25-year and 50-year storm.

Based on these requirements, it is assumed all development post-1987 within the area would not increase flows from the natural, pre-project conditions. Therefore, it would be appropriate to assume pre-project land-uses within the overall Spring Canyon watershed (for areas developed post-1987), as it would theoretically result in the same or similar calculated peak flows.

HYDROLOGY

The scope of this technical analysis was limited to a desktop review of existing hydrologic studies performed for the watershed and other readily available tools such as the United States Geological Survey's (USGS) publicly available StreamStats tool, and NOAA Atlas 14 rainfall data to estimate point precipitation frequency estimates. A large watershed-scale hydrologic analysis was not conducted as part of this study, and instead the available information was leveraged to approximate the anticipated peak flows.

USGS StreamStats

The StreamStats program is a spatial analytical tool that delineates drainage basins and estimates basin characteristics and flow statistics. The benefit of utilizing this tool is the simplicity, as the only user input is the downstream limit of the requested study area. For this study, the Spring Canyon drainage course, just upstream of the existing cross-border culvert was selected. The program automatically delineates the approximate drainage basin, as shown in Figure 1.

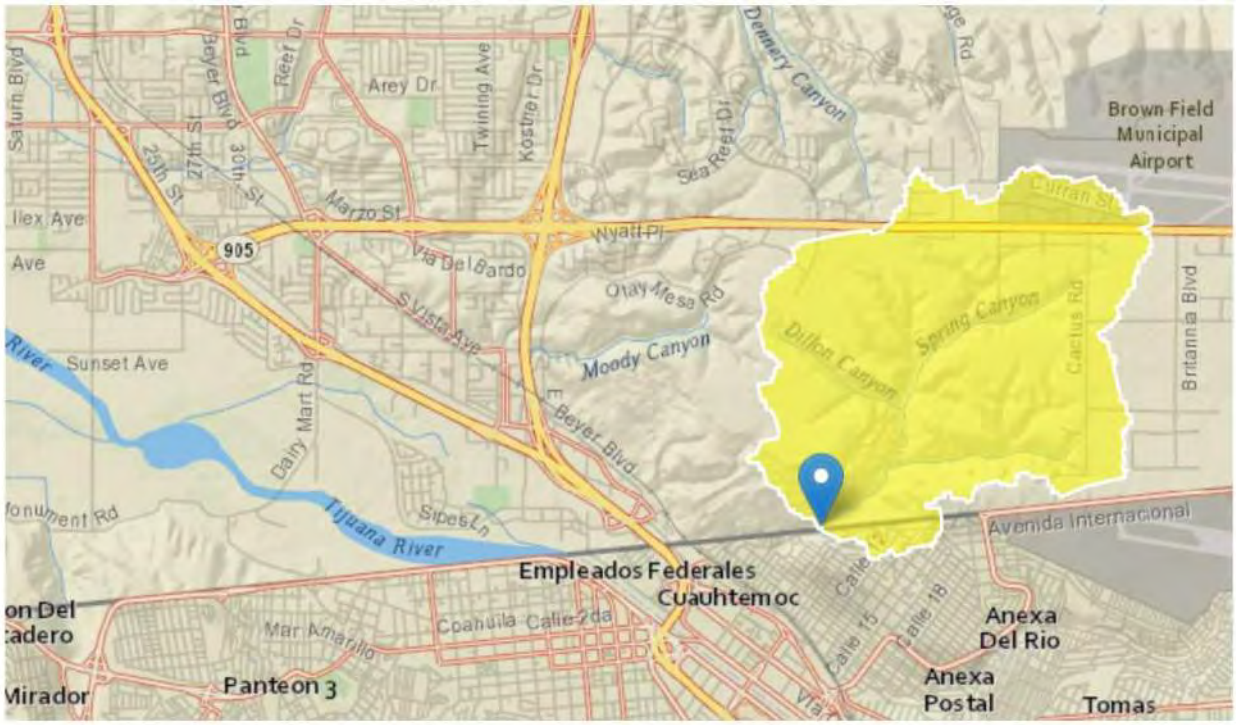


Figure 1: USGS StreamStats Spring Canyon Basin Delineation

The generated basin was then compared to available topographic information and aerial imagery, to confirm the limits of the watershed and compare to the previous drainage study prepared by Kimley-Horn and Associates. The calculated StreamStats basin area of 3.4 square miles matched closely with the previous hydrology report delineation (3.42 square miles) and was therefore deemed acceptable for this level of analysis.

Previously Performed Hydrologic Studies

A previous drainage study encompassing the Spring Canyon watershed entitled *Drainage Study for the Otay Mesa Community Plan Update* was prepared by Kimley-Horn and Associates, Inc. in 2007 (Kimley-Horn Study). A detailed Modified Rational Method Analysis was performed for the Spring Canyon Watershed, which is a subbasin of the larger *West Watershed*, as shown in Figure 2 (reflected in a solid thick green outline). The study analyzed the 50-year and 100-year storm events.

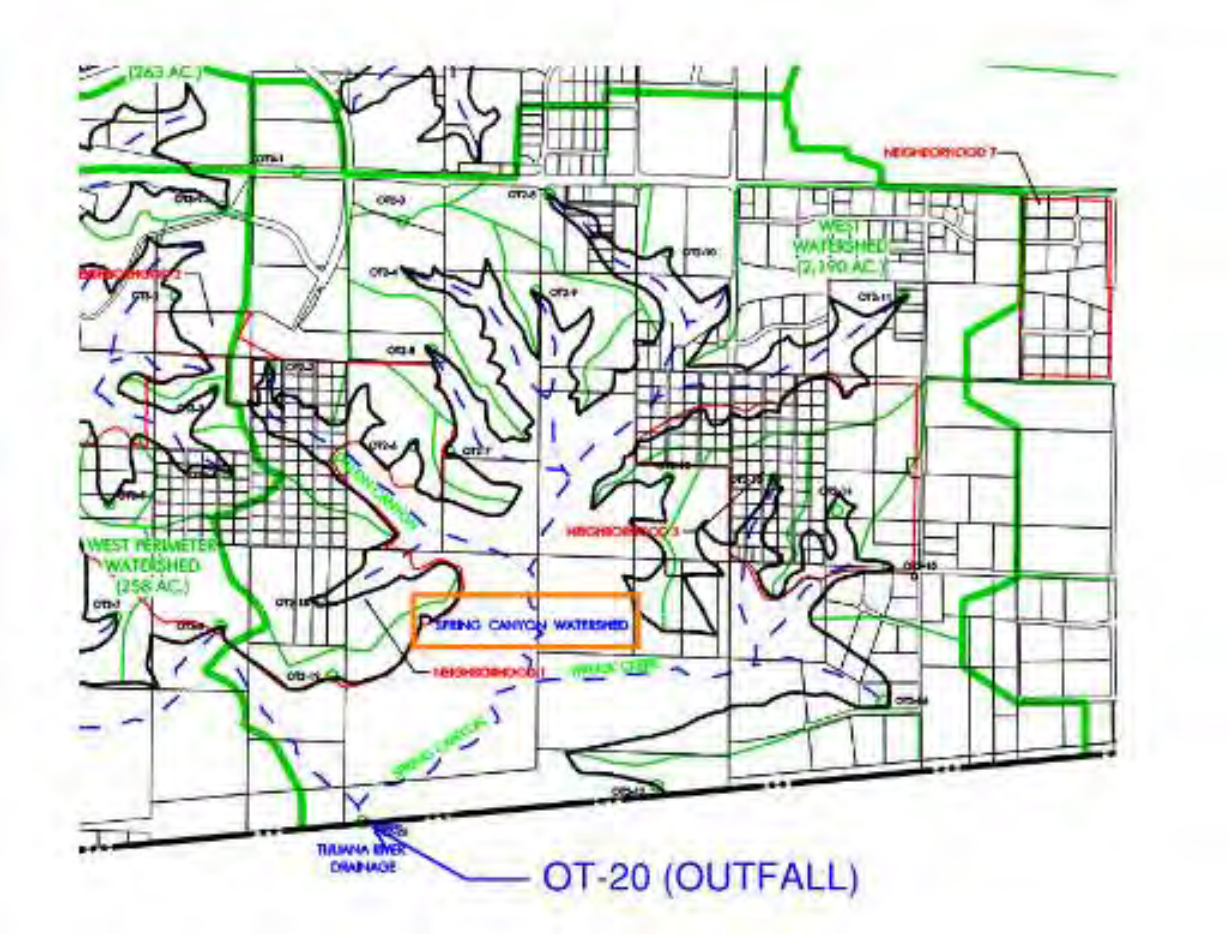


Figure 2: Drainage Map Excerpt of West Watershed (Kimley-Horn, 2007)

The total drainage area contributing to the existing box culvert outfall was delineated and totaled 3.42 square miles, according to the Kimley-Horn Study. This matches the approximated drainage area delineated by the StreamStats program. The resulting peak flows from the 50-year and 100-year storm events were 672 and 1,676 cubic-feet-per-second, respectively.

Hydrologic Analysis Summary			
	Area (mi²)	Q50(cfs)	Q100(cfs)
West Perimeter Watershed	0.40	170	444
West Watershed	3.42	672	1,676
East Watershed	6.78	1,280	3,673
	10.60	2,122	5,793

Figure 3: Hydrologic Analysis Summary Excerpt (Kimley-Horn, 2007)

Hydrologic Calculation Methodology

As mentioned previously, in lieu of performing a detailed hydrologic analysis, this study leverages the existing and easily accessible hydrologic information for the Spring Canyon watershed. A review of the StreamStats results show anticipated peak flows to be much lower than what is considered practical and reasonable for the region. Averaging out the peak flow from the 100-year storm event over the entire watershed area results in an average flow of 0.23 cfs per acre, which is much lower than expected or feasible for a watershed of this size and with these characteristics.

Furthermore, a detailed and site-specific drainage study had previously analyzed the subject area, which provides more representative model of the watershed. Therefore, the calculated flows from the 100-year, 10-year, 5-year, and 2-year events defer heavily to the analysis provided in the Kimley-Horn Study.

Given the results from the 100-year storm event, an estimated intensity and duration can be estimated based on the Rational Method:

$$Q = C\ I\ A$$

where:

- Q= peak discharge, in cubic feet per second (cfs)
- C= runoff coefficient expressed as that percentage of rainfall which becomes surface runoff (no units);
- I= average rainfall intensity for a storm duration equal to the time of concentration (Tc) of the contributing drainage area, in inches per hour;
- A= drainage area contributing to the design location, in acres

Based on the Cross-Border Memo, it is appropriate to assume mostly natural, pre-project runoff coefficients (C), for areas developed post-1987. Available historical imagery suggests much of the industrial and commercial developments located within the watershed occurred past this date. Therefore, an estimated C value between 0.45-0.5 would be deemed appropriate. For this analysis, a value of 0.48 was used.

Given the 100-year flow rate of 1,676 cubic-feet-per-second and a drainage area of 3.4 square miles (2,190 acres), the 100-year rainfall intensity is calculated to be 1.6 inches/hour. This correlates, as shown in Figure 4, to a time of concentration of approximately 45 minutes.

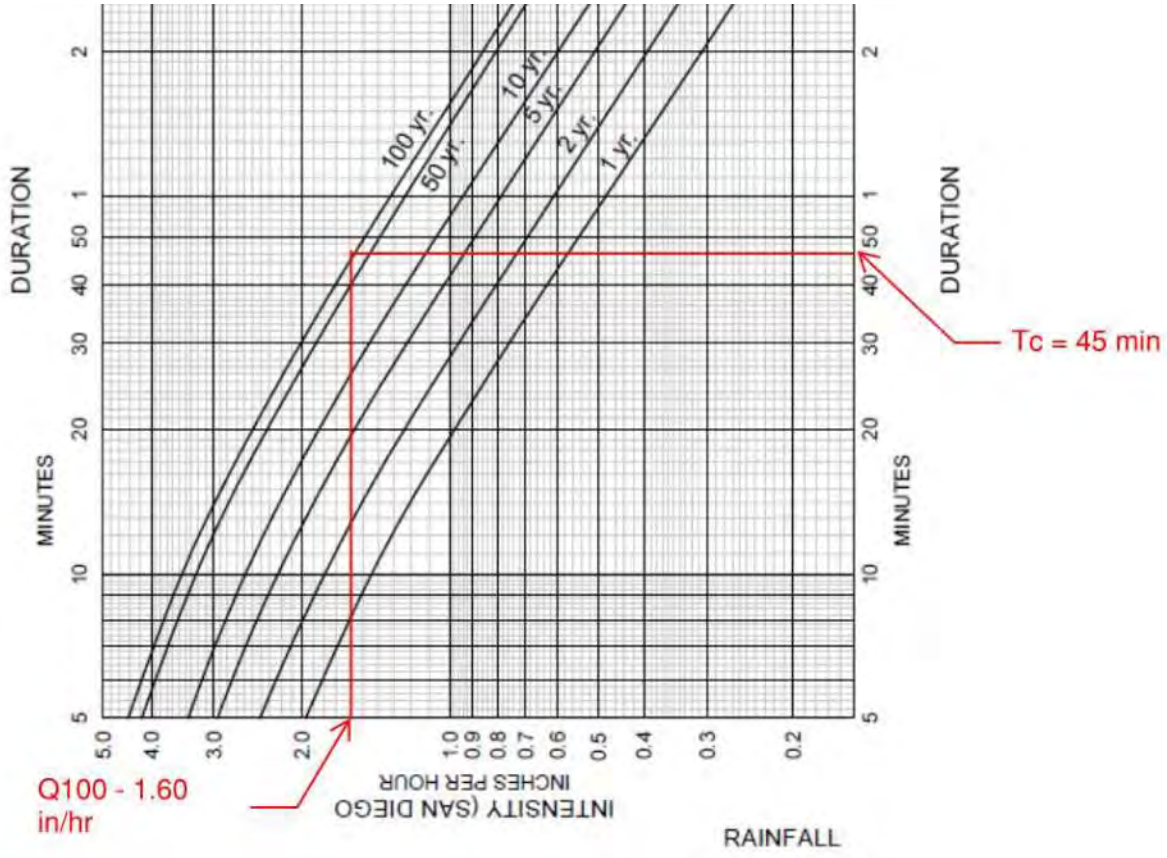


Figure 4: Tc Calculation from City of San Diego Intensity-Duration-Frequency Chart

To validate this calculation, an approximated time of concentration calculation was also performed for the Spring Canyon Watershed. The calculation provided verification on calculated intensities from the existing Rational Method analysis.

$T_C = T_i + T_t$

Where:

T_C= Time of Concentration (minutes)
T_i= Inlet Time (minutes)
T_t= Travel Time (minutes)

For the largely natural watershed, the time of concentration was estimated to be 45 minutes, which included a T_i of 10 minutes, an approximated travel time (T_t) within the upstream urbanized drainage facilities of 10 minutes, and a travel time (T_t) within the natural 2-mile-long drainage corridor of 25 minutes based on a preliminary flow velocity of 7 feet-per-second. Based on the results, the time of concentration value of 45 minutes was assumed valid.

Peak Flow Calculations for Overall Spring Canyon Watershed

Given the calculated time of concentration, the associated intensities for the 50-year, 10-year, 5-year, and 2-year storm events were estimated using the City of San Diego Intensity, Duration, Frequency chart in Figure 5. Although, theoretically, the time of concentration would increase due to a longer travel time within the conveyance systems, using a constant T_c is adequate to estimate flows for this level of analysis.

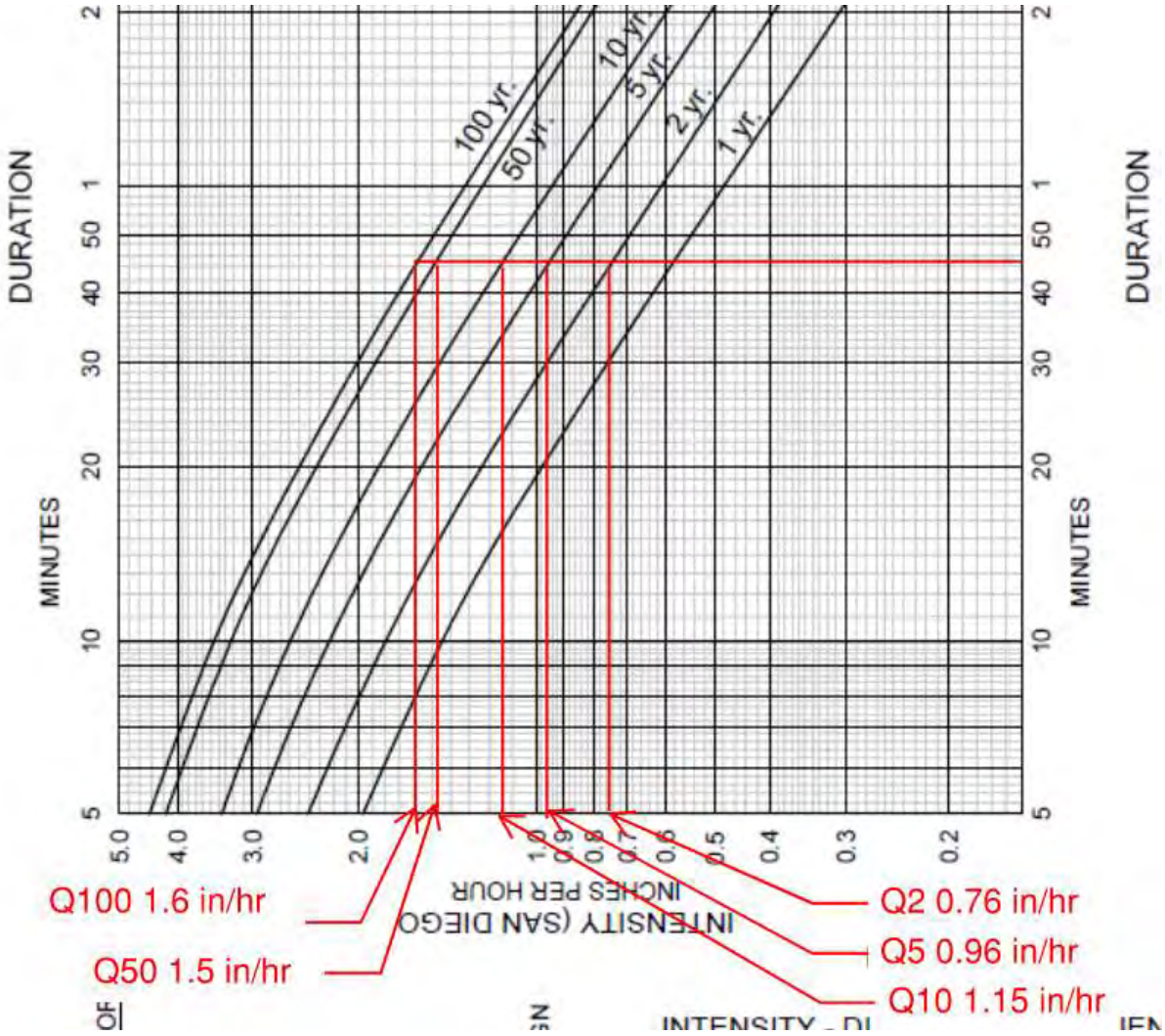


Figure 5: Overall Spring Canyon Watershed Intensity, City of San Diego IDF Chart

Given the calculated intensities, the estimated peak flow rates for the subject storm events were calculated using the Rational Method formula. The results are provided in Table 1.

Table 1: Peak Flow Rate Calculation Summary

Storm Event	C	I (in/hr)	A (acre)	Q (cfs)
100-year	0.48	1.6	2,190	1,676
50-year	0.48	1.5	2,190	1,577
10-year	0.48	1.15	2,190	1,209
5-year	0.48	0.96	2,190	1,009
2-year	0.48	0.76	2,190	799

Peak Flow Calculations for Dillon Canyon and Wruck Canyon Tributaries

Two main tributaries feed into Spring Canyon within the area of study: Dillon Canyon and Wruck Canyon. The estimated peak flows at the confluence with the Spring Canyon drainage corridor were calculated for these tributaries to provide an estimated flow change for use within the HEC-RAS hydraulic model.

The same methodologies for calculating T_c for the overall Spring Canyon watershed were followed, resulting in a T_c of 35 minutes and 40 minutes for Dillon Canyon and Wruck Canyon, respectively. The intensities for each storm event were calculated from the City of San Diego Intensity-Duration-Frequency charts and the estimated peak flows were calculated using the Rational Method equation. Hydrologic calculation results for Dillon Canyon and Wruck Canyon are provided in Table 2 and Table 3, respectively.

Table 2: Dillon Canyon Peak Flow Calculation Summary

Storm Event	C	I (in/hr)	A (acre)	Q (cfs)
100-year	0.48	1.88	350	316
50-year	0.48	1.7	350	286
10-year	0.48	1.33	350	223
5-year	0.48	1.1	350	185
2-year	0.48	0.88	350	148

Table 3: Wruck Canyon Peak Flow Calculation Summary

Storm Event	C	I (in/hr)	A (acre)	Q (cfs)
100-year	0.48	1.7	250	204
50-year	0.48	1.6	250	192
10-year	0.48	1.22	250	146
5-year	0.48	1.05	250	126
2-year	0.48	0.8	250	96

HYDRAULIC ANALYSIS

The hydraulic analysis focused on determining the inundation limits for the 2-year, 5-year, 10-year, and 100-year storm events to support the environmental consultant's evaluation of restoration opportunities. The analysis was performed utilizing HEC-RAS and the software's built-in RAS Mapper tool.

The data required for a successful model is, at a minimum, topographic information, flow data (calculated above), boundary conditions, and channel flow characteristics.

Topographic Data

The hydraulic analysis utilized the City of San Diego, 2021 digital elevation model (DEM), provided by City of San Diego staff. The topography was built using raw collected LiDAR data, which was processed into a DEM for use by the City. RICK performed an internal conversion of this DEM from the North American Vertical Datum of 1988 (NAVD 88), to the National Geodetic Datum of 1929 (NGVD 1929), which is the datum used in the City of San Diego.

Boundary Conditions

The upstream extent of the hydraulic model was set at a location significantly upstream of the areas of interest, as delineated by the Environmental consultant. This location represents natural, unimpeded flow of the drainage corridor and thus a normal depth boundary condition was used.

The downstream extent of the hydraulic model was set at the entrance to the existing cross-border box culvert. At this location, an inlet-control scenario will likely cause backwater impacts to upstream reaches of Spring Canyon. The box culvert was estimated to be approximately 25-feet wide by 10-feet high, based on available site information and photos. To account for the barred culvert opening, an effective width of 20 feet was used (assuming 1-inch bars installed at 6-inches on center). These approximations are reasonable for the purpose of this study, as the backwater effect will not be relevant to the areas of interest for mitigation and restoration. The inlet-control culvert design nomographs were used to calculate anticipated headwater based on the storm event flow rates, as shown in Figure 6.

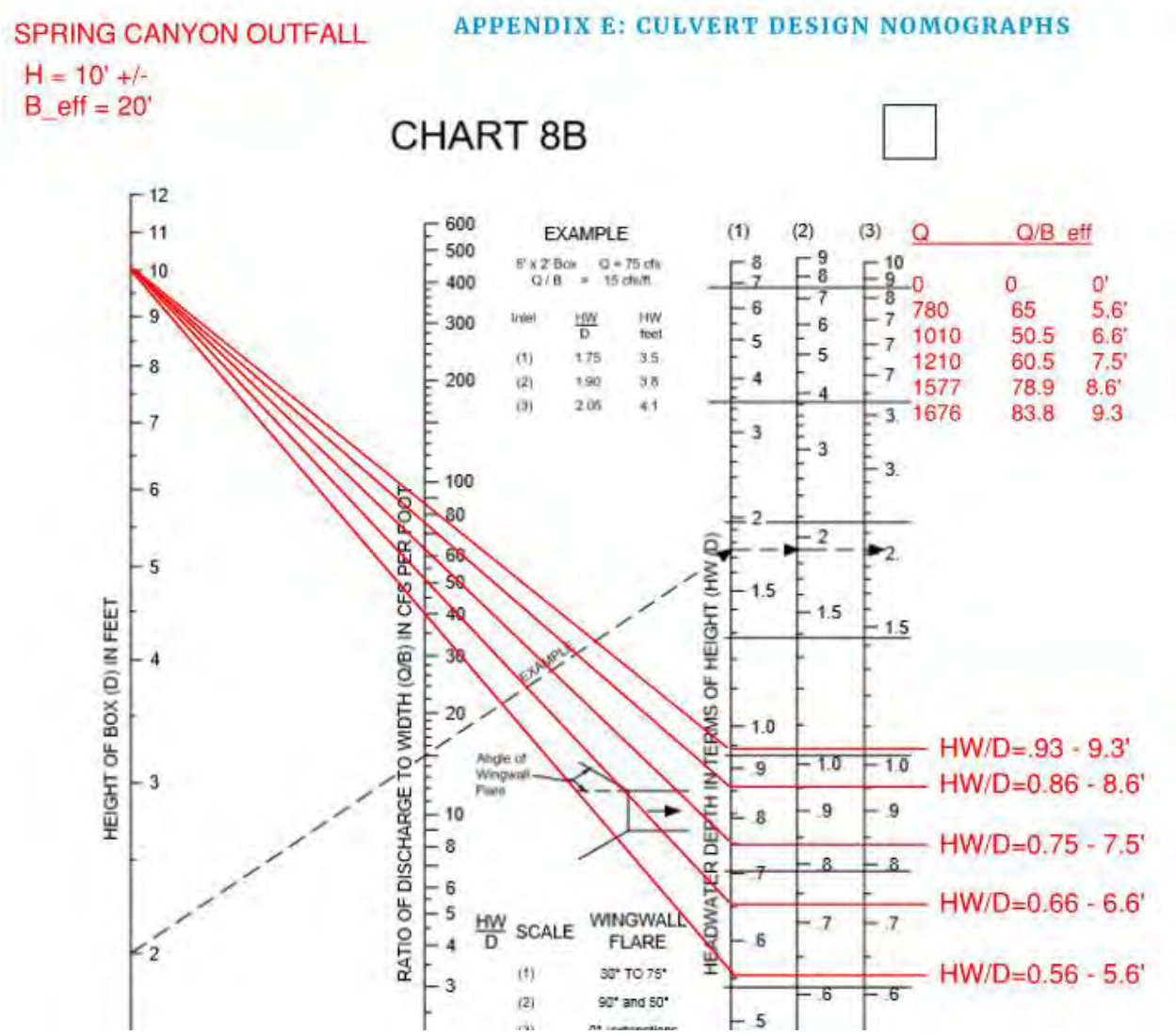


Figure 6: Inlet-Control Nomograph for Downstream Boundary Condition

Spring Canyon Channel Characteristics

The Spring Canyon drainage corridor slopes moderately (1 percent to 3 percent), from north to south towards the box culvert. The valley confining the flow path varies considerably through its length, with generally steeper, more well-defined banks at the upstream portions, and flatter, less-defined banks towards the south as shown in Figure 7 and Figure 8, respectively.

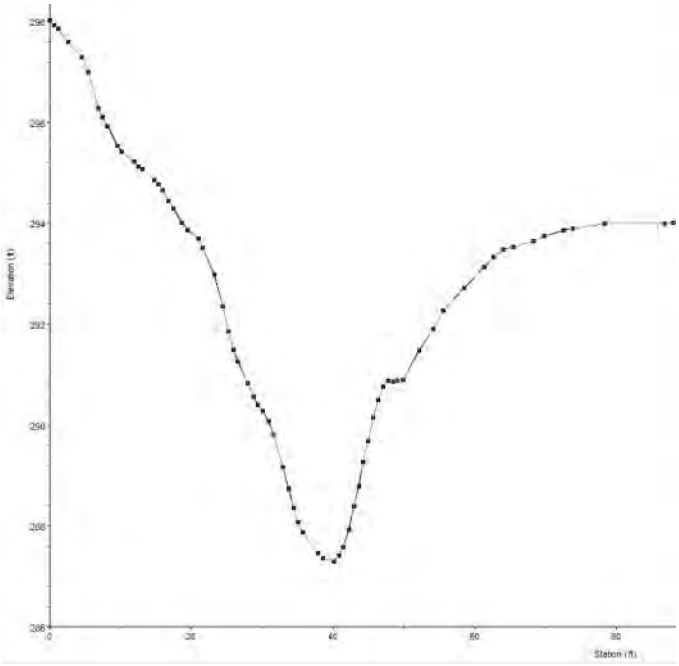


Figure 7: Upstream Cross-Section (7240) Showing Well-Defined Valley

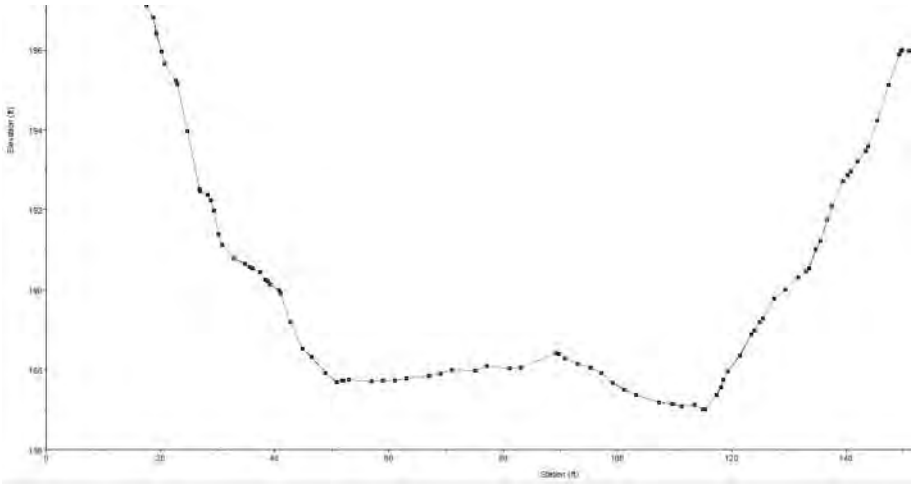


Figure 8: Downstream Cross-Section (1045) Showing Less Well-Defined Valley

The type, and quantity of vegetation also varies greatly from upstream to downstream, which impacted Manning's Roughness (Manning's n) determinations through the whole reach. Downstream, near the culvert entrance, there is thick vegetation, dense brush, and trees within the channel banks while upstream there is sparse brush and moderate grass coverage throughout the flow corridor. Therefore, Manning's values of 0.075 to 0.03 were selected for this model.

Model Development

The hydraulic model was developed natively within the HEC-RAS software using RAS Mapper to visualize the terrain and flow paths of the channel as well as the flood conveyance within the channel overbanks. The DEM was imported into the program along with aerial imagery to help define the overall channel characteristics.

First, the streamline of the channel was defined from the DEM topography file. Since there was a concentrated focus on the smaller storm event flows (i.e., 2-year and 5-year) in this analysis, the stream was modeled to follow closely to the channel flow line, rather than the center of overall flood conveyance. This provides a better definition on the shallower flows that would be more likely confined within the channel banks.

Cross-sections were then cut across the streamline, perpendicular to the direction of flow. These sections were located approximately every 100 feet along the stream centerline and also at specific changes in stream alignment, such as curves, and at other locations of varied channel geometry. This combination of cross-sections provides a detailed analysis of the crucial drainage conveyance features of the Spring Canyon system. Reach lengths for left overbank, stream center, and right overbank, were automatically calculated within the software based on the distance between cross-sections.

Then, Manning's n values were associated to all cross-sections along the reach. To simplify the model in this analysis, the horizontal variation was limited to left overbank, center, and right overbank. A review of aerial imagery and site photos confirmed this to be an adequate assumption for this level of analysis, as much of the vegetative growth in the drainage corridor is within the channel banks. These values, as discussed previously, were selected based on available imagery, and site photos, and varied from 0.075 at the southernmost downstream extents of the reach, to 0.03 for the steeper portions of the valley.

Results

The full results of the hydraulic analysis are provided as an attachment to this memo, and the hydraulic workmap, showing the limits of inundation for the 2-year, 5-year, 10-year and 100-year storm events are also provided as an attachment.

Overall Spring Canyon Model

The extent of inundation between the storm events varied along the reach, due to the channel characteristics described above. Little variation between the floodplains is noticed within sections well-defined by steep hillsides, but there are also locations where significant increases of floodplain limits are experienced due to site topography with flatter overbanks that convey flood flows such as those shown in Figure 9 and Figure 10.

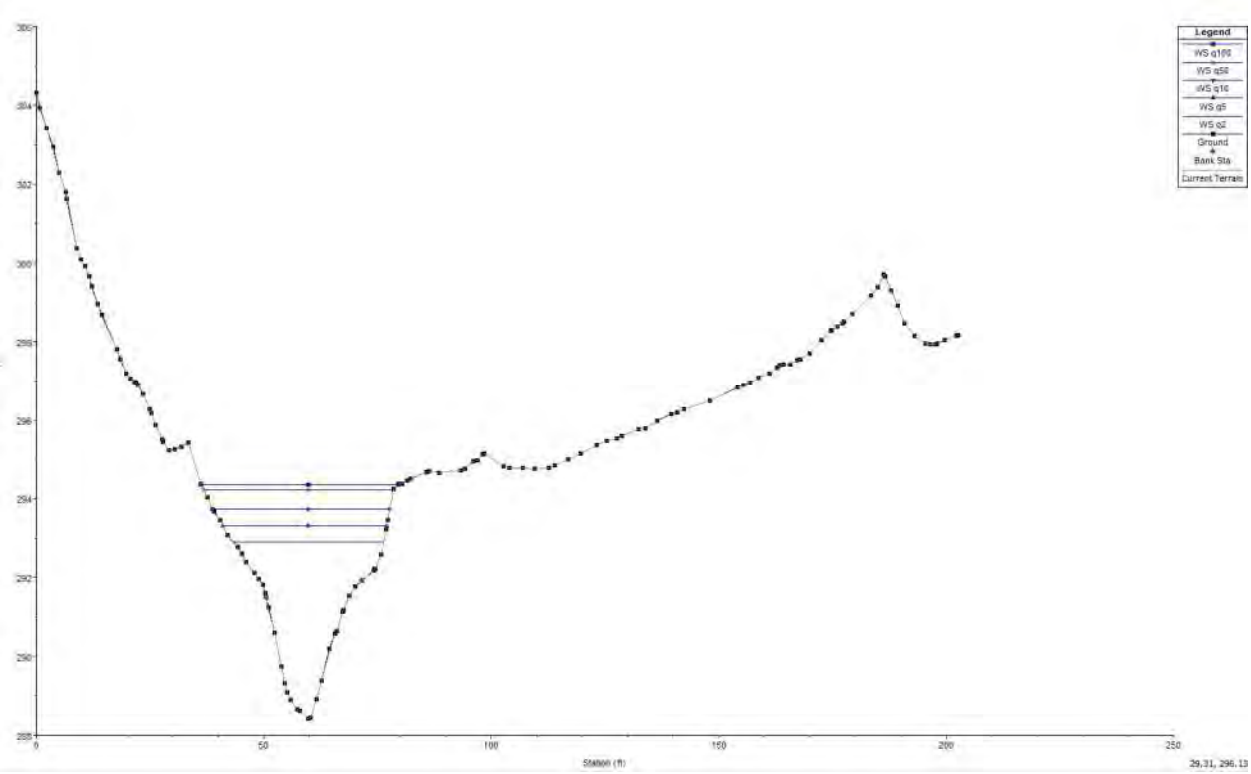


Figure 9: Steeper Valey Cross-Section Geometry (STA 7295) with Little Variation in Floodplain Inundation Extents

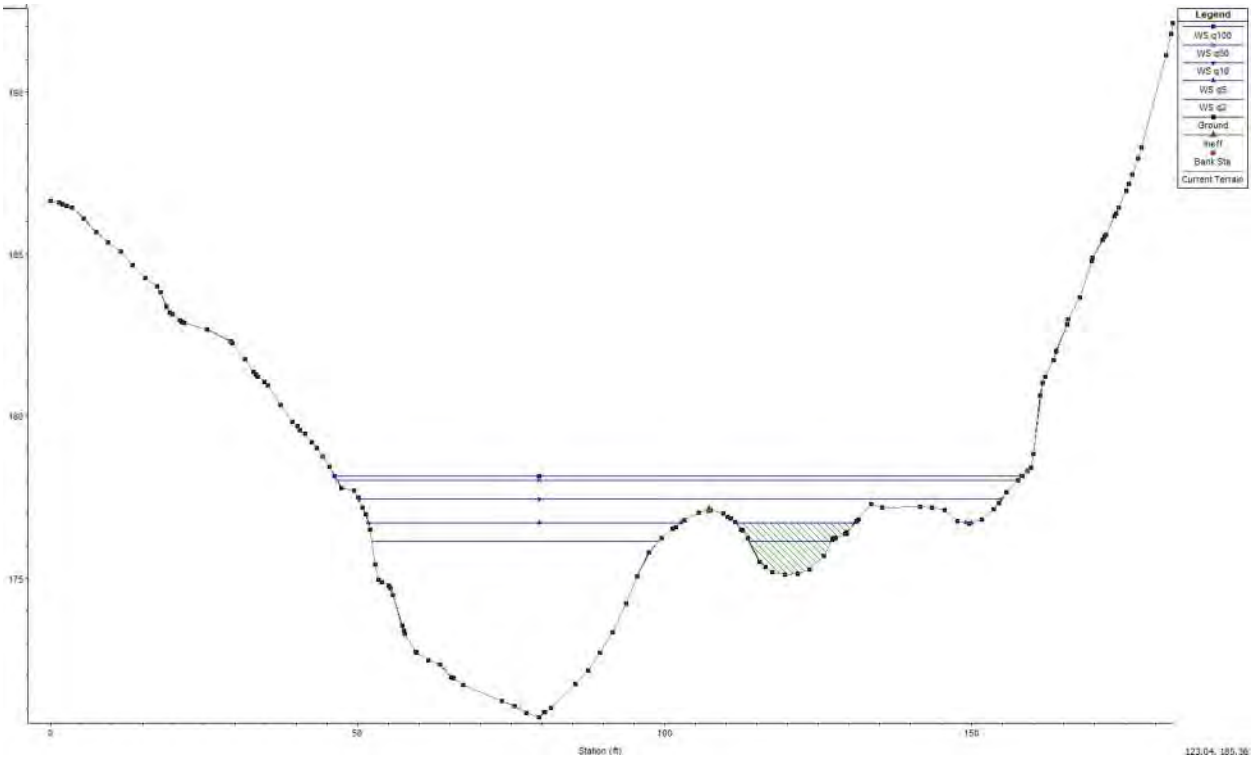


Figure 10:Flatter Overbank Topography Cross-Section Geometry (STA 582) with Significant Variation in Floodplain Inundation Extents

Results within Environmental Areas of Interest

The environmental consultant identified two separate locations for the evaluation of restoration activities. These are located between station 2409 and 5998 of the HEC-RAS model. Through this portion of Spring Canyon, there are many areas where flows are confined between steep valley banks, limiting opportunities for restoration.

There were several locations identified during previous discussions between RICK and RECON staff, where restoration opportunities may be more feasible. Specifically mentioned during these discussions was the location between station 5687 and 5998. The cross-section shown in Figure 11 highlights an opportunity to flatten the right overbank, allowing flood waters from the smaller storm events to inundate a larger swath of area, potentially providing additional habitat.

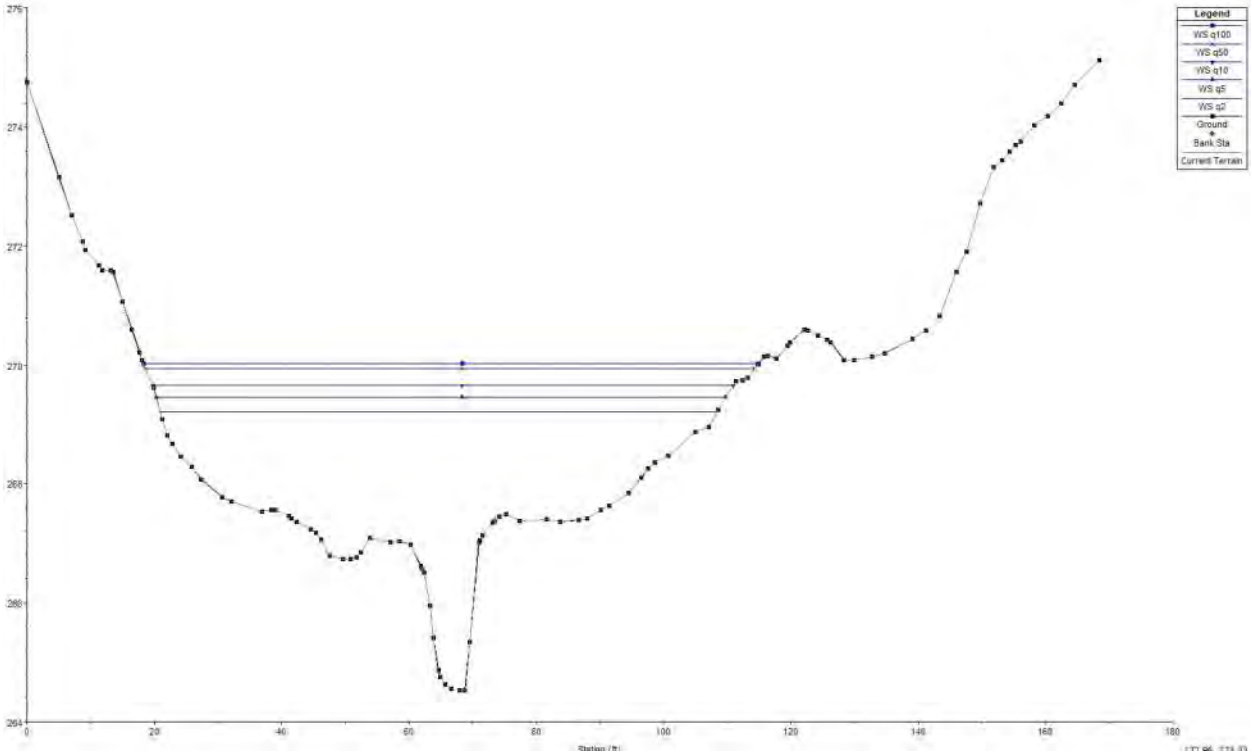


Figure 11: Potential Restoration Opportunity Location Identified During Previous Discussion with RECON

The scope of this Technical Memorandum does not involve the identification of all of these opportunities, but rather the analyses performed shall be used by the environmental consultant to better inform their evaluation of potential locations.

CONCLUSION

The analyses performed for this study identified the limits of inundation for selected storm events (2-year, 5-year, 10-year, 100-year) at the request of the environmental consultant, in order inform their evaluation of wetland restoration activities through the Spring Canyon drainage corridor. Based on the hydrologic flow calculations, and corresponding hydraulic analysis of the channel, there does appear to be opportunities, as discussed between RICK, Schaefer Ecological Solutions, and RECON during a meeting on December 13, 2023. After a thorough review of the entirety of the HEC-RAS hydraulic model results, workmaps and exhibits, it is anticipated that the mitigation area occurs within and adjacent to the floodplain of Spring Canyon and supports opportunities for re-establishment of wetland vegetation and transitional wetland buffer areas.

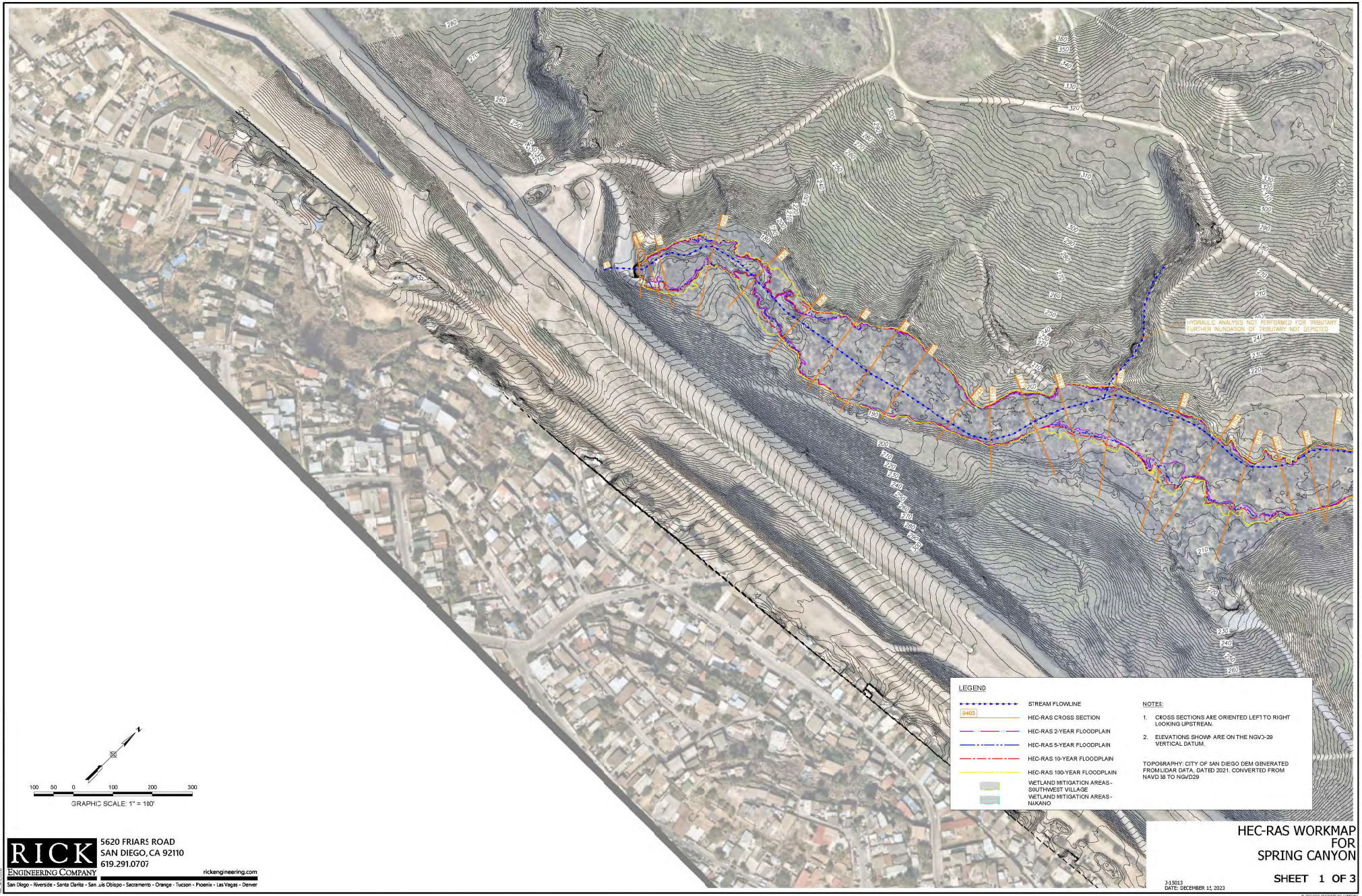
Please feel free to contact Eric Hengesbaugh or myself if you have any questions and/or concerns at (619) 291-0707.

Sincerely,

RICK ENGINEERING COMPANY

Brendan Hastie
RCE #65809, Exp. 09/25
Principal

BH:KDM:C_SD_J/15013-SouthOtay/WR Reports/SpringCanyonMemo/15013-CWE.001



LEGEND

- STREAM FLOWLINE
- 9403 HEC-RAS CROSS SECTION
- HEC-RAS 2-YEAR FLOODPLAIN
- HEC-RAS 5-YEAR FLOODPLAIN
- HEC-RAS 10-YEAR FLOODPLAIN
- HEC-RAS 100-YEAR FLOODPLAIN
- WETLAND MITIGATION AREAS - SOUTHWEST VILLAGE
- WETLAND MITIGATION AREAS - NAKANO

NOTES:

1. CROSS SECTIONS ARE ORIENTED LEFT TO RIGHT LOOKING UPSTREAM.
2. ELEVATIONS SHOWN ARE ON THE NGVD-29 VERTICAL DATUM.

TOPOGRAPHY: CITY OF SAN DIEGO DEM GENERATED FROM LIDAR DATA, DATED 2021. CONVERTED FROM NAVD 88 TO NGVD29

100 50 0 100 200 300

GRAPHIC SCALE: 1" = 100'

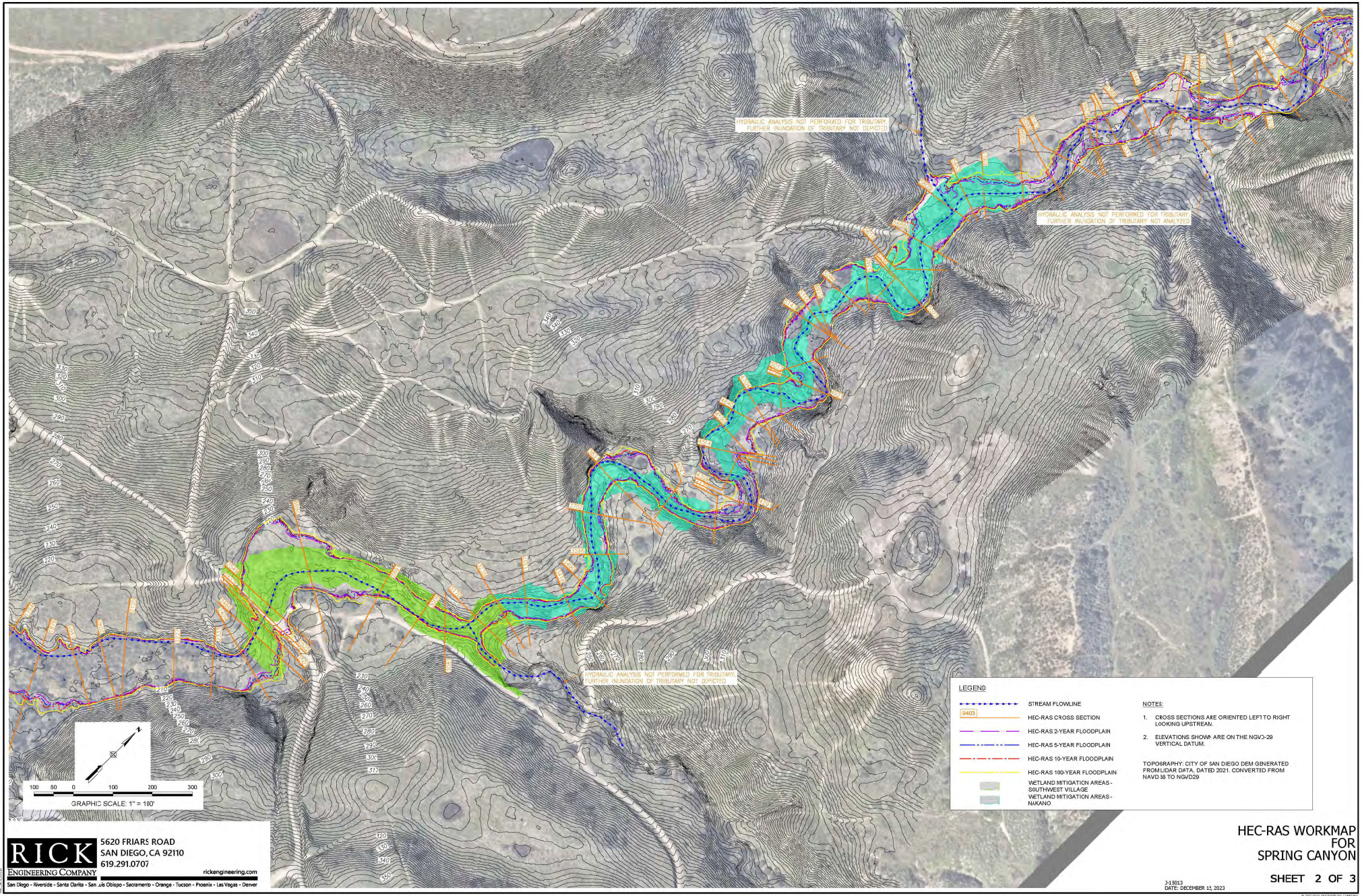
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HEC-RAS WORKMAP FOR SPRING CANYON

SHEET 1 OF 3

J-13013
DATE: DECEMBER 11, 2023

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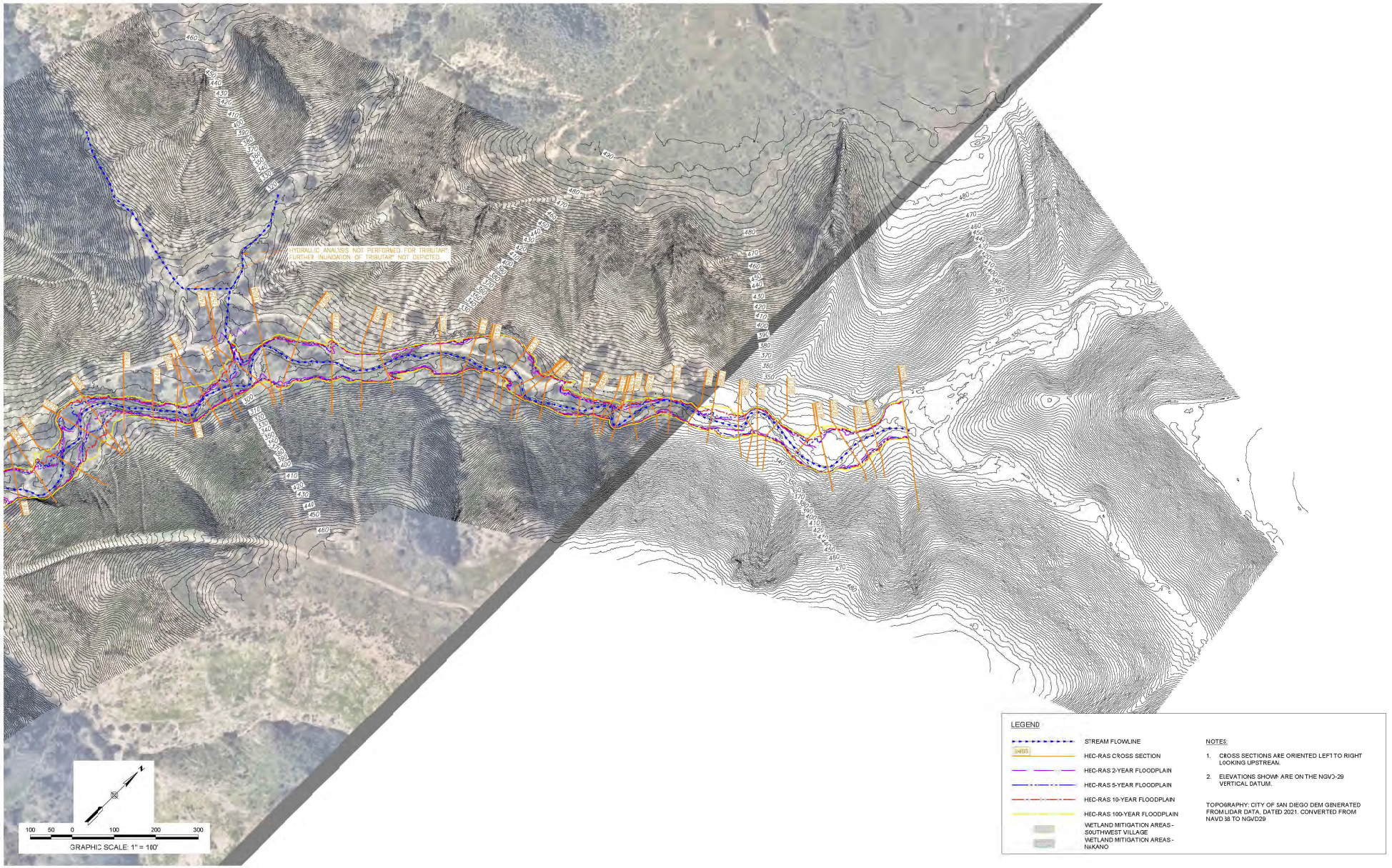
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HEC-RAS WORKMAP FOR SPRING CANYON

SHEET 2 OF 3

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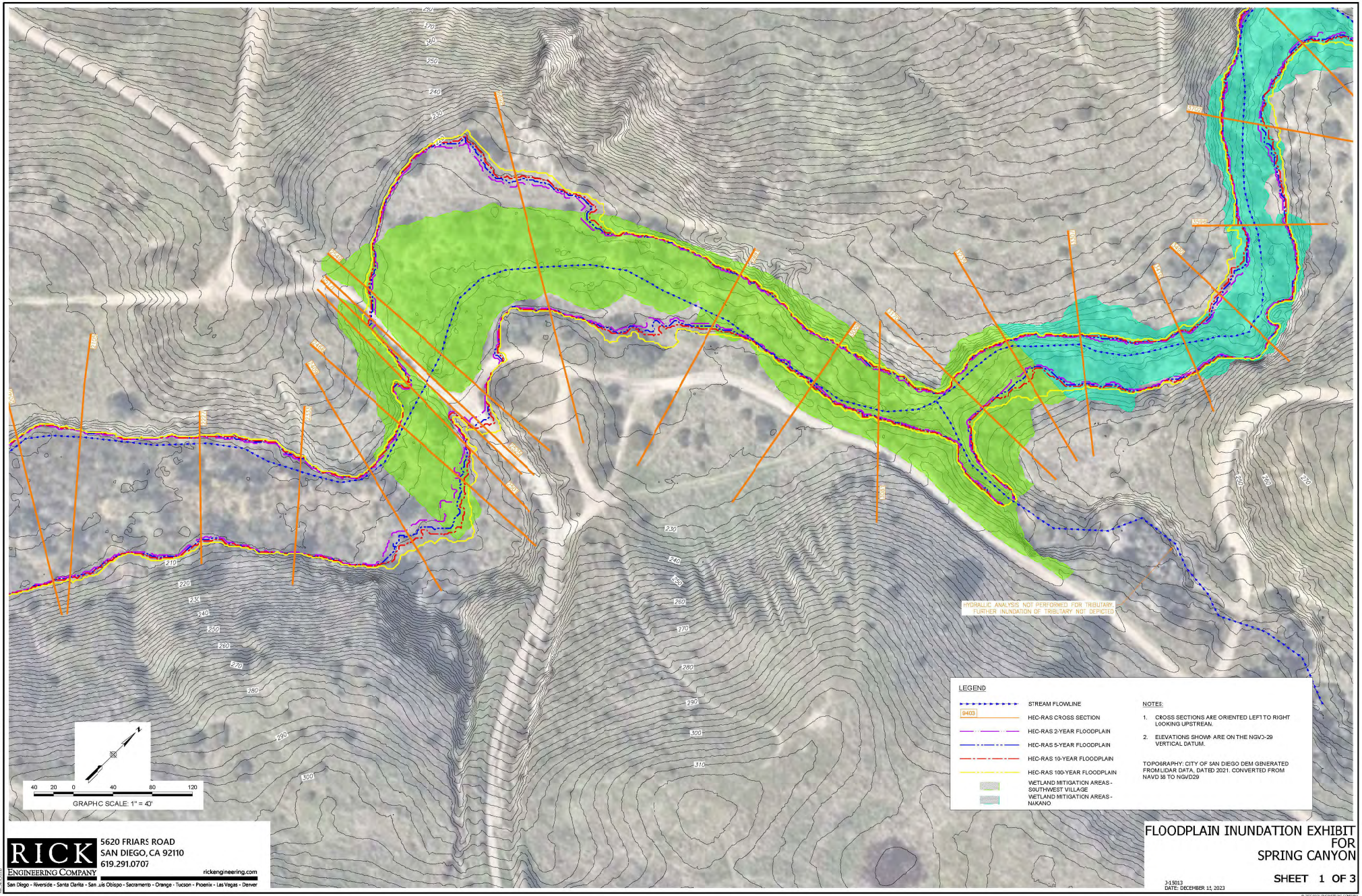
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HEC-RAS WORKMAP FOR SPRING CANYON

SHEET 3 OF 3

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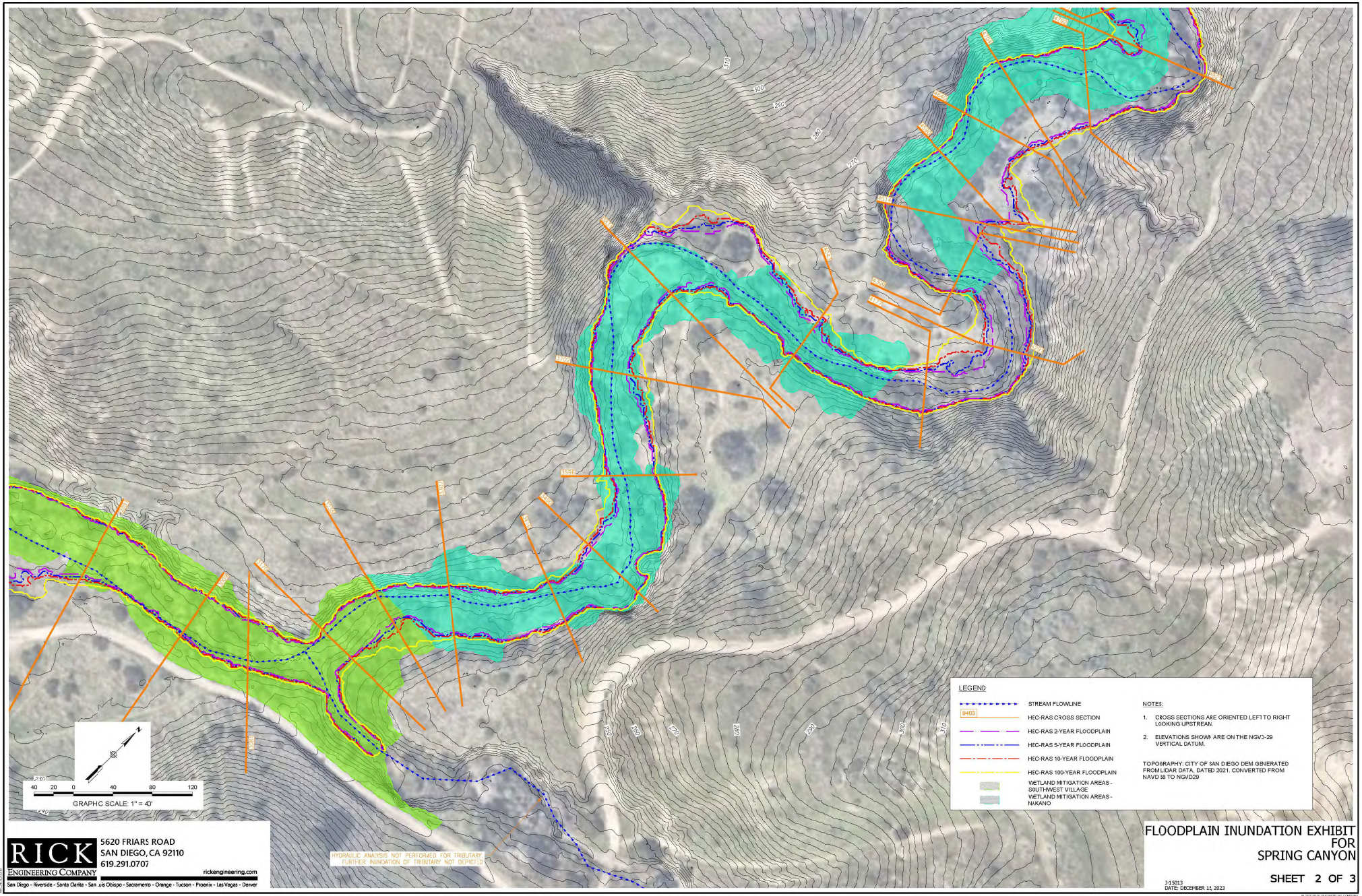
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FLOODPLAIN INUNDATION EXHIBIT FOR SPRING CANYON

SHEET 1 OF 3

J-13013
DATE: DECEMBER 15, 2023

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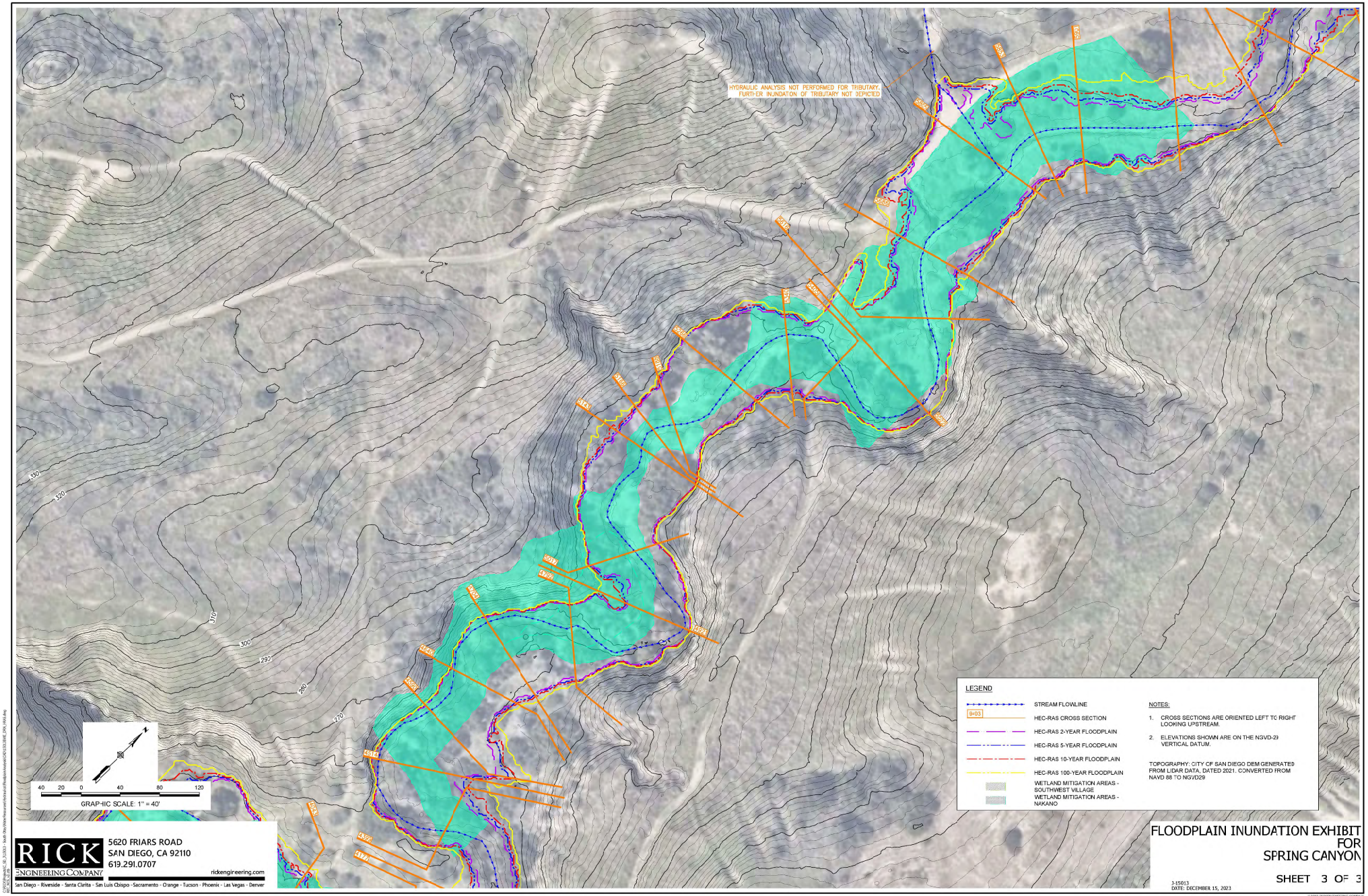
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FLOODPLAIN INUNDATION EXHIBIT FOR SPRING CANYON

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FLOODPLAIN INUNDATION EXHIBIT FOR SPRING CANYON

SHEET 3 OF 3

J-15013
DATE: DECEMBER 15, 2023

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HEC-RAS Plan: Sprg_Cnyn_Ex River: SpringCanyon Reach: Reach 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	9403	q2	555.00	332.99	336.24	336.24	336.78	0.012263	6.55	98.19	85.95	0.80
Reach 1	9403	q5	698.00	332.99	336.42	336.42	337.04	0.012468	6.99	113.98	88.86	0.82
Reach 1	9403	q10	840.00	332.99	336.59	336.59	337.28	0.012473	7.33	129.16	91.91	0.83
Reach 1	9403	q100	1156.00	332.99	336.94	336.94	337.76	0.011941	7.85	162.45	97.45	0.83
Reach 1	9320	q2	555.00	330.32	334.19	334.19	335.06	0.011713	7.83	78.40	48.74	0.82
Reach 1	9320	q5	698.00	330.32	334.57	334.57	335.46	0.010441	8.05	98.30	55.38	0.79
Reach 1	9320	q10	840.00	330.32	334.86	334.86	335.79	0.010035	8.36	114.86	59.00	0.79
Reach 1	9320	q100	1156.00	330.32	335.31	335.31	336.44	0.010466	9.26	142.70	63.16	0.82
Reach 1	9285	q2	555.00	329.91	333.24	333.24	334.05	0.013235	7.55	81.07	53.88	0.86
Reach 1	9285	q5	698.00	329.91	333.59	333.59	334.42	0.011594	7.74	101.11	60.36	0.82
Reach 1	9285	q10	840.00	329.91	333.81	333.81	334.73	0.011880	8.25	114.82	63.90	0.85
Reach 1	9285	q100	1156.00	329.91	334.33	334.33	335.34	0.010904	8.79	150.39	73.77	0.83
Reach 1	9252	q2	555.00	329.06	332.66	332.66	333.19	0.008598	6.46	106.36	93.91	0.70
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Reach 1	9183	q100	1156.00	327.44	331.89	331.89	332.65	0.010033	8.38	175.64	111.54	0.78
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Reach 1	9099	q100	1156.00	325.49	330.81	330.81	331.90	0.009945	9.27	151.81	71.35	0.81
Reach 1	9017	q2	555.00	323.69	327.60	327.60	328.58	0.014440	8.14	74.03	40.88	0.89
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Reach 1	9017	q10	840.00	323.69	328.32	328.32	329.42	0.013307	8.83	106.62	48.47	0.88
Reach 1	9017	q100	1156.00	323.69	328.90	328.90	330.16	0.013193	9.58	135.99	52.34	0.90
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Reach 1	8962	q5	698.00	322.15	326.84		327.30	0.006262	6.14	134.70	60.98	0.61
Reach 1	8962	q10	840.00	322.15	327.21		327.70	0.005807	6.29	158.26	64.50	0.59
Reach 1	8962	q100	1156.00	322.15	327.93		328.46	0.005120	6.53	206.24	68.55	0.57
Reach 1	8926	q2	555.00	321.61	325.93		326.56	0.009939	6.41	87.33	39.57	0.74
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Reach 1	8926	q100	1156.00	321.61	327.24	326.83	328.21	0.009597	8.03	151.22	61.02	0.77
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Reach 1	8894	q100	1156.00	320.86	326.38	326.38	327.80	0.014007	9.86	128.38	54.49	0.92
Reach 1	8827	q2	555.00	319.59	323.28	323.28	324.50	0.019446	8.85	62.69	26.21	1.01
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Reach 1	8786	q10	840.00	318.31	322.74	322.74	323.93	0.012963	9.27	101.86	43.01	0.88
Reach 1	8786	q100	1156.00	318.31	323.36	323.36	324.75	0.012424	10.14	129.71	46.37	0.89
Reach 1	8721	q2	555.00	317.21	320.94	320.68	321.86	0.012540	7.96	74.78	32.24	0.84
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Reach 1	8674	q10	840.00	315.59	320.91	320.91	322.17	0.013334	9.63	98.42	39.42	0.89
Reach 1	8674	q100	1156.00	315.59	321.60	321.60	323.02	0.012391	10.43	128.11	46.50	0.89
Reach 1	8618	q2	555.00	314.67	319.15	319.15	320.12	0.012675	8.29	75.11	41.51	0.85
Reach 1	8618	q5	698.00	314.67	319.59	319.59	320.57	0.011176	8.53	94.71	49.22	0.82
Reach 1	8618	q10	840.00	314.67	319.91	319.91	320.94	0.010647	8.86	111.65	54.25	0.81
Reach 1	8618	q100	1156.00	314.67	320.47	320.47	321.63	0.010341	9.59	143.75	60.70	0.82
Reach 1	8573	q2	555.00	314.09	318.31		318.56	0.002667	4.00	139.90	50.03	0.40

HEC-RAS Plan: Sprg_Cnyn_Ex River: SpringCanyon Reach: Reach 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	8573	q5	698.00	314.09	318.78		319.07	0.002648	4.34	164.65	56.64	0.40
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Reach 1	8573	q100	1156.00	314.09	319.98		320.36	0.002576	5.09	240.84	70.61	0.41
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Reach 1	8537	q10	840.00	312.89	318.24	317.98	319.28	0.011348	8.35	106.33	44.50	0.82
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Reach 1	8519	q2	555.00	312.78	317.53		317.95	0.004926	5.21	107.89	38.26	0.53
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Reach 1	8480	q2	555.00	312.68	316.32	316.32	317.56	0.014098	9.17	64.54	27.35	0.92
Reach 1	8480	q5	698.00	312.68	316.81	316.81	318.15	0.012745	9.63	78.90	30.72	0.90
Reach 1	8480	q10	840.00	312.68	317.28	317.28	318.67	0.011402	9.89	94.52	35.14	0.87
Reach 1	8480	q100	1156.00	312.68	318.07	318.07	319.61	0.010376	10.62	124.56	41.70	0.85
Reach 1	8443	q2	555.00	311.70	316.17		316.95	0.010049	7.24	80.75	37.13	0.75
Reach 1	8443	q5	698.00	311.70	316.25	316.25	317.39	0.014490	8.83	83.41	37.87	0.90
Reach 1	8443	q10	840.00	311.70	316.63	316.63	317.84	0.013372	9.19	98.70	44.21	0.89
Reach 1	8443	q100	1156.00	311.70	317.35	317.35	318.61	0.011117	9.55	134.89	55.00	0.83
Reach 1	8355	q2	555.00	309.17	314.30	314.30	315.76	0.016718	9.76	58.68	74.53	0.93
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Reach 1	8355	q10	840.00	309.17	314.56	314.56	315.28	0.009795	7.83	130.06	78.90	0.72
Reach 1	8355	q100	1156.00	309.17	314.90	314.90	315.79	0.010531	8.62	157.77	81.50	0.76
Reach 1	8306	q2	555.00	307.74	312.61	312.52	313.28	0.010149	7.16	89.81	63.49	0.75
Reach 1	8306	q5	698.00	307.74	312.79	312.79	313.63	0.011923	8.08	100.69	75.11	0.82
Reach 1	8306	q10	840.00	307.74	312.79	312.79	314.00	0.017268	9.73	100.69	75.11	0.98
Reach 1	8306	q100	1156.00	307.74	313.54	313.54	314.40	0.009798	8.48	162.96	85.66	0.77
Reach 1	8278	q2	555.00	308.42	312.47	312.47	313.03	0.008538	6.97	106.68	85.02	0.70
Reach 1	8278	q5	698.00	308.42	312.67	312.67	313.30	0.009039	7.49	123.89	87.18	0.73
Reach 1	8278	q10	840.00	308.42	312.82	312.82	313.54	0.009927	8.08	136.84	88.55	0.77
Reach 1	8278	q100	1156.00	308.42	313.19	313.19	314.02	0.010118	8.74	170.24	92.42	0.79
Reach 1	8232	q2	555.00	307.85	311.16	311.16	311.97	0.020918	7.22	76.84	85.63	1.00
Reach 1	8232	q5	698.00	307.85	311.25	311.25	311.68	0.009331	4.99	133.35	88.46	0.68
Reach 1	8232	q10	840.00	307.85	311.25	311.25	311.87	0.013515	6.00	133.34	88.46	0.81
Reach 1	8232	q100	1156.00	307.85	311.51	311.51	312.37	0.015319	6.98	156.54	95.71	0.88
Reach 1	8197	q2	555.00	306.62	309.83	309.83	310.32	0.011141	6.22	100.34	87.93	0.75
Reach 1	8197	q5	698.00	306.62	309.97	309.97	310.58	0.012705	6.89	113.27	91.22	0.81
Reach 1	8197	q10	840.00	306.62	310.09	310.09	310.82	0.014494	7.57	123.93	95.52	0.87
Reach 1	8197	q100	1156.00	306.62	310.47	310.47	311.28	0.012827	7.75	160.54	96.81	0.84
Reach 1	8164	q2	555.00	304.75	309.18	309.18	309.68	0.009340	6.39	106.04	88.98	0.70
Reach 1	8164	q5	698.00	304.75	309.34	309.34	309.93	0.010379	6.93	120.40	89.80	0.75
Reach 1	8164	q10	840.00	304.75	309.50	309.50	310.15	0.010755	7.25	135.20	90.64	0.76
Reach 1	8164	q100	1156.00	304.75	309.82	309.80	310.62	0.011433	7.85	164.08	92.28	0.80
Reach 1	8122	q2	555.00	304.02	308.57	308.57	309.14	0.011808	6.67	97.55	83.38	0.77
Reach 1	8122	q5	698.00	304.02	308.86	308.76	309.42	0.009932	6.58	122.47	87.65	0.72
Reach 1	8122	q10	840.00	304.02	309.11		309.68	0.008784	6.58	144.80	89.20	0.69
Reach 1	8122	q100	1156.00	304.02	309.56		310.21	0.007946	6.90	184.91	91.70	0.67
Reach 1	8053	q2	555.00	302.63	307.80	307.80	308.44	0.007970	7.43	104.18	71.95	0.67
Reach 1	8053	q5	698.00	302.63	308.02	308.02	308.74	0.008760	8.08	120.39	74.41	0.71
Reach 1	8053	q10	840.00	302.63	308.23	308.23	309.02	0.009240	8.58	136.37	77.61	0.73
Reach 1	8053	q100	1156.00	302.63	308.63	308.63	309.55	0.009936	9.44	167.49	80.37	0.77
Reach 1	7909	q2	555.00	300.37	304.95	304.95	305.80	0.011280	8.37	83.02	60.25	0.79
Reach 1	7909	q5	698.00	300.37	305.37	305.37	306.15	0.008973	8.06	110.96	69.76	0.72
Reach 1	7909	q10	840.00	300.37	305.58	305.58	306.44	0.009350	8.52	125.95	71.40	0.74
Reach 1	7909	q100	1156.00	300.37	306.01	306.01	307.03	0.009702	9.27	156.88	73.31	0.77
Reach 1	7855	q2	555.00	300.14	303.99	303.99	304.69	0.011655	7.47	87.96	61.82	0.80
Reach 1	7855	q5	698.00	300.14	304.22	304.22	305.02	0.011807	7.95	102.71	63.81	0.82
Reach 1	7855	q10	840.00	300.14	304.42	304.42	305.33	0.012111	8.42	115.72	65.63	0.84
Reach 1	7855	q100	1156.00	300.14	304.89	304.89	305.94	0.011357	8.95	147.72	70.11	0.83
Reach 1	7778	q2	555.00	298.68	302.89	302.89	303.57	0.011417	7.71	93.17	64.82	0.80
Reach 1	7778	q5	698.00	298.68	303.13	303.13	303.88	0.011636	8.22	112.34	88.76	0.82

HEC-RAS Plan: Sprg_Cnyn_Ex River: SpringCanyon Reach: Reach 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	7778	q10	840.00	298.68	303.47	303.47	304.14	0.009634	8.00	143.16	97.15	0.76
Reach 1	7778	q100	1156.00	298.68	303.80	303.80	304.60	0.010517	8.87	176.01	102.26	0.80
Reach 1	7680	q2	555.00	296.31	300.64	300.64	301.17	0.009859	6.85	111.83	104.26	0.73
Reach 1	7680	q5	698.00	296.31	300.85	300.85	301.41	0.009919	7.22	134.29	112.21	0.74
Reach 1	7680	q10	840.00	296.31	301.00	301.00	301.62	0.010462	7.66	151.75	116.29	0.77
Reach 1	7680	q100	1156.00	296.31	301.34	301.34	302.04	0.010475	8.23	193.79	127.72	0.78
Reach 1	7604	q2	555.00	294.73	298.93	298.93	299.51	0.009587	6.83	108.01	87.27	0.73
Reach 1	7604	q5	698.00	294.73	299.14	299.14	299.79	0.010336	7.37	126.32	89.96	0.76
Reach 1	7604	q10	840.00	294.73	299.34	299.34	300.03	0.010741	7.77	144.25	93.48	0.78
Reach 1	7604	q100	1156.00	294.73	299.72	299.72	300.51	0.011254	8.42	181.86	100.83	0.81
Reach 1	7525	q2	555.00	293.21	297.35		297.75	0.006650	5.86	118.47	66.78	0.61
Reach 1	7525	q5	698.00	293.21	297.85		298.23	0.005181	5.76	153.16	73.88	0.56
Reach 1	7525	q10	840.00	293.21	298.10		298.54	0.005613	6.29	172.51	81.38	0.59
Reach 1	7525	q100	1156.00	293.21	298.68		299.18	0.005441	6.84	223.79	95.56	0.59
Reach 1	7455	q2	555.00	292.03	296.01	295.99	297.10	0.013143	8.66	71.53	36.85	0.88
Reach 1	7455	q5	698.00	292.03	296.36	296.36	297.63	0.013695	9.49	85.26	43.50	0.91
Reach 1	7455	q10	840.00	292.03	296.98	296.98	298.03	0.009535	8.87	119.85	64.39	0.78
Reach 1	7455	q100	1156.00	292.03	297.66	297.66	298.71	0.008479	9.29	170.00	83.69	0.76
Reach 1	7431	q2	555.00	291.30	295.75	295.75	296.75	0.014528	8.45	73.29	42.00	0.89
Reach 1	7431	q5	698.00	291.30	296.17	296.17	297.22	0.013123	8.82	92.23	47.66	0.87
Reach 1	7431	q10	840.00	291.30	296.52	296.52	297.62	0.012248	9.14	109.80	51.52	0.85
Reach 1	7431	q100	1156.00	291.30	297.07	297.07	298.39	0.012752	10.25	140.52	62.58	0.89
Reach 1	7386	q2	555.00	290.15	294.79		295.39	0.008241	6.28	90.25	36.89	0.68
Reach 1	7386	q5	698.00	290.15	295.15		295.88	0.008577	6.89	103.96	38.14	0.70
Reach 1	7386	q10	840.00	290.15	295.48		296.32	0.008840	7.41	116.78	40.29	0.72
Reach 1	7386	q100	1156.00	290.15	296.15	295.50	297.16	0.008513	8.24	153.31	68.05	0.73
Reach 1	7330	q2	555.00	289.18	293.78	293.78	294.78	0.012768	8.64	75.78	38.69	0.85
Reach 1	7330	q5	698.00	289.18	294.15	294.15	295.26	0.012607	9.23	90.57	41.53	0.86
Reach 1	7330	q10	840.00	289.18	294.47	294.47	295.69	0.012711	9.80	104.11	44.45	0.87
Reach 1	7330	q100	1156.00	289.18	295.11	295.11	296.54	0.012897	10.93	138.83	82.00	0.90
Reach 1	7295	q2	555.00	288.42	292.90	292.90	294.04	0.014416	8.70	68.55	33.05	0.90
Reach 1	7295	q5	698.00	288.42	293.32	293.32	294.57	0.013697	9.27	82.88	36.01	0.90
Reach 1	7295	q10	840.00	288.42	293.73	293.73	295.04	0.012572	9.61	98.24	38.89	0.88
Reach 1	7295	q100	1156.00	288.42	294.35	294.32	295.96	0.012865	10.78	123.70	43.29	0.91
Reach 1	7240	q2	555.00	287.30	291.94	291.94	293.15	0.014035	9.09	66.75	29.30	0.90
Reach 1	7240	q5	698.00	287.30	292.36	292.36	293.73	0.013797	9.79	79.56	31.80	0.91
Reach 1	7240	q10	840.00	287.30	292.81	292.81	294.24	0.012713	10.15	94.51	35.53	0.89
Reach 1	7240	q100	1156.00	287.30	293.49	293.49	295.22	0.012928	11.35	121.04	42.68	0.92
Reach 1	7168	q2	555.00	286.06	290.73		291.56	0.009489	7.61	79.54	31.04	0.73
Reach 1	7168	q5	698.00	286.06	290.75	290.74	292.04	0.014640	9.48	80.33	31.20	0.91
Reach 1	7168	q10	840.00	286.06	291.10	291.10	292.54	0.014727	10.08	91.78	34.71	0.93
Reach 1	7168	q100	1156.00	286.06	292.01	292.01	293.45	0.011555	10.34	131.60	51.63	0.85
Reach 1	7085	q2	555.00	285.13	289.45	289.45	290.54	0.015627	8.75	71.26	40.81	0.93
Reach 1	7085	q5	698.00	285.13	290.12	290.12	290.95	0.009623	7.94	110.95	69.02	0.76
Reach 1	7085	q10	840.00	285.13	290.55	290.55	291.28	0.007802	7.74	146.75	94.79	0.70
Reach 1	7085	q100	1156.00	285.13	291.00	291.00	291.80	0.007936	8.41	196.39	117.34	0.72
Reach 1	7025	q2	555.00	283.97	287.93	287.93	289.05	0.016566	8.63	66.01	29.77	0.95
Reach 1	7025	q5	698.00	283.97	288.37	288.37	289.59	0.014800	9.03	80.55	40.69	0.93
Reach 1	7025	q10	840.00	283.97	289.13	289.13	289.94	0.008116	7.78	134.09	96.39	0.71
Reach 1	7025	q100	1156.00	283.97	289.71	289.71	290.44	0.006686	7.79	200.46	126.86	0.66
Reach 1	6930	q2	555.00	281.75	286.48	286.48	287.41	0.015366	8.63	78.38	45.33	0.90
Reach 1	6930	q5	698.00	281.75	286.91	286.91	287.83	0.013223	8.77	99.72	58.77	0.85
Reach 1	6930	q10	840.00	281.75	287.22	287.22	288.16	0.012413	9.02	119.97	69.68	0.84
Reach 1	6930	q100	1156.00	281.75	287.86	287.86	288.72	0.009925	8.99	174.31	98.09	0.77
Reach 1	6843	q2	555.00	281.66	285.05	285.05	285.62	0.011397	6.92	95.38	75.71	0.77
Reach 1	6843	q5	698.00	281.66	285.21	285.21	285.90	0.012367	7.52	107.84	76.50	0.81
Reach 1	6843	q10	840.00	281.66	285.40	285.40	286.16	0.012010	7.77	122.64	77.43	0.81
Reach 1	6843	q100	1156.00	281.66	285.74	285.74	286.69	0.012361	8.48	149.02	79.16	0.84
Reach 1	6761	q2	555.00	279.76	283.88		284.38	0.010005	6.80	106.19	68.10	0.73
Reach 1	6761	q5	698.00	279.76	284.29		284.76	0.007926	6.65	134.31	71.02	0.67
Reach 1	6761	q10	840.00	279.76	284.70		285.15	0.006322	6.45	164.33	74.04	0.61

HEC-RAS Plan: Sprg_Cnyn_Ex River: SpringCanyon Reach: Reach 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	6761	q100	1156.00	279.76	285.33		285.83	0.005609	6.78	212.38	78.56	0.59
Reach 1	6704	q2	555.00	278.64	282.76	282.76	283.71	0.012011	8.45	77.01	41.05	0.84
Reach 1	6704	q5	698.00	278.64	283.13	283.13	284.16	0.011522	8.91	93.00	44.93	0.84
Reach 1	6704	q10	840.00	278.64	283.34	283.34	284.57	0.012928	9.80	102.33	46.91	0.90
Reach 1	6704	q100	1156.00	278.64	284.16	284.16	285.34	0.010140	9.92	148.19	63.62	0.82
Reach 1	6593	q2	555.00	277.07	280.84	280.84	281.87	0.014067	8.25	70.96	38.28	0.88
Reach 1	6593	q5	698.00	277.07	281.37	281.37	282.34	0.011015	8.21	94.10	51.03	0.80
Reach 1	6593	q10	840.00	277.07	281.74	281.74	282.70	0.009778	8.32	115.06	64.82	0.77
Reach 1	6593	q100	1156.00	277.07	282.38	282.38	283.38	0.008698	8.75	158.61	88.68	0.75
Reach 1	6532	q2	555.00	276.04	280.39	280.39	280.94	0.008856	6.92	104.11	88.03	0.69
Reach 1	6532	q5	698.00	276.04	280.59	280.59	281.19	0.009081	7.31	122.08	90.66	0.70
Reach 1	6532	q10	840.00	276.04	280.75	280.75	281.42	0.009518	7.72	136.72	92.25	0.73
Reach 1	6532	q100	1156.00	276.04	281.07	281.07	281.88	0.010046	8.41	167.21	100.78	0.76
Reach 1	6442	q2	555.00	274.73	278.63	278.63	279.18	0.012448	7.21	103.94	79.96	0.80
Reach 1	6442	q5	698.00	274.73	278.82	278.82	279.45	0.013264	7.66	119.65	81.17	0.84
Reach 1	6442	q10	840.00	274.73	278.99	278.96	279.69	0.014205	8.04	133.25	84.54	0.87
Reach 1	6442	q100	1156.00	274.73	279.33	279.33	280.19	0.014586	8.83	164.51	93.29	0.90
Reach 1	6388	q2	555.00	273.61	277.94	277.94	278.50	0.013664	7.02	106.76	88.23	0.76
Reach 1	6388	q5	698.00	273.61	278.15	278.15	278.77	0.014022	7.49	125.89	92.14	0.78
Reach 1	6388	q10	840.00	273.61	278.32	278.32	279.01	0.014563	7.94	142.18	94.47	0.81
Reach 1	6388	q100	1156.00	273.61	278.65	278.65	279.48	0.015562	8.80	174.32	98.46	0.85
Reach 1	6331	q2	555.00	273.37	276.51	276.51	277.18	0.014190	7.12	94.24	71.78	0.80
Reach 1	6331	q5	698.00	273.37	276.77	276.77	277.50	0.013980	7.56	113.71	76.69	0.80
Reach 1	6331	q10	840.00	273.37	276.99	276.99	277.78	0.013979	7.96	130.89	79.77	0.81
Reach 1	6331	q100	1156.00	273.37	277.41	277.41	278.32	0.014229	8.76	165.60	87.19	0.84
Reach 1	6290	q2	555.00	271.50	275.36	275.36	276.21	0.015148	7.65	81.70	55.05	0.82
Reach 1	6290	q5	698.00	271.50	275.70	275.70	276.61	0.014406	8.08	101.84	63.28	0.82
Reach 1	6290	q10	840.00	271.50	276.05	276.05	276.94	0.012806	8.19	125.37	71.92	0.79
Reach 1	6290	q100	1156.00	271.50	276.53	276.53	277.55	0.012954	9.00	162.46	82.86	0.81
Reach 1	6266	q2	555.00	270.63	274.41	274.41	275.43	0.020586	8.14	69.97	40.21	0.93
Reach 1	6266	q5	698.00	270.63	274.91	274.91	275.91	0.015949	8.15	93.92	56.11	0.85
Reach 1	6266	q10	840.00	270.63	275.27	275.27	276.27	0.014154	8.31	115.68	62.93	0.81
Reach 1	6266	q100	1156.00	270.63	275.82	275.82	276.93	0.013569	9.02	153.03	73.19	0.82
Reach 1	6163	q2	555.00	268.51	272.97	272.90	273.70	0.013479	7.74	86.37	52.72	0.77
Reach 1	6163	q5	698.00	268.51	273.37	273.22	274.08	0.011367	7.70	108.29	57.43	0.72
Reach 1	6163	q10	840.00	268.51	273.60	273.45	274.41	0.011817	8.19	121.91	60.23	0.75
Reach 1	6163	q100	1156.00	268.51	274.08	273.95	275.05	0.012197	9.03	152.92	68.39	0.77
Reach 1	6089	q2	555.00	267.72	271.58	271.58	272.58	0.017357	8.33	69.65	33.87	0.85
Reach 1	6089	q5	698.00	267.72	271.96	271.96	273.07	0.017026	8.80	83.20	37.92	0.85
Reach 1	6089	q10	840.00	267.72	272.51	272.51	273.49	0.013791	8.60	108.51	53.66	0.77
Reach 1	6089	q100	1156.00	267.72	273.03	273.03	274.15	0.013470	9.08	138.15	59.34	0.77
Reach 1	5998	q2	555.00	266.32	270.52	270.31	271.23	0.011157	7.33	86.36	47.59	0.72
Reach 1	5998	q5	698.00	266.32	270.81	270.66	271.64	0.011664	7.95	100.84	51.65	0.75
Reach 1	5998	q10	840.00	266.32	271.03	270.97	272.00	0.012539	8.58	112.49	54.35	0.78
Reach 1	5998	q100	1156.00	266.32	271.71	271.71	272.68	0.011691	9.26	157.90	80.23	0.78
Reach 1	5901	q2	555.00	264.51	269.30	269.30	270.02	0.013961	8.07	89.08	57.10	0.76
Reach 1	5901	q5	698.00	264.51	269.57	269.57	270.37	0.014463	8.64	105.39	63.92	0.78
Reach 1	5901	q10	840.00	264.51	269.84	269.84	270.67	0.013903	8.87	123.79	71.30	0.78
Reach 1	5901	q100	1156.00	264.51	270.29	270.29	271.22	0.014247	9.62	159.08	87.93	0.80
Reach 1	5853	q2	555.00	264.52	269.21		269.41	0.003790	4.30	158.78	87.64	0.40
Reach 1	5853	q5	698.00	264.52	269.44		269.69	0.004117	4.68	179.45	89.54	0.42
Reach 1	5853	q10	840.00	264.52	269.64		269.94	0.004452	5.04	197.39	91.21	0.44
Reach 1	5853	q100	1156.00	264.52	270.03		270.43	0.005115	5.74	234.18	96.61	0.48
Reach 1	5805	q2	703.00	263.75	268.48	268.48	269.05	0.011402	7.58	125.60	102.65	0.71
Reach 1	5805	q5	883.00	263.75	268.79	268.67	269.34	0.010019	7.52	159.74	118.77	0.68
Reach 1	5805	q10	1063.00	263.75	269.04		269.59	0.009143	7.50	191.92	126.55	0.65
Reach 1	5805	q100	1472.00	263.75	269.52		270.09	0.007511	7.32	252.66	129.94	0.60
Reach 1	5687	q2	703.00	261.61	266.75	266.75	267.57	0.013479	8.49	105.30	63.87	0.78
Reach 1	5687	q5	883.00	261.61	267.04	267.04	267.94	0.013555	8.96	125.03	69.32	0.79
Reach 1	5687	q10	1063.00	261.61	267.36	267.36	268.28	0.012963	9.21	148.17	77.92	0.78
Reach 1	5687	q100	1472.00	261.61	267.86	267.86	268.91	0.012892	9.88	190.36	94.20	0.79

HEC-RAS Plan: Sprg_Cnyn_Ex River: SpringCanyon Reach: Reach 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	5616	q2	703.00	260.92	265.06	265.06	265.32	0.005308	4.61	175.46	126.88	0.47
Reach 1	5616	q5	883.00	260.92	265.06	265.06	265.47	0.008377	5.79	175.44	126.88	0.59
Reach 1	5616	q10	1063.00	260.92	265.06	265.06	265.66	0.012142	6.97	175.44	126.88	0.71
Reach 1	5616	q100	1472.00	260.92	265.32	265.32	266.13	0.013274	7.71	208.64	127.59	0.75
Reach 1	5522	q2	703.00	260.08	263.79	263.79	264.30	0.012477	6.72	127.89	143.57	0.73
Reach 1	5522	q5	883.00	260.08	263.99	263.99	264.54	0.011965	6.85	153.25	151.25	0.72
Reach 1	5522	q10	1063.00	260.08	264.10	264.10	264.43	0.005164	4.59	231.78	153.17	0.47
Reach 1	5522	q100	1472.00	260.08	264.59	264.10	264.95	0.004467	4.64	307.59	155.11	0.45
Reach 1	5405	q2	703.00	257.39	262.18	262.18	263.03	0.012751	8.52	113.93	91.95	0.79
Reach 1	5405	q5	883.00	257.39	262.60	262.60	263.40	0.011099	8.54	148.11	109.58	0.75
Reach 1	5405	q10	1063.00	257.39	262.86	262.86	263.71	0.011300	8.98	170.83	115.20	0.76
Reach 1	5405	q100	1472.00	257.39	263.24	263.24	264.30	0.013200	10.27	206.67	121.08	0.83
Reach 1	5340	q2	703.00	256.85	260.89	260.89	261.64	0.017914	8.30	109.92	73.74	0.86
Reach 1	5340	q5	883.00	256.85	261.17	261.17	261.99	0.017831	8.80	130.65	78.00	0.87
Reach 1	5340	q10	1063.00	256.85	261.39	261.39	262.32	0.018651	9.41	148.00	81.84	0.90
Reach 1	5340	q100	1472.00	256.85	261.91	261.91	262.94	0.017729	10.11	194.44	93.16	0.90
Reach 1	5266	q2	703.00	256.47	259.25	259.25	259.86	0.017816	7.64	124.20	95.16	0.88
Reach 1	5266	q5	883.00	256.47	259.47	259.47	260.15	0.017707	8.09	145.32	97.30	0.89
Reach 1	5266	q10	1063.00	256.47	259.65	259.65	260.41	0.018067	8.56	163.41	98.80	0.91
Reach 1	5266	q100	1472.00	256.47	260.00	260.00	260.96	0.019521	9.63	197.87	102.07	0.97
Reach 1	5188	q2	703.00	254.65	258.31		258.67	0.009458	5.92	154.93	104.46	0.64
Reach 1	5188	q5	883.00	254.65	258.54		258.95	0.009654	6.33	180.06	108.45	0.66
Reach 1	5188	q10	1063.00	254.65	258.76		259.22	0.009577	6.62	204.11	110.75	0.66
Reach 1	5188	q100	1472.00	254.65	259.22		259.76	0.009314	7.15	255.44	115.35	0.67
Reach 1	5166	q2	703.00	253.60	257.92		258.44	0.011782	7.23	135.71	96.11	0.72
Reach 1	5166	q5	883.00	253.60	258.15		258.73	0.011920	7.63	158.27	98.31	0.73
Reach 1	5166	q10	1063.00	253.60	258.39		259.00	0.011500	7.84	181.77	100.50	0.73
Reach 1	5166	q100	1472.00	253.60	258.78		259.54	0.012201	8.64	221.49	103.61	0.76
Reach 1	5143	q2	703.00	253.37	257.63	257.63	258.22	0.011404	7.10	123.91	96.21	0.71
Reach 1	5143	q5	883.00	253.37	257.83	257.83	258.50	0.011756	7.52	143.61	98.38	0.73
Reach 1	5143	q10	1063.00	253.37	258.04	257.99	258.78	0.011581	7.78	164.92	105.12	0.74
Reach 1	5143	q100	1472.00	253.37	258.54	258.39	259.33	0.009630	7.76	220.32	113.12	0.69
Reach 1	5017	q2	703.00	251.50	255.98	255.98	256.69	0.011209	8.15	122.11	74.24	0.74
Reach 1	5017	q5	883.00	251.50	256.23	256.23	257.04	0.011917	8.78	141.14	75.70	0.77
Reach 1	5017	q10	1063.00	251.50	256.44	256.44	257.35	0.012806	9.41	156.90	76.57	0.81
Reach 1	5017	q100	1472.00	251.50	256.90	256.90	258.00	0.013656	10.41	192.45	78.86	0.85
Reach 1	4921	q2	703.00	250.52	253.73	253.73	254.44	0.020814	8.06	108.57	70.71	0.92
Reach 1	4921	q5	883.00	250.52	253.96	253.96	254.79	0.021436	8.60	125.08	72.09	0.94
Reach 1	4921	q10	1063.00	250.52	254.20	254.20	255.11	0.020833	8.90	142.74	73.50	0.94
Reach 1	4921	q100	1472.00	250.52	254.88	254.88	255.76	0.018375	9.36	205.32	104.81	0.90
Reach 1	4792	q2	703.00	246.92	251.64	251.64	252.39	0.013061	7.49	113.97	74.84	0.77
Reach 1	4792	q5	883.00	246.92	251.91	251.91	252.74	0.013310	8.03	134.81	77.50	0.79
Reach 1	4792	q10	1063.00	246.92	252.13	252.13	253.06	0.014030	8.61	151.55	79.10	0.82
Reach 1	4792	q100	1472.00	246.92	252.60	252.60	253.69	0.014219	9.46	190.13	82.38	0.85
Reach 1	4704	q2	703.00	246.09	250.54		251.00	0.009629	6.13	145.02	94.16	0.65
Reach 1	4704	q5	883.00	246.09	250.86		251.34	0.008930	6.29	175.71	96.52	0.64
Reach 1	4704	q10	1063.00	246.09	251.17		251.65	0.008252	6.38	205.96	99.10	0.62
Reach 1	4704	q100	1472.00	246.09	251.80		252.31	0.007291	6.60	270.42	105.57	0.60
Reach 1	4641	q2	703.00	245.35	250.20		250.59	0.005524	5.47	154.43	72.56	0.52
Reach 1	4641	q5	883.00	245.35	250.41		250.92	0.006796	6.26	170.06	75.03	0.58
Reach 1	4641	q10	1063.00	245.35	250.57		251.21	0.008320	7.08	181.80	77.55	0.64
Reach 1	4641	q100	1472.00	245.35	250.92		251.83	0.011058	8.53	209.96	82.59	0.75
Reach 1	4590	q2	703.00	244.24	249.51	249.51	250.13	0.012615	7.42	130.42	105.80	0.73
Reach 1	4590	q5	883.00	244.24	249.77	249.77	250.41	0.012207	7.70	160.73	119.45	0.73
Reach 1	4590	q10	1063.00	244.24	249.97	249.97	250.64	0.012318	8.03	185.29	125.76	0.74
Reach 1	4590	q100	1472.00	244.24	250.38	250.38	251.11	0.012251	8.59	240.71	142.86	0.75
Reach 1	4514	q2	703.00	243.59	247.91	247.91	248.49	0.014878	7.54	126.18	97.94	0.79
Reach 1	4514	q5	883.00	243.59	248.11	248.11	248.76	0.015599	7.99	146.31	101.60	0.82
Reach 1	4514	q10	1063.00	243.59	248.43		249.03	0.012787	7.61	179.72	108.10	0.75
Reach 1	4514	q100	1472.00	243.59	249.17		249.66	0.008070	6.70	268.68	139.14	0.61

HEC-RAS Plan: Sprg_Cnyn_Ex River: SpringCanyon Reach: Reach 1 (Continued)

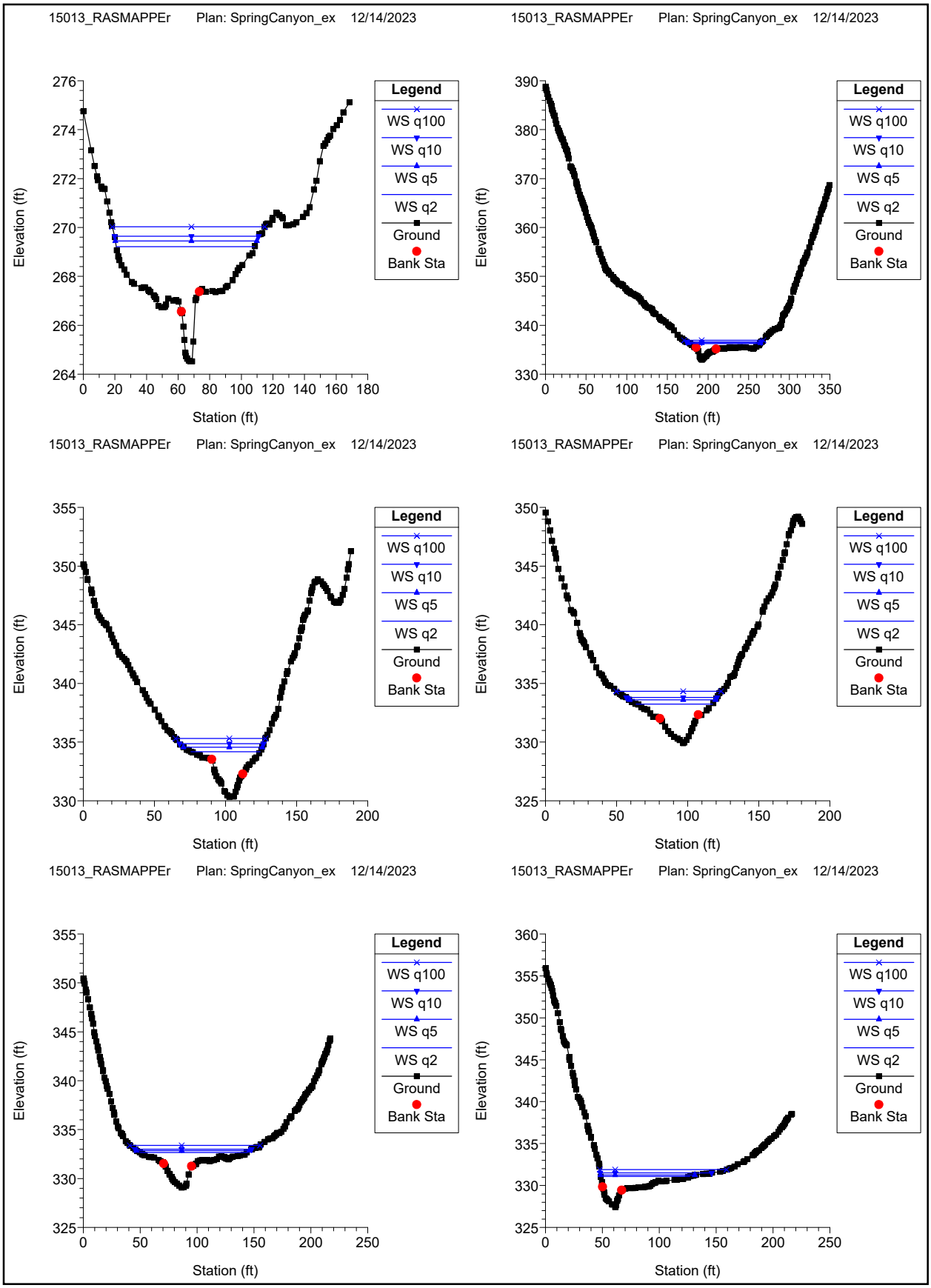
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	4399	q2	703.00	241.47	246.71		247.39	0.009113	7.16	117.02	59.51	0.65
Reach 1	4399	q5	883.00	241.47	247.17		247.86	0.008121	7.31	146.32	65.16	0.63
Reach 1	4399	q10	1063.00	241.47	247.57		248.27	0.007616	7.52	172.75	69.59	0.62
Reach 1	4399	q100	1472.00	241.47	248.26		249.06	0.007729	8.32	231.08	94.03	0.64
Reach 1	4291	q2	703.00	238.94	244.61	244.61	245.95	0.018536	9.57	79.14	32.13	0.90
Reach 1	4291	q5	883.00	238.94	245.17	245.17	246.56	0.016316	9.91	99.01	38.86	0.87
Reach 1	4291	q10	1063.00	238.94	245.68	245.68	247.08	0.014419	10.09	120.76	46.68	0.83
Reach 1	4291	q100	1472.00	238.94	246.76	246.76	248.02	0.010733	10.03	185.42	75.66	0.74
Reach 1	4177	q2	703.00	237.00	242.83		243.49	0.009251	6.99	110.37	41.70	0.64
Reach 1	4177	q5	883.00	237.00	243.22		244.00	0.009570	7.61	127.00	44.40	0.67
Reach 1	4177	q10	1063.00	237.00	243.59		244.47	0.009590	8.07	144.11	47.32	0.68
Reach 1	4177	q100	1472.00	237.00	244.21		245.37	0.010622	9.27	174.69	52.06	0.73
Reach 1	4043	q2	703.00	235.30	240.81	240.81	241.85	0.015788	8.60	91.70	43.81	0.84
Reach 1	4043	q5	883.00	235.30	241.21	241.21	242.35	0.015503	9.13	109.60	47.31	0.85
Reach 1	4043	q10	1063.00	235.30	241.50	241.50	242.79	0.016087	9.79	123.63	49.43	0.87
Reach 1	4043	q100	1472.00	235.30	242.21	242.21	243.67	0.014932	10.55	161.37	55.93	0.87
Reach 1	3831	q2	703.00	233.02	238.57		238.92	0.005424	5.28	150.98	62.76	0.48
Reach 1	3831	q5	883.00	233.02	239.07		239.44	0.004826	5.27	183.30	65.44	0.46
Reach 1	3831	q10	1063.00	233.02	239.53		239.91	0.004443	5.29	213.61	67.78	0.45
Reach 1	3831	q100	1472.00	233.02	240.23		240.72	0.004619	5.75	262.42	71.24	0.46
Reach 1	3702	q2	703.00	231.57	236.84	236.50	237.77	0.018085	7.95	92.60	37.19	0.70
Reach 1	3702	q5	883.00	231.57	237.17	236.92	238.32	0.019933	8.81	105.58	41.95	0.75
Reach 1	3702	q10	1063.00	231.57	237.44	237.44	238.81	0.021661	9.57	117.84	47.02	0.79
Reach 1	3702	q100	1472.00	231.57	238.33	238.33	239.69	0.016894	9.50	166.49	61.39	0.72
Reach 1	3596	q2	703.00	231.39	234.47	234.47	235.53	0.025007	6.73	88.60	44.61	0.78
Reach 1	3596	q5	883.00	231.39	234.82	234.82	236.04	0.023428	7.00	104.66	46.14	0.77
Reach 1	3596	q10	1063.00	231.39	235.23	235.23	236.50	0.020187	7.01	124.19	50.98	0.73
Reach 1	3596	q100	1472.00	231.39	235.97	235.97	237.37	0.016608	7.40	166.12	60.21	0.68
Reach 1	3490	q2	703.00	227.32	232.63		233.12	0.012326	6.12	128.50	66.39	0.56
Reach 1	3490	q5	883.00	227.32	233.00	232.52	233.53	0.011540	6.31	153.68	69.80	0.55
Reach 1	3490	q10	1063.00	227.32	233.35	232.77	233.91	0.010551	6.38	178.98	72.02	0.54
Reach 1	3490	q100	1472.00	227.32	234.11	233.25	234.73	0.008837	6.49	235.23	77.31	0.50
Reach 1	3416	q2	703.00	226.48	230.63	230.63	231.76	0.028210	7.72	84.18	42.36	0.84
Reach 1	3416	q5	883.00	226.48	231.06	231.06	232.30	0.023865	7.61	102.71	44.67	0.78
Reach 1	3416	q10	1063.00	226.48	231.40	231.40	232.77	0.021808	7.82	118.33	46.74	0.76
Reach 1	3416	q100	1472.00	226.48	232.11	232.11	233.74	0.018311	8.17	152.90	50.47	0.72
Reach 1	3308	q2	703.00	223.81	228.62		229.31	0.014905	6.18	106.82	47.70	0.62
Reach 1	3308	q5	883.00	223.81	229.01		229.81	0.014011	6.35	126.14	49.98	0.61
Reach 1	3308	q10	1063.00	223.81	229.36		230.28	0.013400	6.49	144.03	51.79	0.60
Reach 1	3308	q100	1472.00	223.81	229.87	229.51	231.16	0.015072	7.28	171.12	54.64	0.64
Reach 1	3235	q2	703.00	222.69	227.34		228.19	0.017089	7.01	97.04	37.07	0.68
Reach 1	3235	q5	883.00	222.69	227.81		228.78	0.015952	7.40	115.27	41.10	0.67
Reach 1	3235	q10	1063.00	222.69	228.23	227.73	229.29	0.015175	7.74	133.60	48.31	0.67
Reach 1	3235	q100	1472.00	222.69	229.16	228.84	230.21	0.011663	7.76	189.10	68.09	0.61
Reach 1	3170	q2	799.00	221.49	226.03	225.72	226.97	0.019969	7.43	103.70	41.84	0.73
Reach 1	3170	q5	1009.00	221.49	226.34	226.15	227.54	0.021442	8.20	117.21	43.31	0.77
Reach 1	3170	q10	1209.00	221.49	226.61	226.52	228.04	0.022570	8.83	129.15	44.69	0.80
Reach 1	3170	q100	1676.00	221.49	227.32	227.32	229.12	0.021062	9.56	162.15	48.34	0.79
Reach 1	3082	q2	799.00	219.83	224.22	224.01	225.10	0.022462	7.43	106.78	48.57	0.77
Reach 1	3082	q5	1009.00	219.83	224.61	224.38	225.62	0.021246	7.85	126.09	51.31	0.76
Reach 1	3082	q10	1209.00	219.83	224.93	224.72	226.07	0.020615	8.23	142.98	54.05	0.76
Reach 1	3082	q100	1676.00	219.83	225.59	225.40	226.98	0.019275	8.89	180.15	58.06	0.76
Reach 1	3009	q2	799.00	218.91	223.36		223.90	0.011960	5.86	135.43	47.07	0.57
Reach 1	3009	q5	1009.00	218.91	223.70		224.39	0.013409	6.56	151.80	49.11	0.61
Reach 1	3009	q10	1209.00	218.91	223.98		224.81	0.014500	7.18	165.91	50.88	0.65
Reach 1	3009	q100	1676.00	218.91	224.52		225.69	0.017069	8.50	194.55	54.78	0.72
Reach 1	2891	q2	799.00	216.25	221.09	221.09	222.01	0.021112	7.75	103.83	57.75	0.73
Reach 1	2891	q5	1009.00	216.25	221.44	221.44	222.46	0.019251	7.88	124.54	61.09	0.70
Reach 1	2891	q10	1209.00	216.25	221.72	221.72	222.85	0.018485	8.10	142.68	64.89	0.70
Reach 1	2891	q100	1676.00	216.25	222.30	222.30	223.63	0.017287	8.53	181.93	72.32	0.69
Reach 1	2699	q2	799.00	215.72	219.40		219.53	0.004066	2.88	276.34	132.92	0.32

HEC-RAS Plan: Sprg_Cnyn_Ex River: SpringCanyon Reach: Reach 1 (Continued)

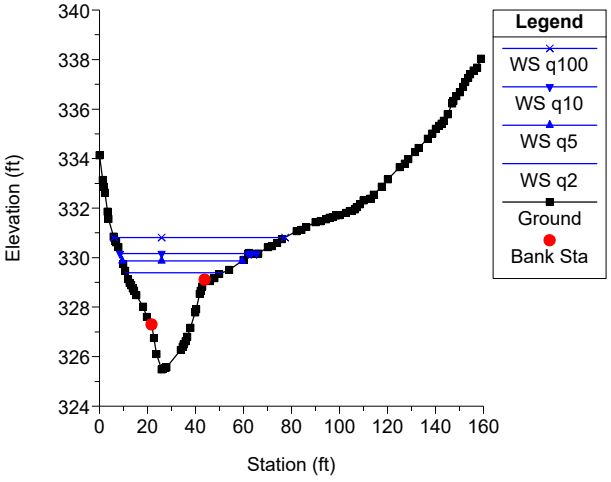
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	2699	q5	1009.00	215.72	219.68		219.84	0.004329	3.18	313.32	135.80	0.34
Reach 1	2699	q10	1209.00	215.72	219.91		220.10	0.004574	3.44	344.98	138.95	0.35
Reach 1	2699	q100	1676.00	215.72	220.36		220.63	0.005130	3.98	410.34	147.40	0.38
Reach 1	2549	q2	799.00	211.76	219.20		219.27	0.000820	2.14	396.09	157.99	0.16
Reach 1	2549	q5	1009.00	211.76	219.44		219.53	0.000980	2.41	434.89	160.88	0.18
Reach 1	2549	q10	1209.00	211.76	219.65		219.76	0.001118	2.63	467.99	162.67	0.19
Reach 1	2549	q100	1676.00	211.76	220.04		220.21	0.001435	3.11	532.83	166.61	0.22
Reach 1	2525	q2	799.00	216.92	218.63	218.63	219.17	0.004644	6.99	145.02	139.73	0.97
Reach 1	2525	q5	1009.00	216.92	218.85	218.85	219.43	0.004297	7.32	177.07	152.70	0.95
Reach 1	2525	q10	1209.00	216.92	219.00	219.00	219.64	0.004325	7.75	201.21	160.04	0.97
Reach 1	2525	q100	1676.00	216.92	219.39	219.35	220.08	0.003783	8.15	266.84	177.77	0.93
Reach 1	2517	q2	799.00	215.79	218.53	218.53	219.10	0.004418	6.98	143.01	137.65	0.95
Reach 1	2517	q5	1009.00	215.79	218.80	218.80	219.36	0.003786	7.11	181.17	150.83	0.90
Reach 1	2517	q10	1209.00	215.79	218.95	218.95	219.58	0.003798	7.50	204.97	154.66	0.91
Reach 1	2517	q100	1676.00	215.79	219.26	219.26	220.04	0.003936	8.37	255.22	167.92	0.95
Reach 1	2502	q2	799.00	209.45	213.46		213.93	0.020096	5.28	145.59	76.85	0.57
Reach 1	2502	q5	1009.00	209.45	213.74		214.31	0.020626	5.68	168.12	80.59	0.59
Reach 1	2502	q10	1209.00	209.45	214.00		214.65	0.020501	5.94	189.21	83.29	0.59
Reach 1	2502	q100	1676.00	209.45	214.51		215.32	0.021350	6.51	237.23	101.34	0.62
Reach 1	2466	q2	799.00	208.16	212.83	212.30	213.27	0.017650	5.43	150.06	82.04	0.55
Reach 1	2466	q5	1009.00	208.16	213.14	212.56	213.65	0.016908	5.67	176.21	84.61	0.55
Reach 1	2466	q10	1209.00	208.16	213.42		213.99	0.016817	5.97	200.40	91.14	0.55
Reach 1	2466	q100	1676.00	208.16	213.95		214.65	0.016145	6.40	251.72	98.90	0.55
Reach 1	2409	q2	799.00	207.77	211.56		212.04	0.021212	5.43	143.84	73.57	0.59
Reach 1	2409	q5	1009.00	207.77	211.92		212.46	0.020314	5.74	171.54	80.75	0.59
Reach 1	2409	q10	1209.00	207.77	212.22		212.81	0.019440	5.95	197.06	86.39	0.58
Reach 1	2409	q100	1676.00	207.77	212.83		213.52	0.017893	6.31	252.28	95.69	0.57
Reach 1	2333	q2	799.00	207.18	210.68		210.86	0.009059	3.42	233.45	94.33	0.38
Reach 1	2333	q5	1009.00	207.18	211.01		211.24	0.009733	3.81	265.15	96.31	0.40
Reach 1	2333	q10	1209.00	207.18	211.30		211.56	0.010271	4.13	292.82	97.88	0.42
Reach 1	2333	q100	1676.00	207.18	211.87		212.23	0.011315	4.79	349.98	100.46	0.45
Reach 1	2227	q2	799.00	206.39	208.58		209.01	0.043512	5.28	151.44	104.90	0.77
Reach 1	2227	q5	1009.00	206.39	208.83		209.33	0.041350	5.69	177.47	107.01	0.77
Reach 1	2227	q10	1209.00	206.39	209.04		209.61	0.039799	6.04	200.74	108.77	0.77
Reach 1	2227	q100	1676.00	206.39	209.50		210.19	0.037309	6.71	251.04	113.09	0.77
Reach 1	2105	q2	799.00	204.25	206.92		207.04	0.007784	2.72	293.42	149.81	0.34
Reach 1	2105	q5	1009.00	204.25	207.21		207.35	0.007930	3.00	336.10	150.82	0.35
Reach 1	2105	q10	1209.00	204.25	207.45		207.62	0.008044	3.24	373.60	152.01	0.36
Reach 1	2105	q100	1676.00	204.25	207.97		208.18	0.008247	3.71	452.82	154.77	0.38
Reach 1	2040	q2	799.00	203.24	206.28		206.43	0.011605	3.07	260.29	149.53	0.41
Reach 1	2040	q5	1009.00	203.24	206.57		206.74	0.011257	3.33	303.04	150.48	0.41
Reach 1	2040	q10	1209.00	203.24	206.81		207.01	0.011095	3.55	340.14	151.36	0.42
Reach 1	2040	q100	1676.00	203.24	207.32		207.57	0.010813	4.01	418.35	153.50	0.43
Reach 1	1965	q2	799.00	202.77	205.52		205.65	0.009148	2.91	274.75	144.34	0.37
Reach 1	1965	q5	1009.00	202.77	205.82		205.98	0.008917	3.16	319.26	145.59	0.37
Reach 1	1965	q10	1209.00	202.77	206.07		206.25	0.009062	3.41	354.85	146.62	0.38
Reach 1	1965	q100	1676.00	202.77	206.58		206.81	0.009285	3.90	430.40	148.81	0.40
Reach 1	1876	q2	799.00	201.39	204.18		204.44	0.021550	4.07	196.17	117.52	0.56
Reach 1	1876	q5	1009.00	201.39	204.51		204.79	0.021508	4.29	235.47	130.53	0.56
Reach 1	1876	q10	1209.00	201.39	204.74		205.06	0.021008	4.53	267.02	133.86	0.57
Reach 1	1876	q100	1676.00	201.39	205.25		205.64	0.019680	4.99	335.62	138.19	0.56
Reach 1	1784	q2	799.00	200.02	202.50		202.73	0.016232	3.80	210.44	113.51	0.49
Reach 1	1784	q5	1009.00	200.02	202.78		203.05	0.016768	4.17	242.02	116.18	0.51
Reach 1	1784	q10	1209.00	200.02	203.04		203.35	0.016637	4.43	273.12	119.08	0.52
Reach 1	1784	q100	1676.00	200.02	203.58		203.96	0.016939	4.95	338.62	126.45	0.53
Reach 1	1658	q2	799.00	197.52	200.60		200.78	0.014712	3.40	234.69	138.31	0.46
Reach 1	1658	q5	1009.00	197.52	200.92		201.12	0.013810	3.60	280.39	144.98	0.46
Reach 1	1658	q10	1209.00	197.52	201.23		201.44	0.013573	3.69	327.44	160.83	0.46
Reach 1	1658	q100	1676.00	197.52	201.78		202.02	0.013497	3.98	420.96	183.88	0.46
Reach 1	1492	q2	799.00	195.21	198.60		198.76	0.010155	3.16	252.60	126.22	0.39
Reach 1	1492	q5	1009.00	195.21	198.92		199.10	0.010728	3.42	294.93	136.51	0.41

HEC-RAS Plan: Sprg_Cnyn_Ex River: SpringCanyon Reach: Reach 1 (Continued)

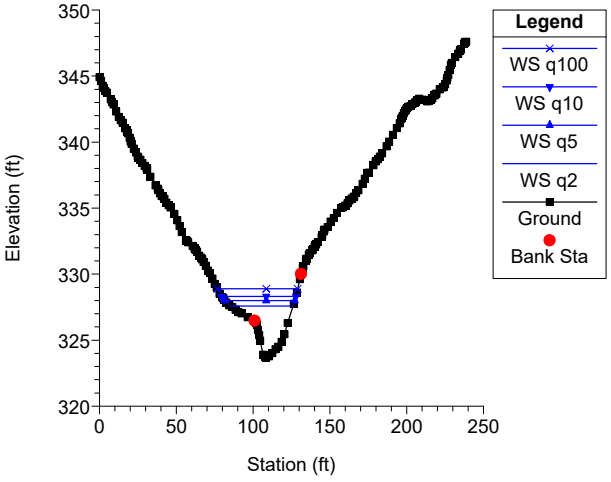
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	1492	q10	1209.00	195.21	199.18		199.39	0.011258	3.65	331.65	150.63	0.42
Reach 1	1492	q100	1676.00	195.21	199.60		199.88	0.012395	4.25	396.79	160.04	0.46
Reach 1	1364	q2	799.00	192.26	196.15	195.93	196.58	0.034501	5.40	152.62	108.27	0.71
Reach 1	1364	q5	1009.00	192.26	196.40	196.15	196.89	0.033681	5.73	181.95	118.89	0.71
Reach 1	1364	q10	1209.00	192.26	196.64	196.35	197.16	0.032277	5.92	211.66	131.32	0.71
Reach 1	1364	q100	1676.00	192.26	197.11	196.78	197.68	0.027866	6.21	277.96	146.80	0.68
Reach 1	1277	q2	799.00	190.74	193.71		194.04	0.023958	4.58	174.55	94.87	0.59
Reach 1	1277	q5	1009.00	190.74	194.02		194.40	0.023333	4.95	203.69	96.28	0.60
Reach 1	1277	q10	1209.00	190.74	194.29		194.72	0.022924	5.25	230.07	98.10	0.60
Reach 1	1277	q100	1676.00	190.74	194.90		195.41	0.022184	5.67	295.40	109.39	0.61
Reach 1	1159	q2	799.00	188.58	191.86		192.06	0.011821	3.62	220.58	100.42	0.43
Reach 1	1159	q5	1009.00	188.58	192.22		192.46	0.011534	3.92	257.72	102.38	0.44
Reach 1	1159	q10	1209.00	188.58	192.53		192.80	0.011438	4.17	289.70	103.80	0.44
Reach 1	1159	q100	1676.00	188.58	193.17		193.51	0.011481	4.70	356.33	106.75	0.45
Reach 1	1045	q2	799.00	187.00	190.00	189.30	190.31	0.020703	4.50	177.60	88.86	0.56
Reach 1	1045	q5	1009.00	187.00	190.26	189.54	190.65	0.022976	5.00	201.72	93.08	0.60
Reach 1	1045	q10	1209.00	187.00	190.50	189.75	190.95	0.024459	5.40	224.03	96.68	0.63
Reach 1	1045	q100	1676.00	187.00	190.93	190.25	191.54	0.027991	6.27	267.20	102.68	0.68
Reach 1	895	q2	799.00	183.36	185.73		186.01	0.042329	4.20	190.16	180.81	0.72
Reach 1	895	q5	1009.00	183.36	185.94		186.24	0.038763	4.41	228.88	189.47	0.71
Reach 1	895	q10	1209.00	183.36	186.10		186.44	0.037586	4.66	259.50	193.13	0.71
Reach 1	895	q100	1676.00	183.36	186.44		186.85	0.034509	5.16	324.85	194.62	0.70
Reach 1	801	q2	799.00	181.36	184.01	183.09	184.15	0.010931	2.93	272.25	207.37	0.40
Reach 1	801	q5	1009.00	181.36	184.25	183.26	184.38	0.011365	2.88	350.65	219.81	0.40
Reach 1	801	q10	1209.00	181.36	184.44	183.43	184.59	0.011396	3.08	392.08	221.96	0.41
Reach 1	801	q100	1676.00	181.36	184.82	183.81	185.01	0.011754	3.51	477.51	227.73	0.43
Reach 1	701	q2	799.00	179.26	181.31	181.31	181.75	0.086704	5.33	150.03	171.66	1.00
Reach 1	701	q5	1009.00	179.26	181.47	181.47	181.97	0.079116	5.65	178.64	174.69	0.98
Reach 1	701	q10	1209.00	179.26	181.59	181.59	182.16	0.079000	6.04	200.02	176.48	1.00
Reach 1	701	q100	1676.00	179.26	181.87	181.87	182.57	0.074064	6.71	249.92	179.73	1.00
Reach 1	582	q2	799.00	170.73	176.13	174.39	176.49	0.011698	4.84	165.23	60.21	0.45
Reach 1	582	q5	1009.00	170.73	176.69	174.86	177.12	0.012557	5.24	192.68	71.36	0.47
Reach 1	582	q10	1209.00	170.73	177.43	175.23	177.73	0.013575	4.35	278.18	104.65	0.47
Reach 1	582	q100	1676.00	170.73	178.13	175.99	178.48	0.012829	4.74	353.43	111.85	0.47
Reach 1	430	q2	799.00	167.76	171.83	171.72	173.02	0.057746	8.78	90.98	34.76	0.96
Reach 1	430	q5	1009.00	167.76	172.50	172.20	173.69	0.048671	8.73	115.62	39.04	0.89
Reach 1	430	q10	1209.00	167.76	173.06	172.65	174.25	0.043470	8.73	138.51	42.85	0.86
Reach 1	430	q100	1676.00	167.76	174.32	173.46	175.41	0.033942	8.42	204.52	89.20	0.77
Reach 1	296	q2	799.00	164.78	170.23		170.48	0.007945	4.00	200.00	56.61	0.37
Reach 1	296	q5	1009.00	164.78	170.70		171.01	0.009335	4.43	227.99	62.60	0.41
Reach 1	296	q10	1209.00	164.78	171.13		171.48	0.010454	4.71	256.63	70.04	0.43
Reach 1	296	q100	1676.00	164.78	171.04		171.74	0.021432	6.71	249.92	68.79	0.62
Reach 1	151	q2	799.00	163.40	167.49	167.49	168.19	0.045532	6.90	119.85	86.97	0.83
Reach 1	151	q5	1009.00	163.40	167.76	167.76	168.52	0.042433	7.13	144.83	96.09	0.82
Reach 1	151	q10	1209.00	163.40	167.95	167.95	168.80	0.042525	7.41	162.91	98.32	0.83
Reach 1	151	q100	1676.00	163.40	169.64		170.04	0.007363	4.26	343.77	113.39	0.37
Reach 1	113	q2	799.00	160.27	165.78		165.97	0.005068	3.41	234.12	59.68	0.30
Reach 1	113	q5	1009.00	160.27	166.84		167.01	0.003676	3.35	306.20	78.74	0.27
Reach 1	113	q10	1209.00	160.27	167.80		167.95	0.002742	3.22	383.74	83.60	0.24
Reach 1	113	q100	1676.00	160.27	169.71		169.85	0.001757	3.05	548.63	88.54	0.20
Reach 1	88	q2	799.00	159.65	165.32	163.34	165.89	0.000586	6.07	131.54	27.56	0.49
Reach 1	88	q5	1009.00	159.65	166.32	163.89	166.94	0.000536	6.32	159.67	28.68	0.47
Reach 1	88	q10	1209.00	159.65	167.22	164.38	167.88	0.000501	6.50	185.97	29.74	0.46
Reach 1	88	q100	1676.00	159.65	169.02	165.40	169.77	0.000466	6.95	241.31	31.77	0.44


15013_RASMAPPEr Plan: SpringCanyon_ex 12/14/2023
Elevation (ft)
Station (ft)
Legend
WS q100
WS q10
WS q5
WS q2
Ground
Bank Sta
15013_RASMAPPEr Plan: SpringCanyon_ex 12/14/2023
Elevation (ft)
Station (ft)
Legend
WS q100
WS q10
WS q5
WS q2
Ground
Bank Sta
15013_RASMAPPEr Plan: SpringCanyon_ex 12/14/2023
Elevation (ft)
Station (ft)
Legend
WS q100
WS q10
WS q5
WS q2
Ground
Bank Sta
15013_RASMAPPEr Plan: SpringCanyon_ex 12/14/2023
Elevation (ft)
Station (ft)
Legend
WS q100
WS q10
WS q5
WS q2
Ground
Bank Sta
15013_RASMAPPEr Plan: SpringCanyon_ex 12/14/2023
Elevation (ft)
Station (ft)
Legend
WS q100
WS q10
WS q5
WS q2
Ground
Bank Sta
15013_RASMAPPEr Plan: SpringCanyon_ex 12/14/2023
Elevation (ft)
Station (ft)
Legend
WS q100
WS q10
WS q5
WS q2
Ground
Bank Sta

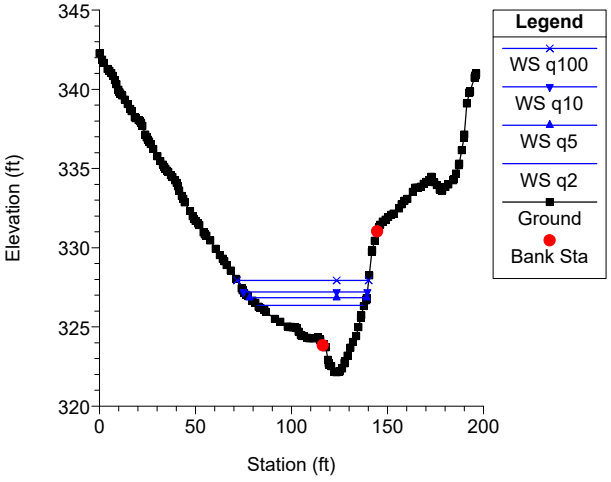
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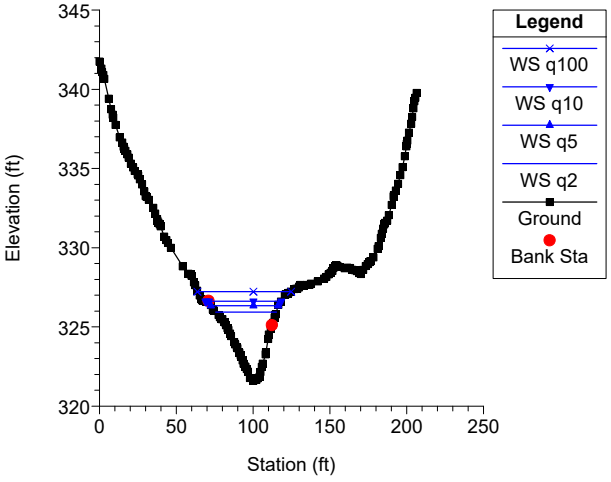
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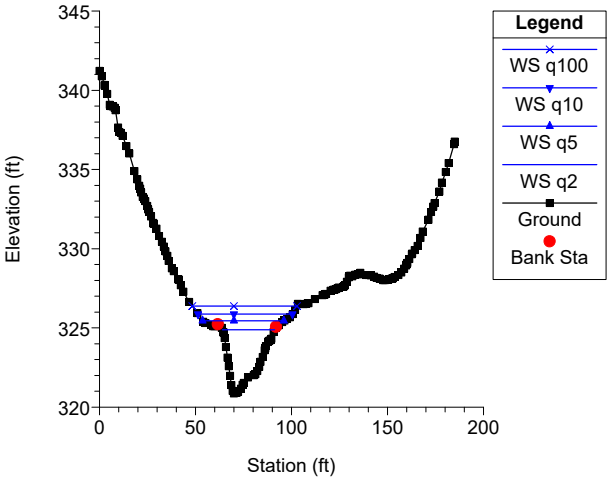
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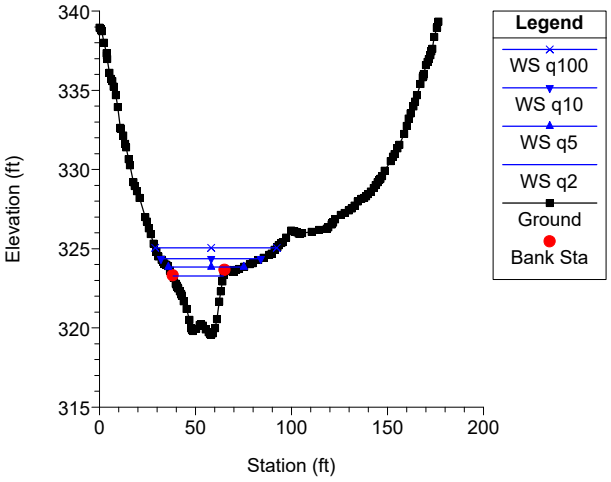
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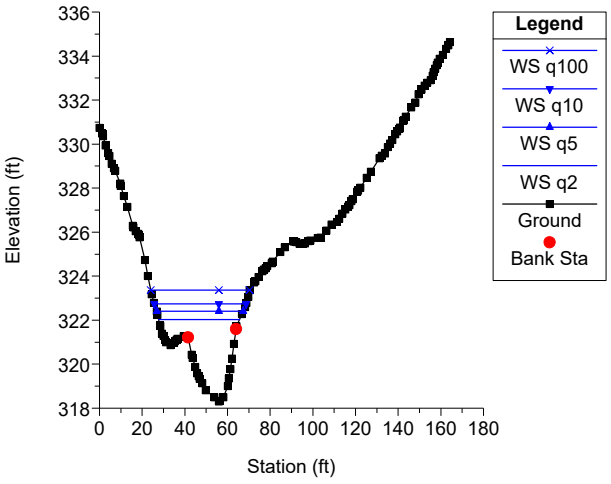
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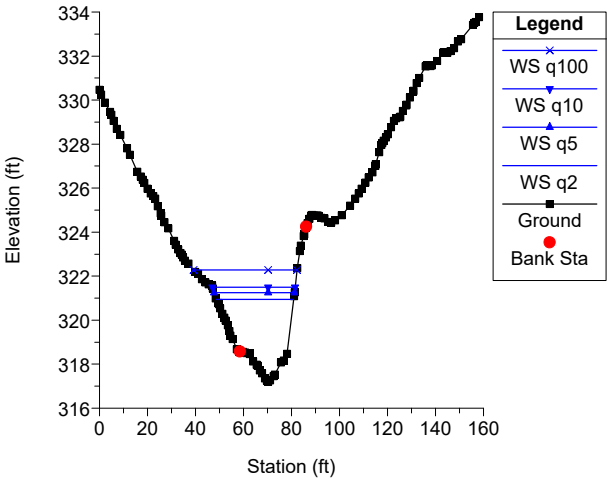
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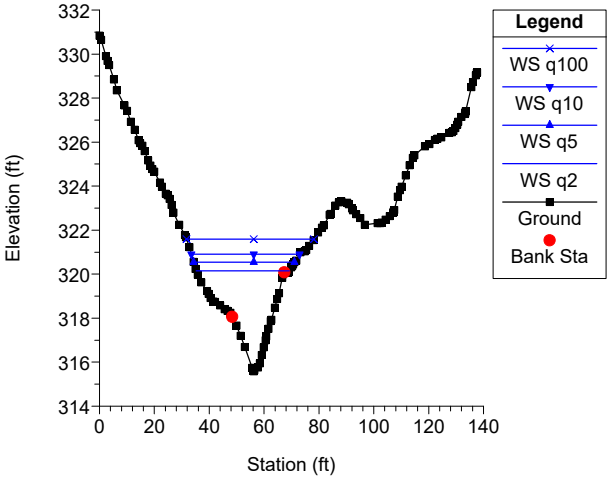
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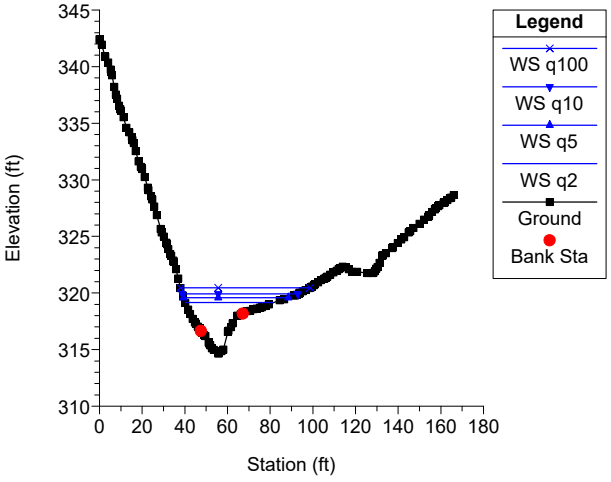
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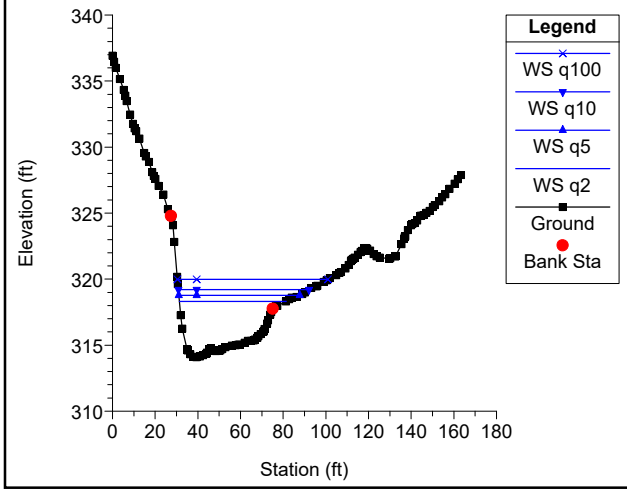
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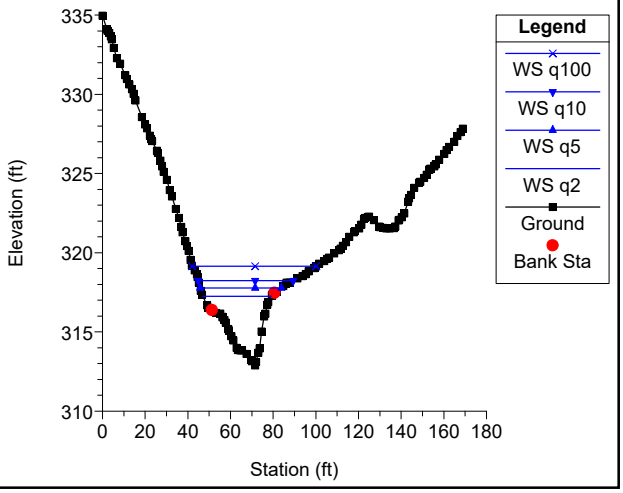
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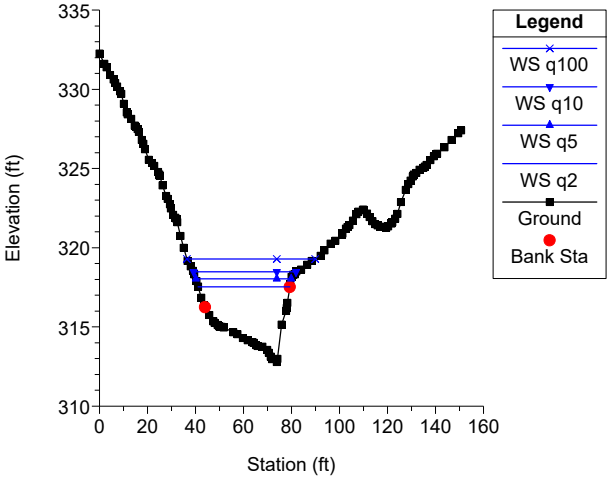
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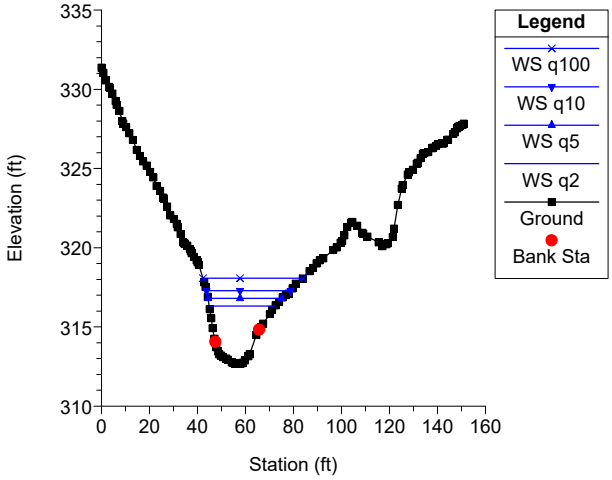
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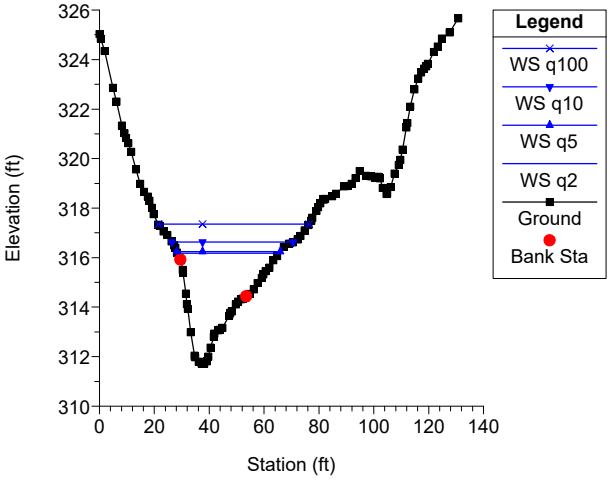
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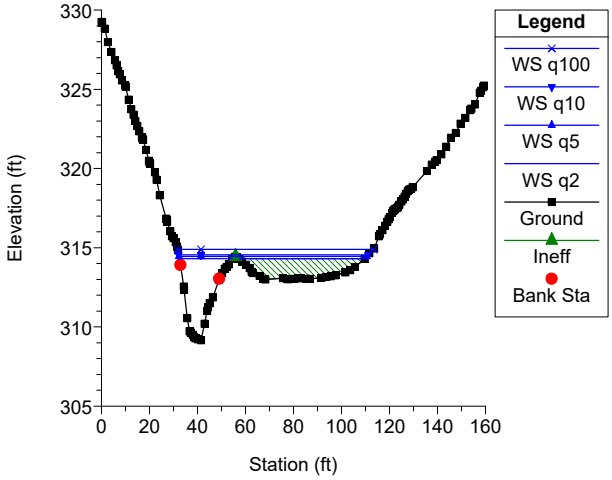
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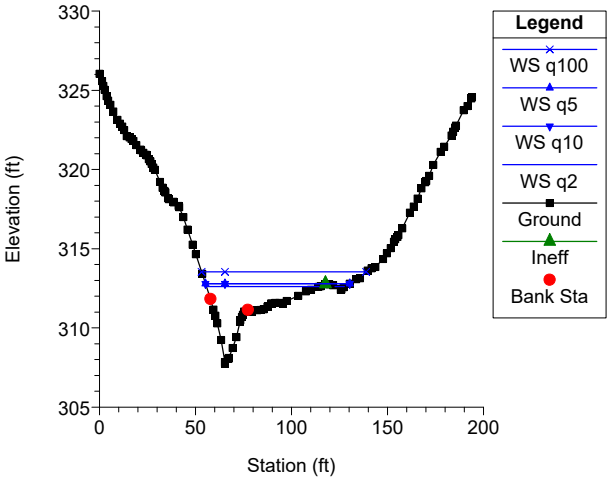
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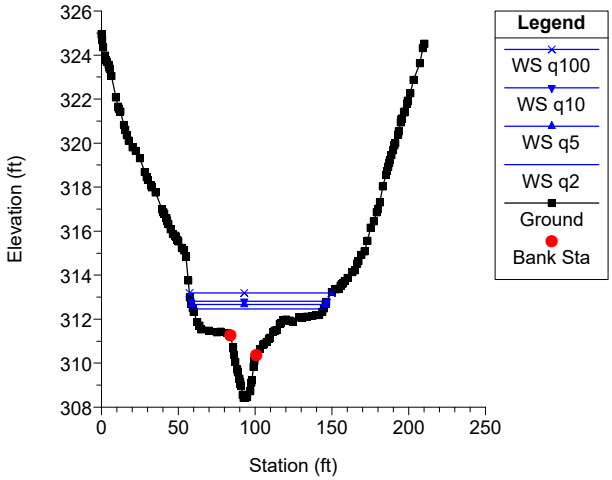
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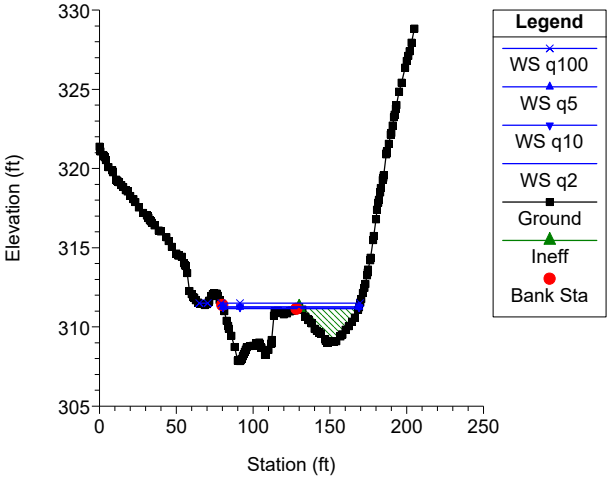
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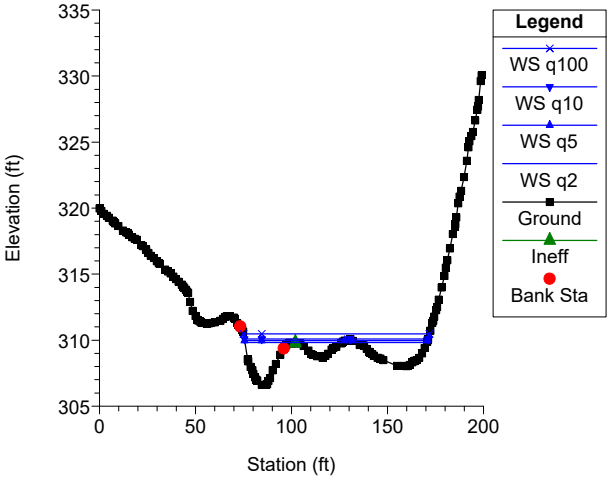
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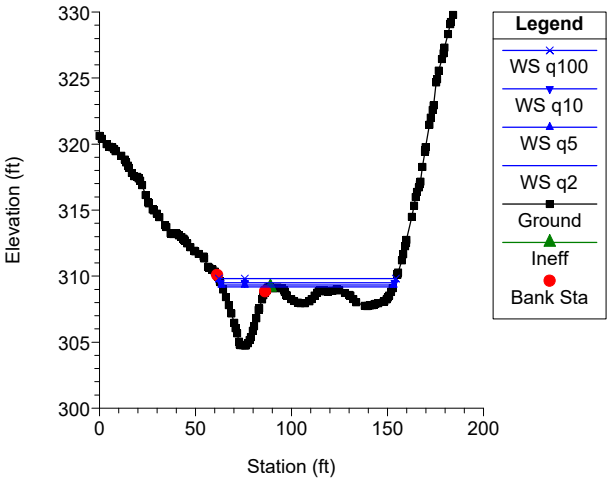
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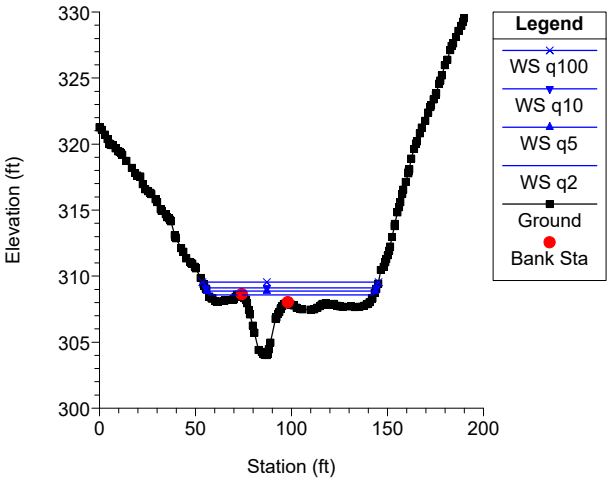
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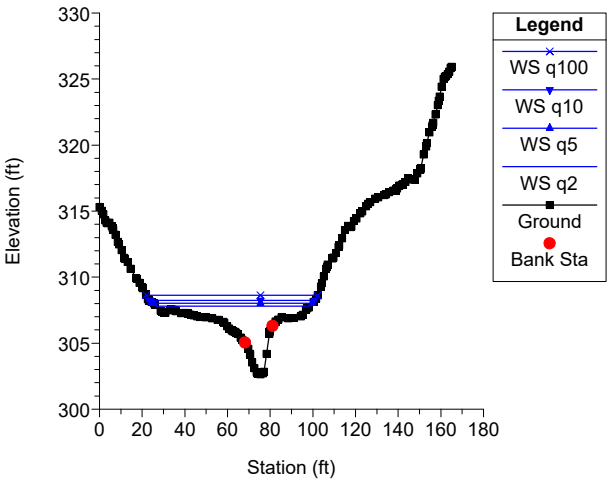
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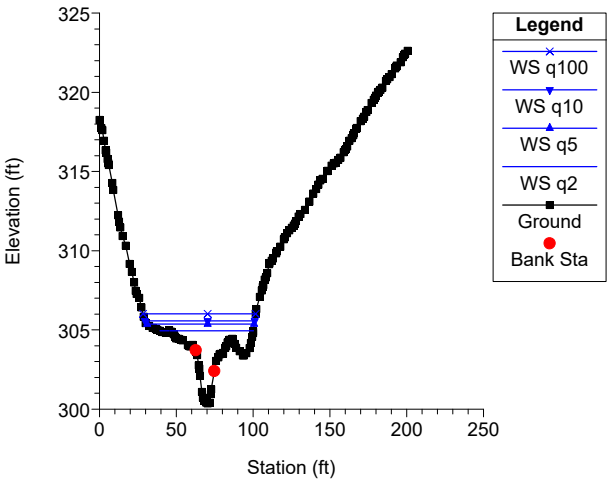
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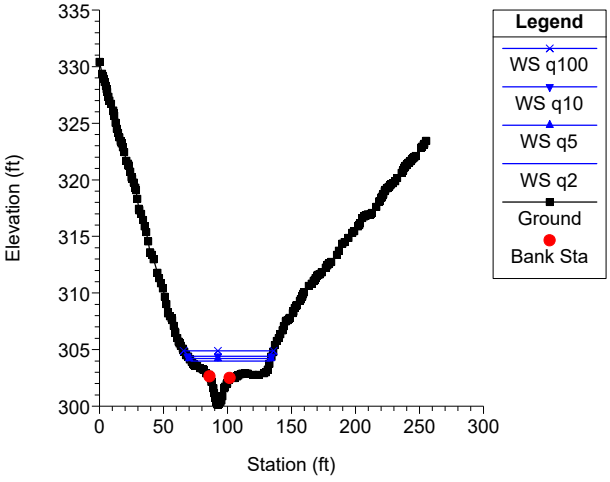
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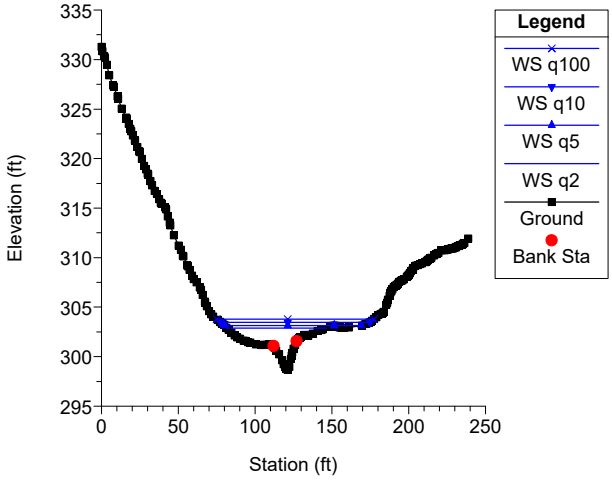
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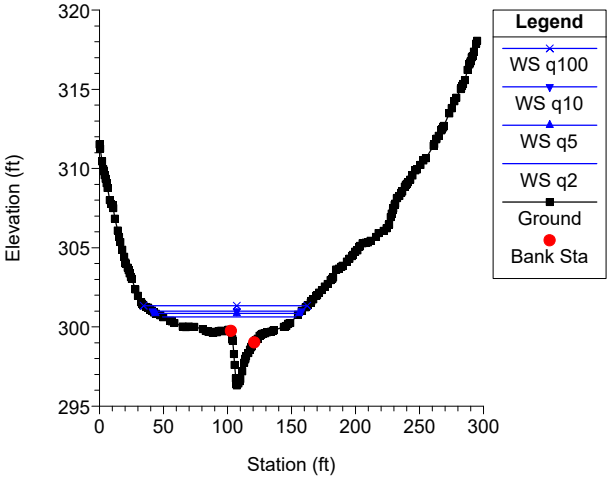
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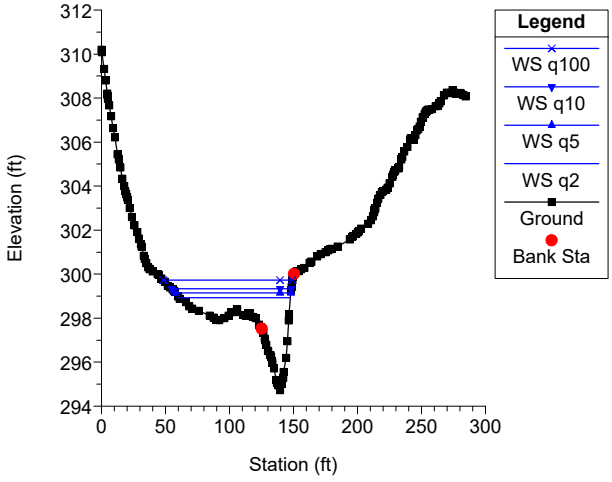
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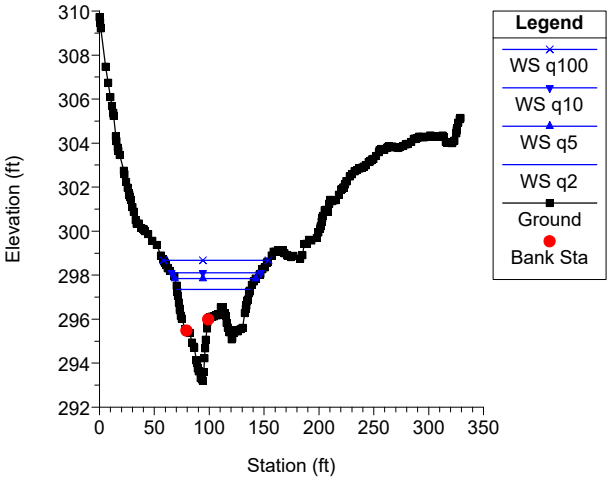
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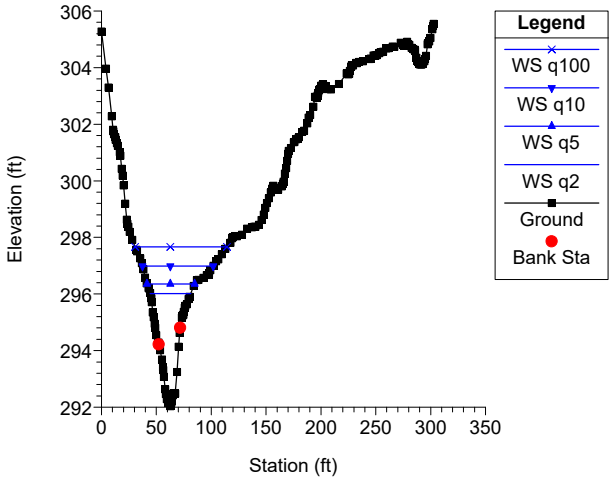
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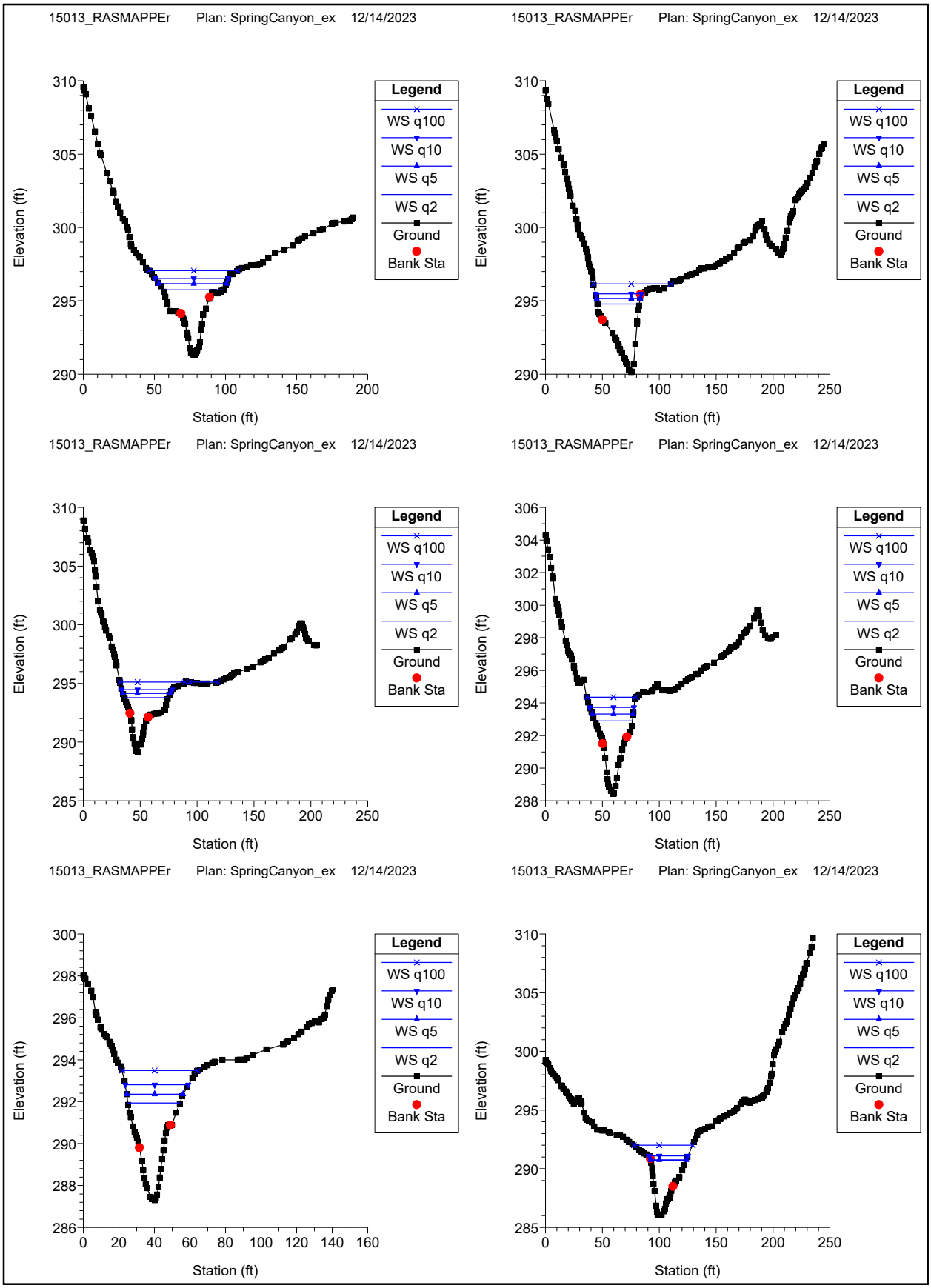


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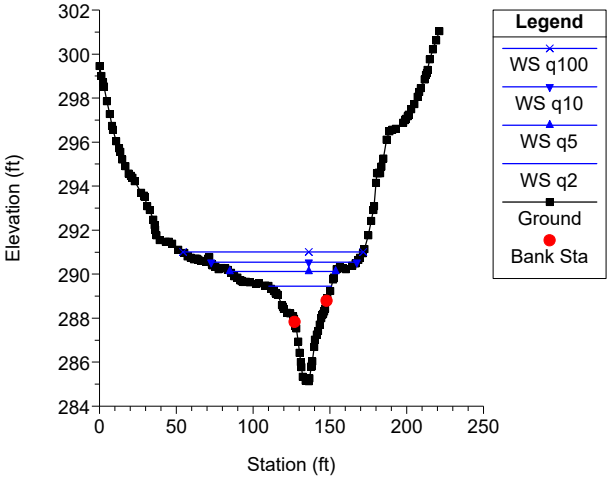


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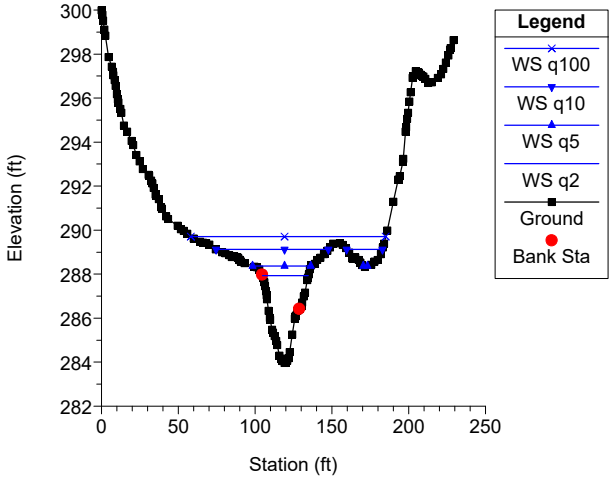



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Elevation (ft)
Station (ft)
Legend
WS q100
WS q10
WS q5
WS q2
Ground
Bank Sta
15013_RASMAPPEr Plan: SpringCanyon_ex 12/14/2023
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Station (ft)
Legend
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WS q10
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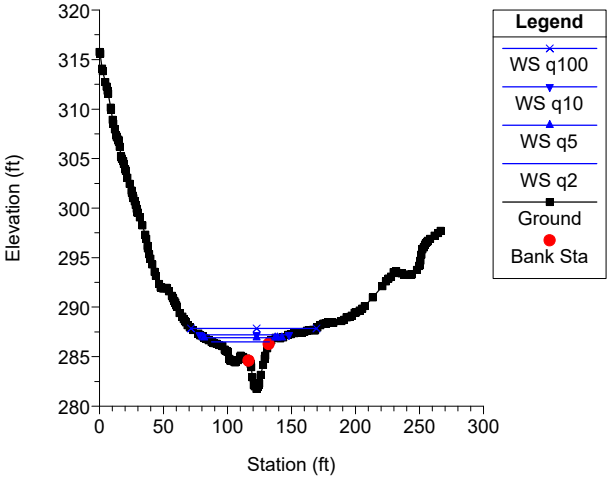
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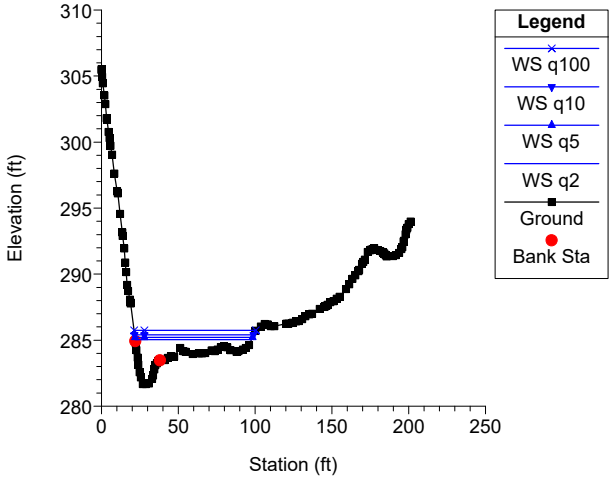
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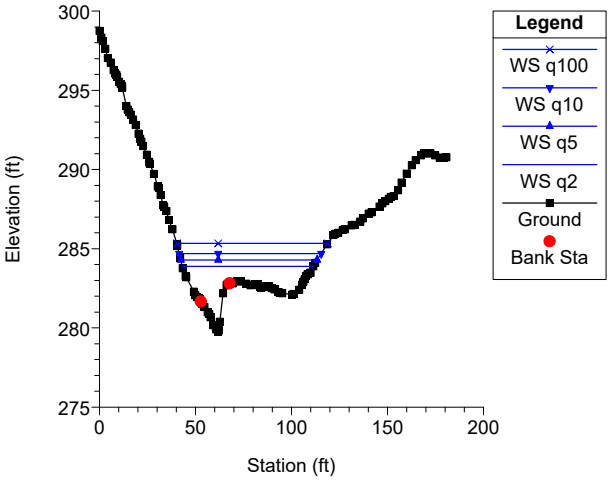
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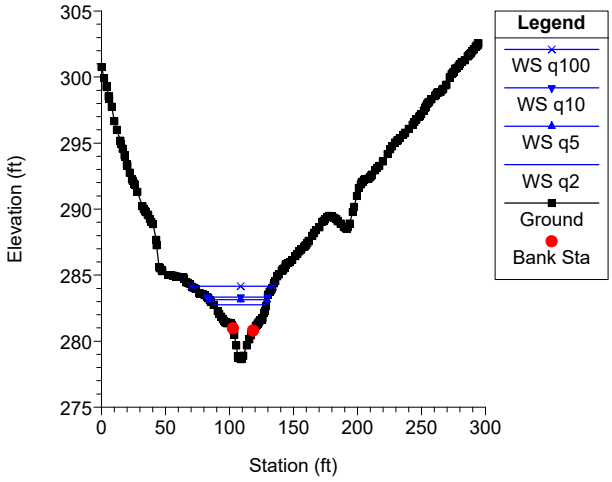
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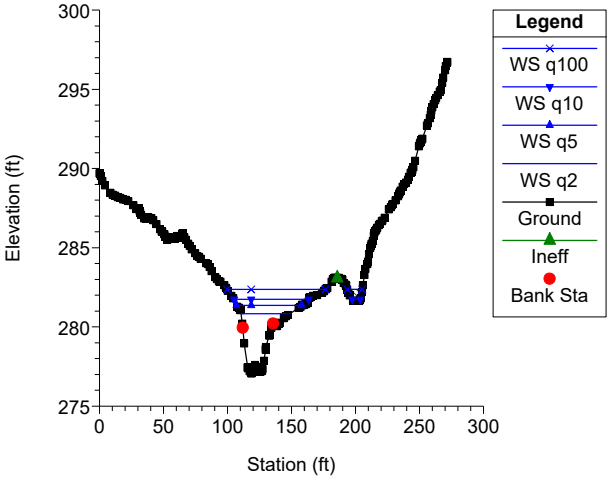
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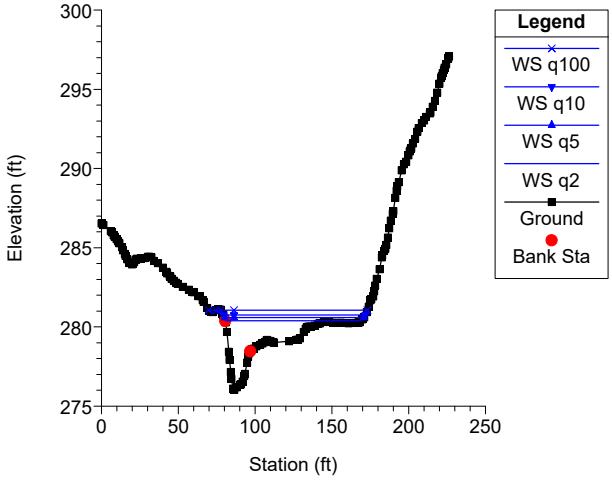
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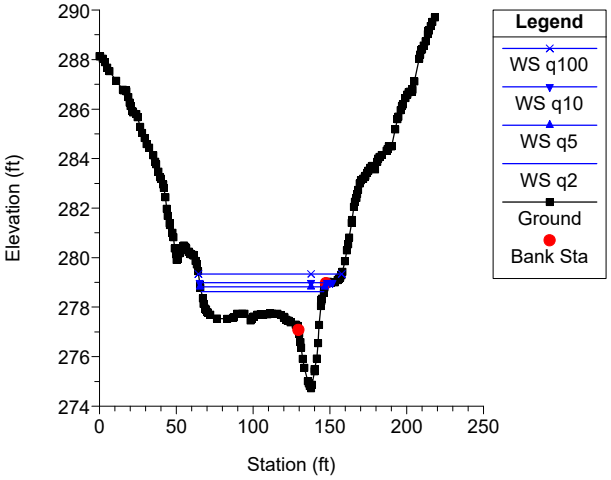
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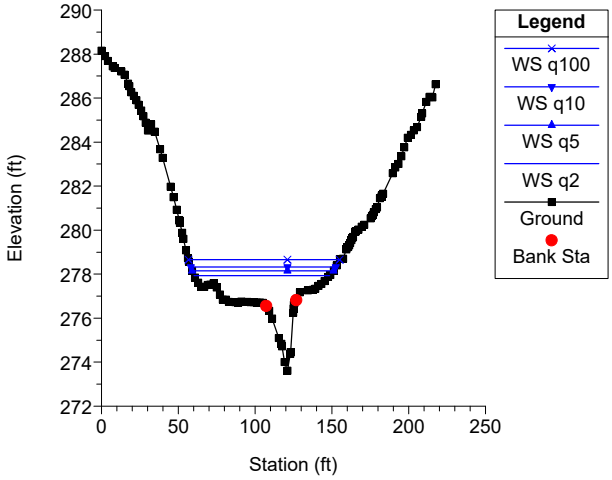
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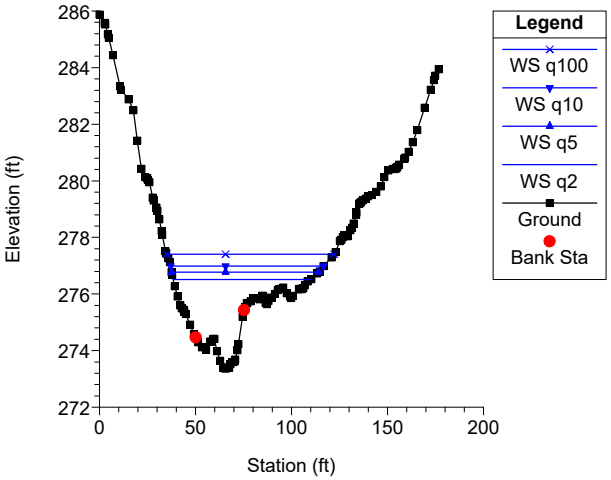
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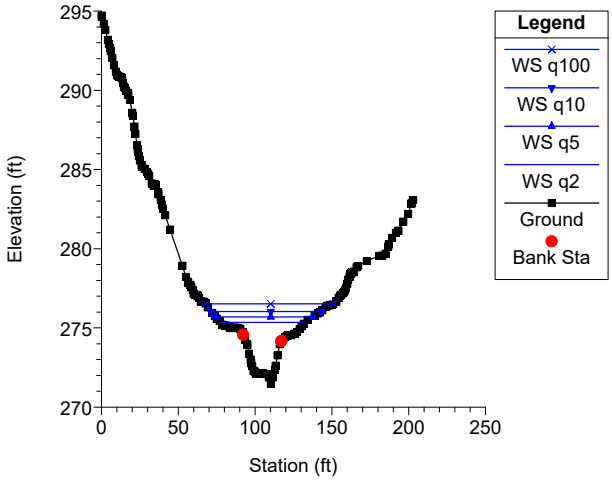
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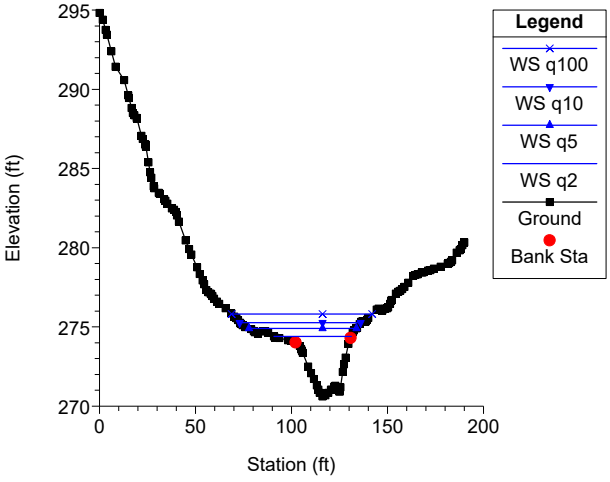
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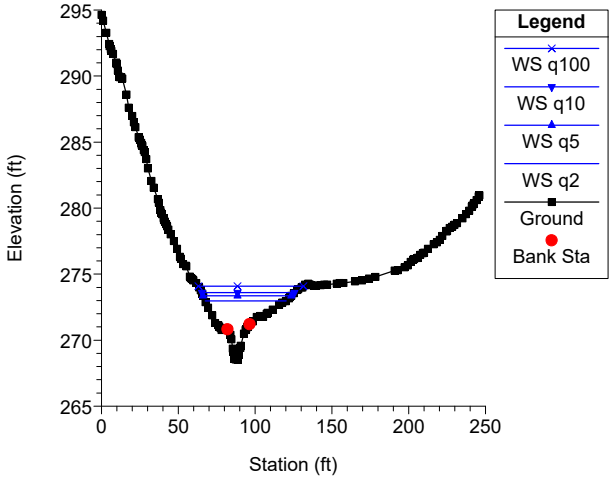
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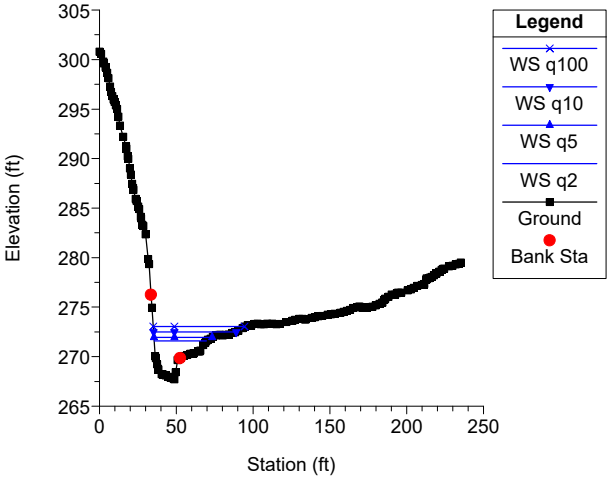
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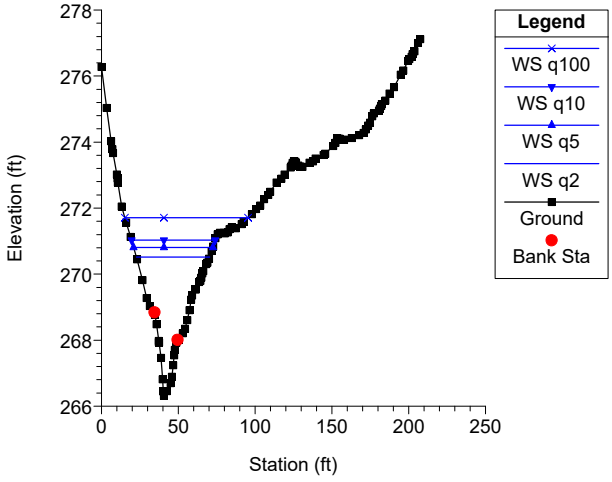
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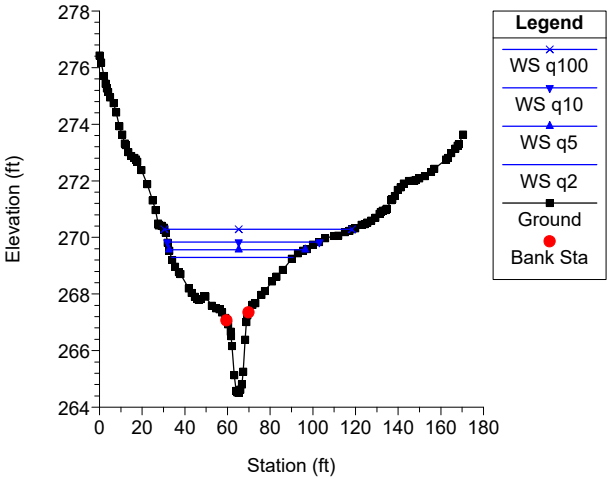
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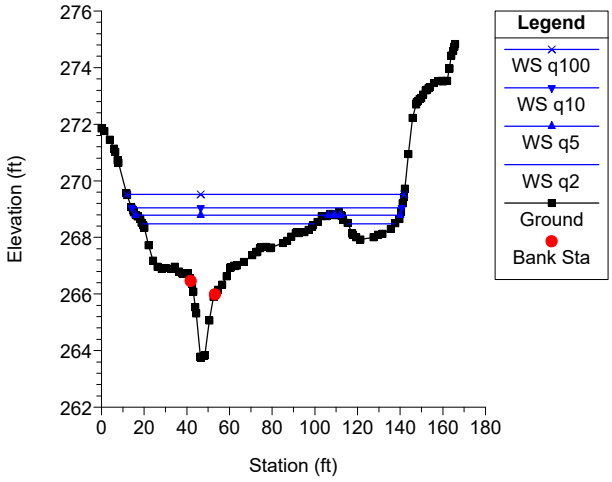
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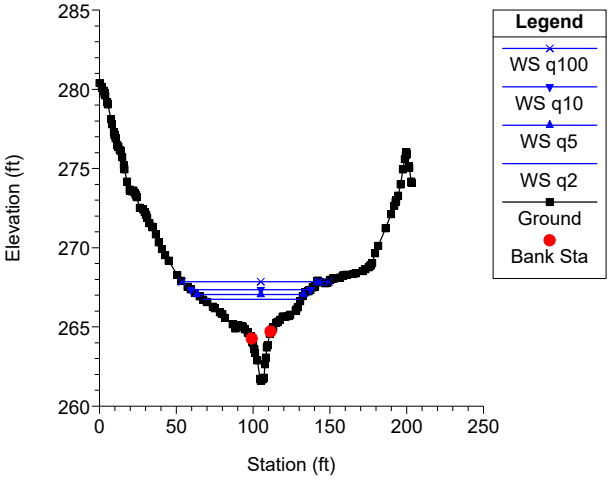
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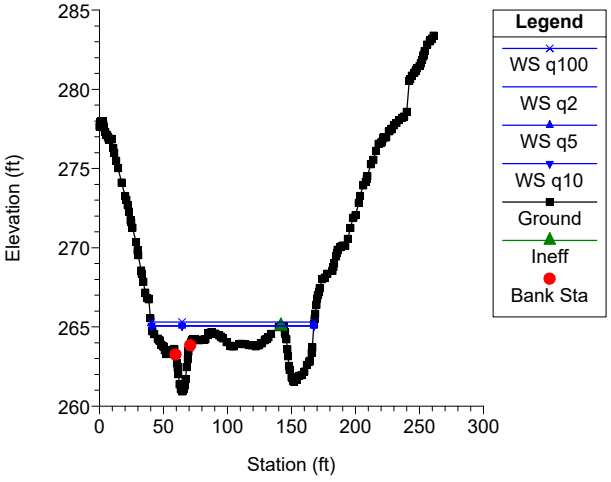
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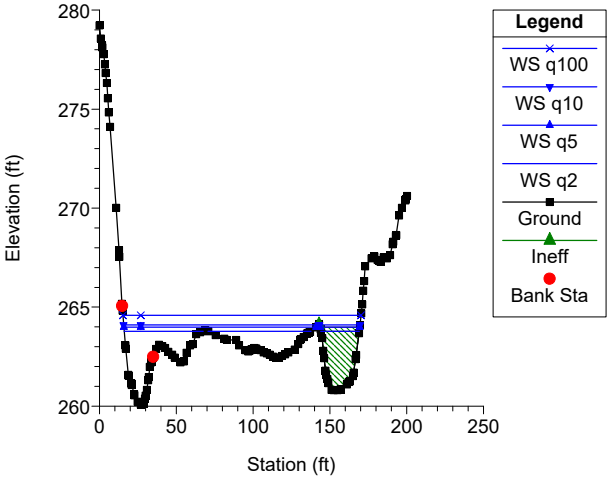
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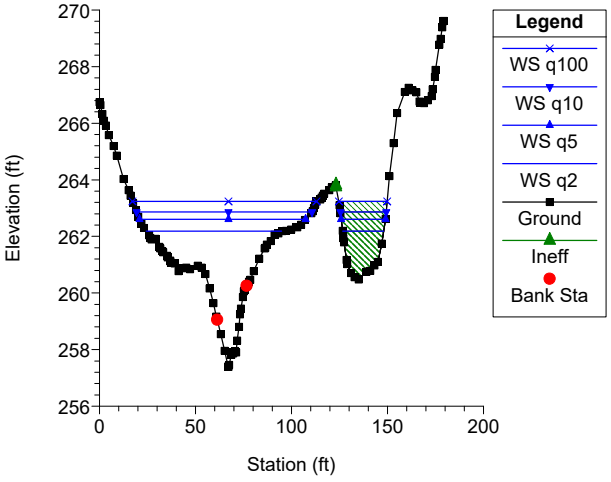
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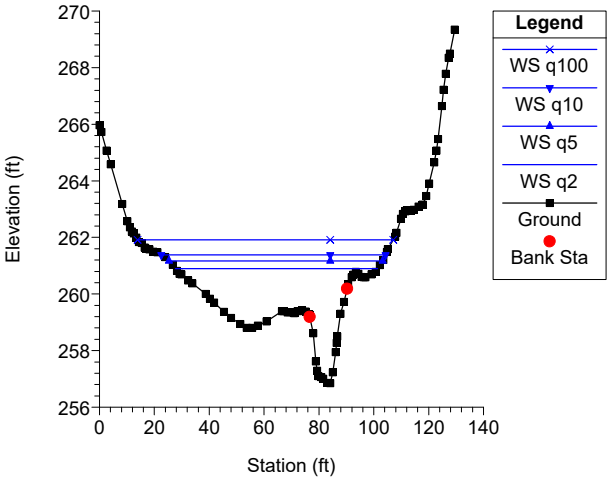
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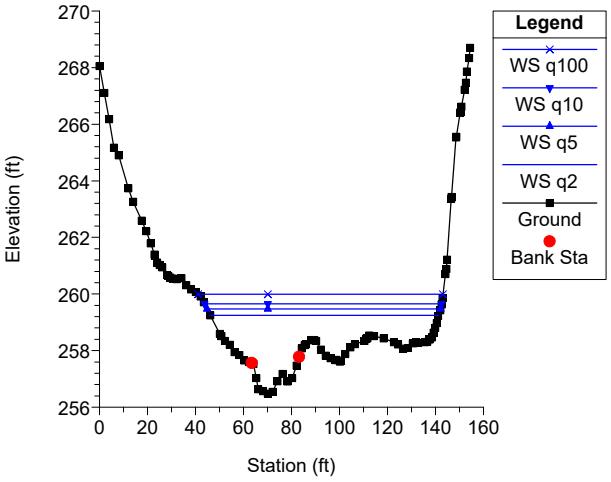
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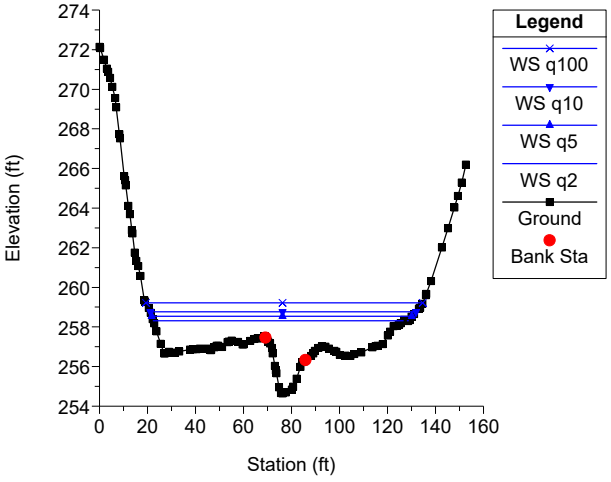
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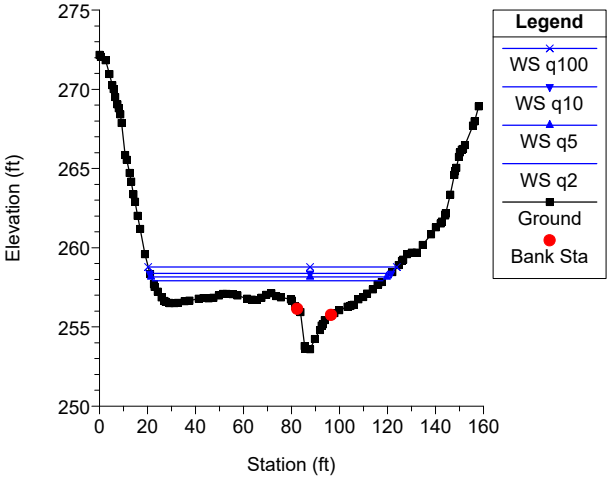
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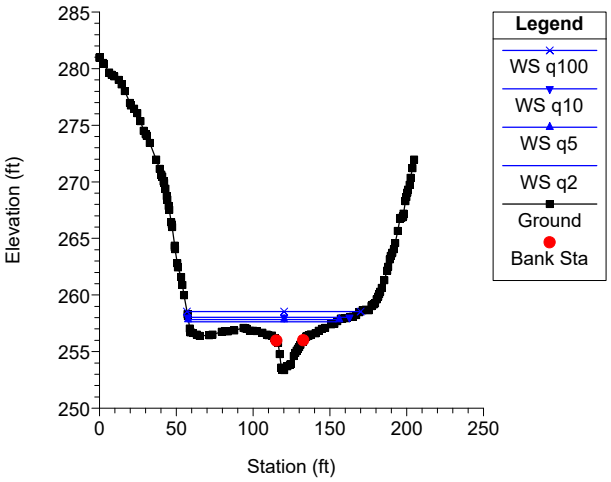
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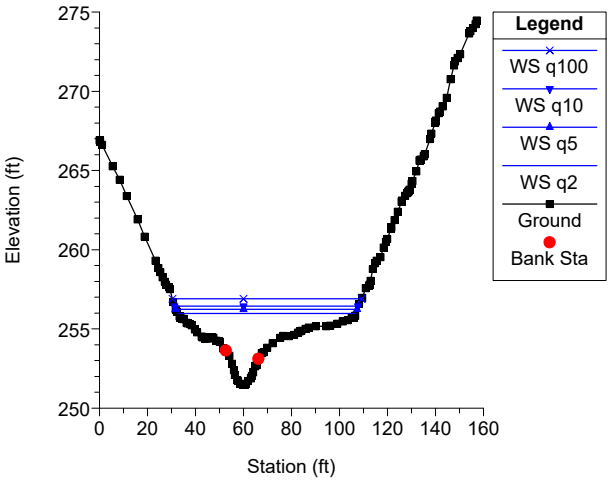
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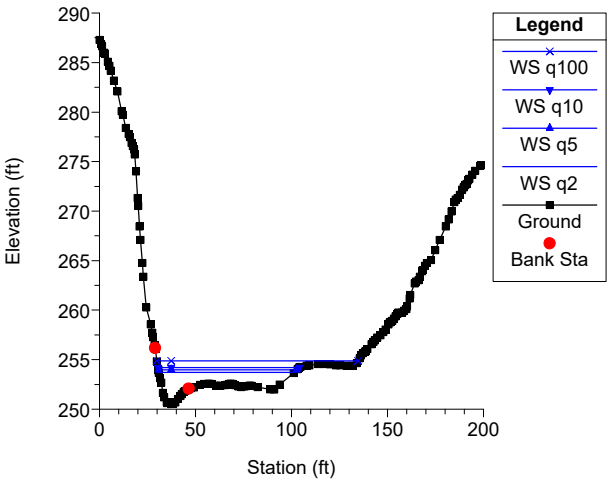
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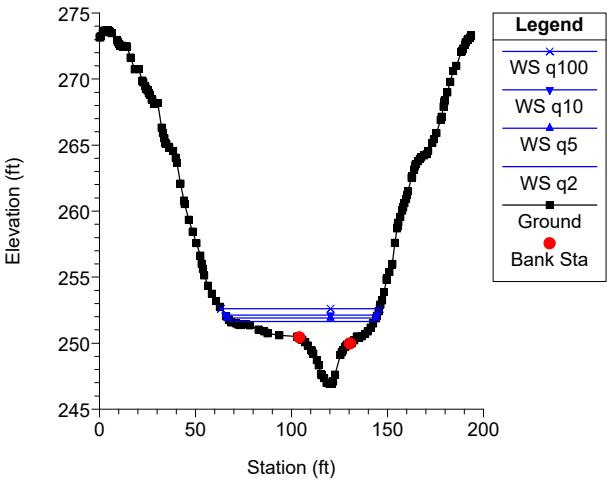
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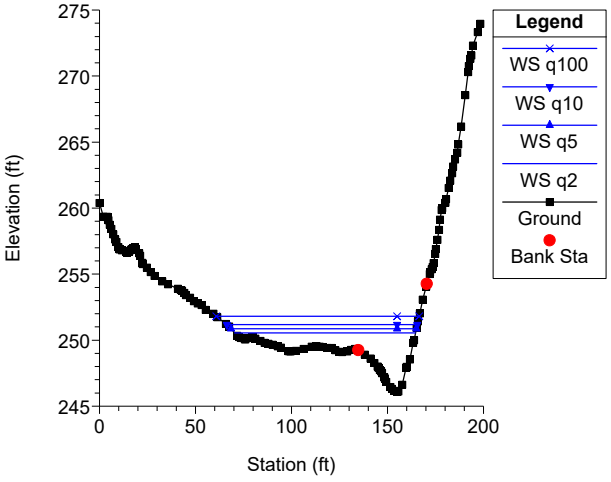
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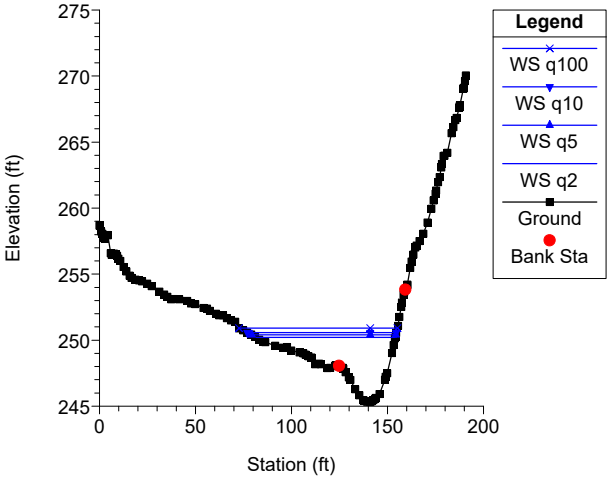
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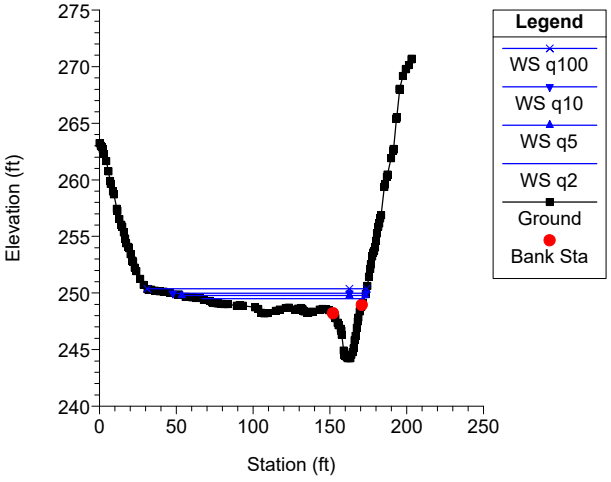
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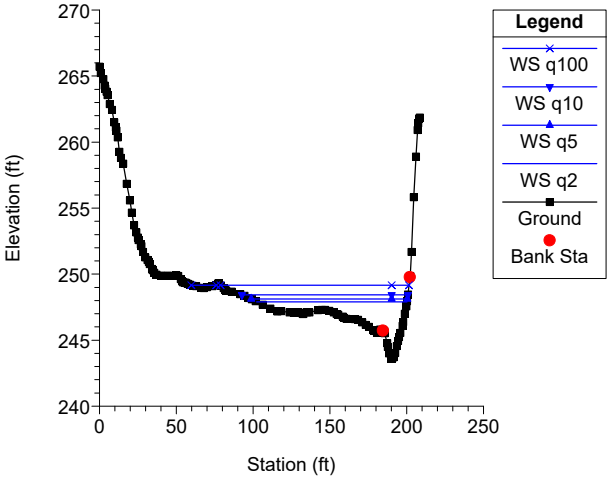
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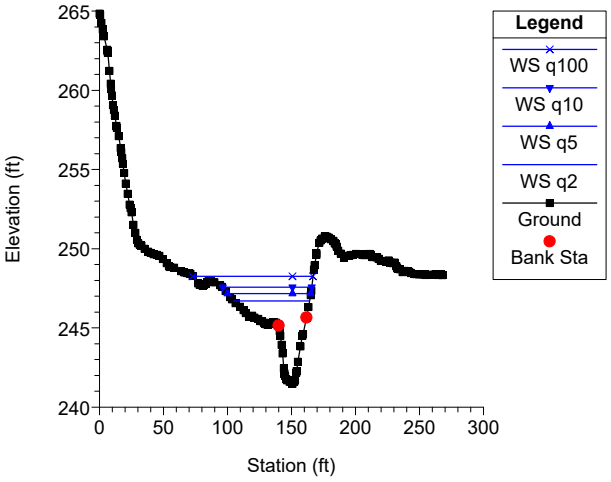
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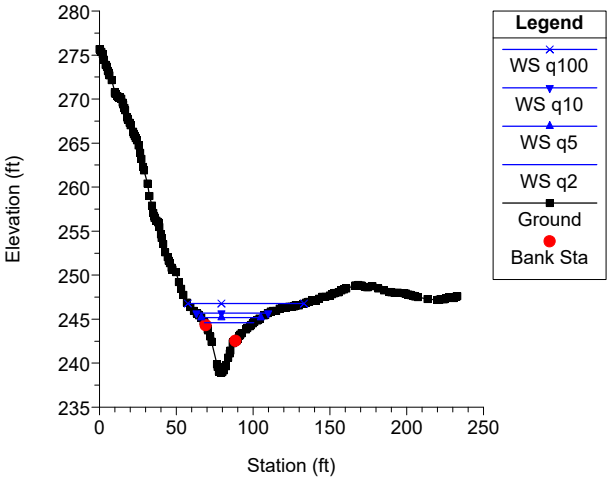
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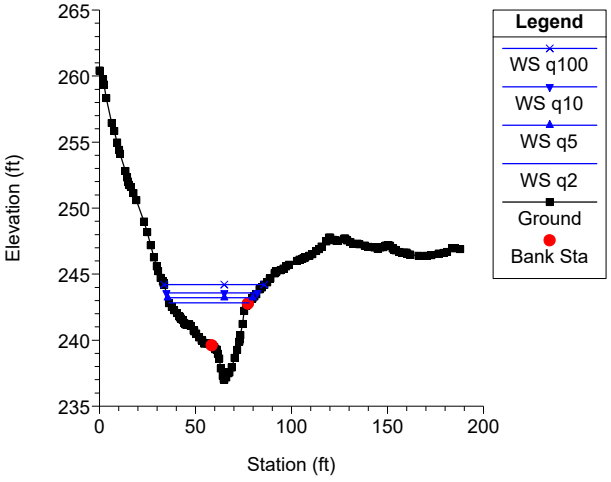
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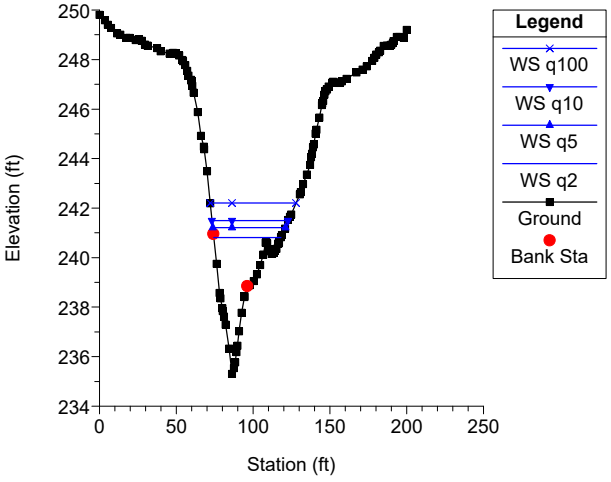
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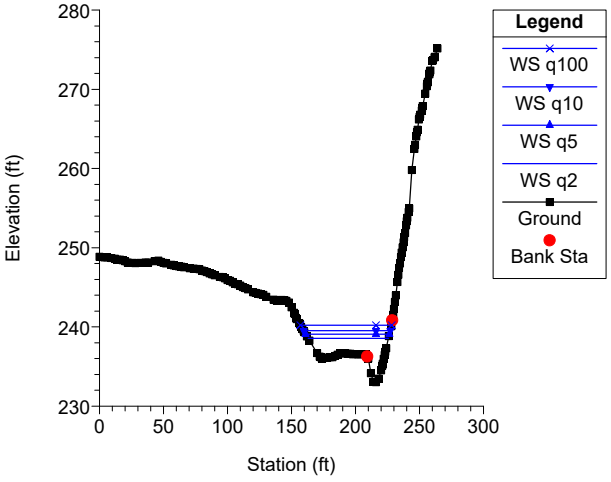
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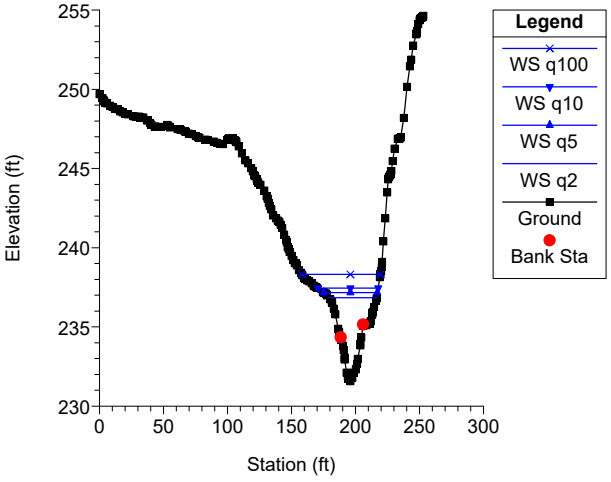
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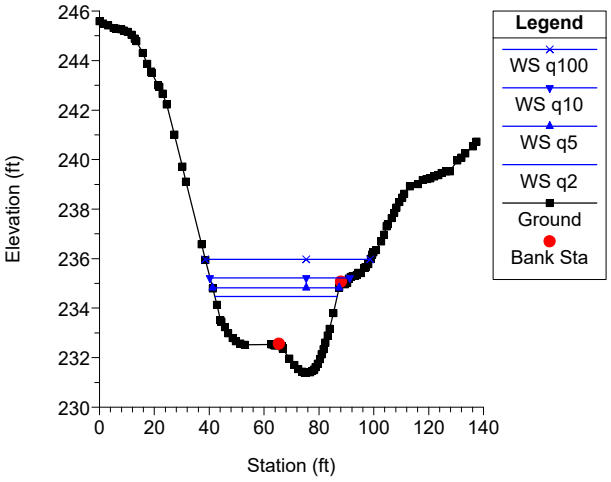
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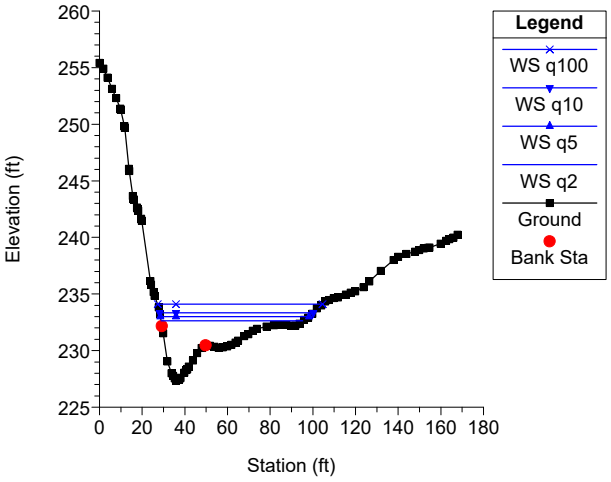
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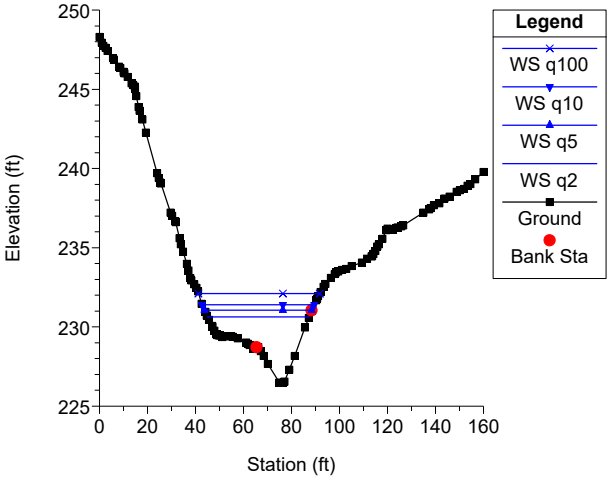
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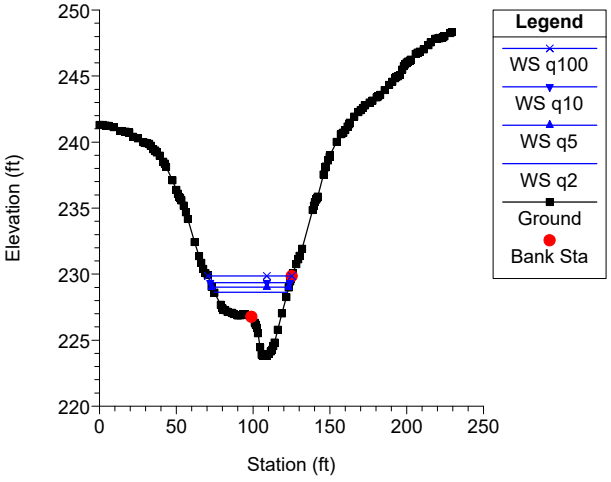
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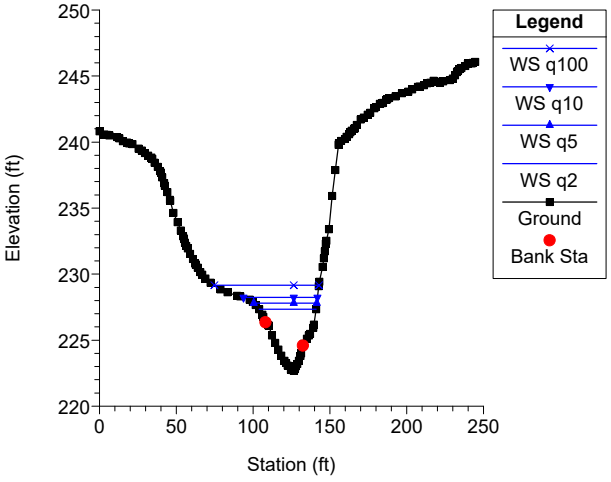
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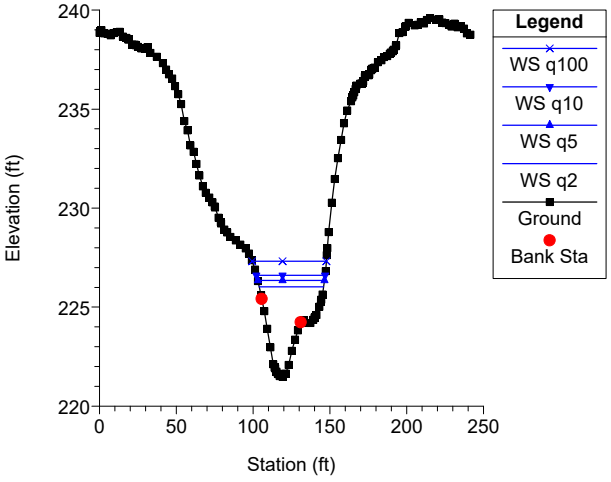
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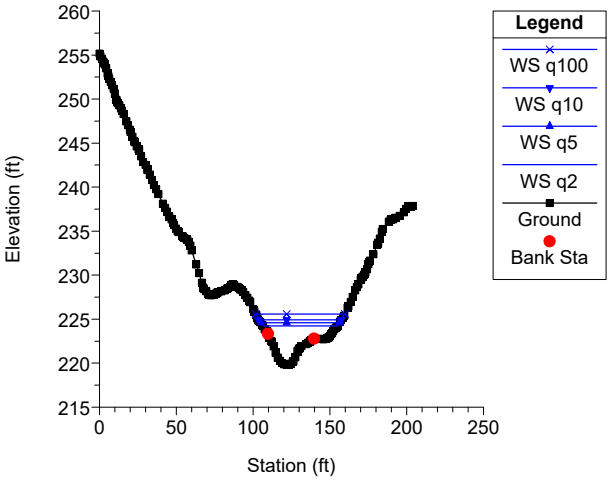
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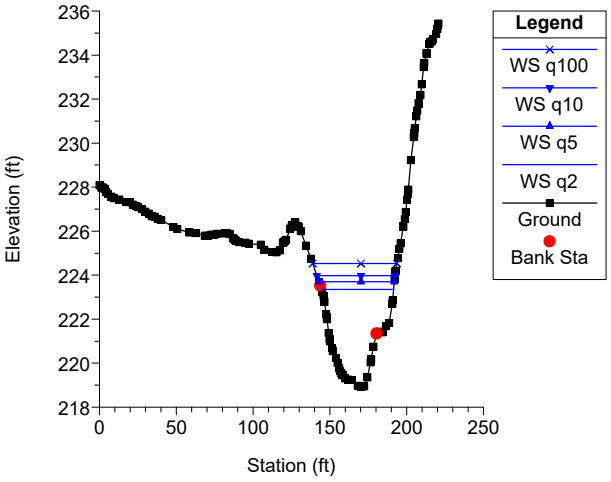
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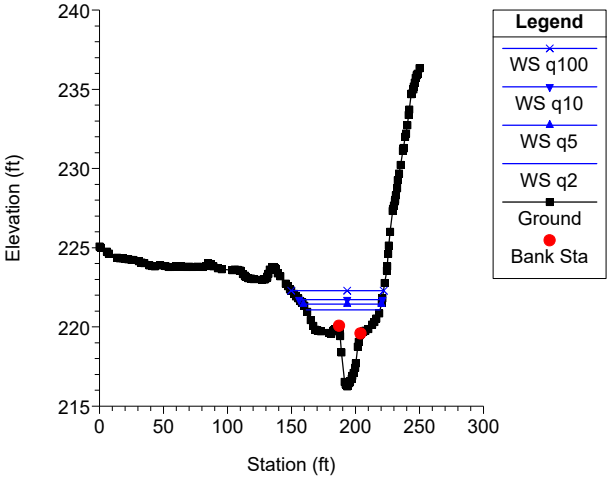
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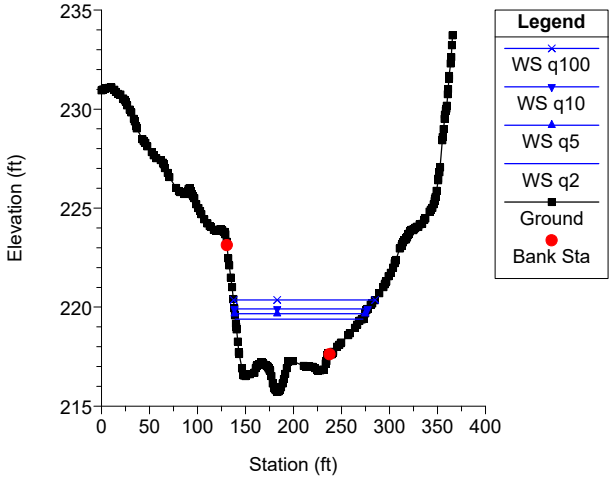
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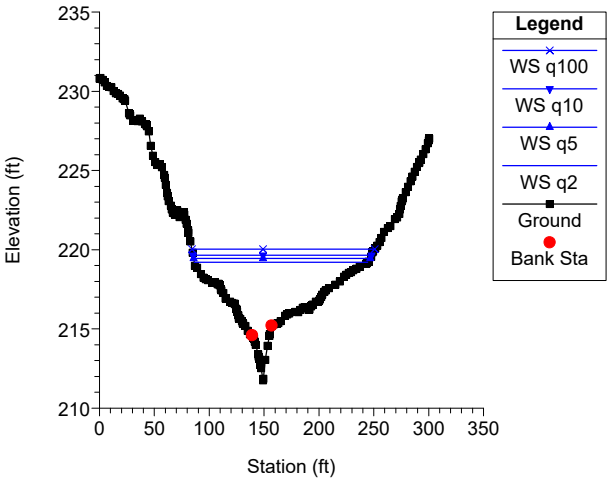
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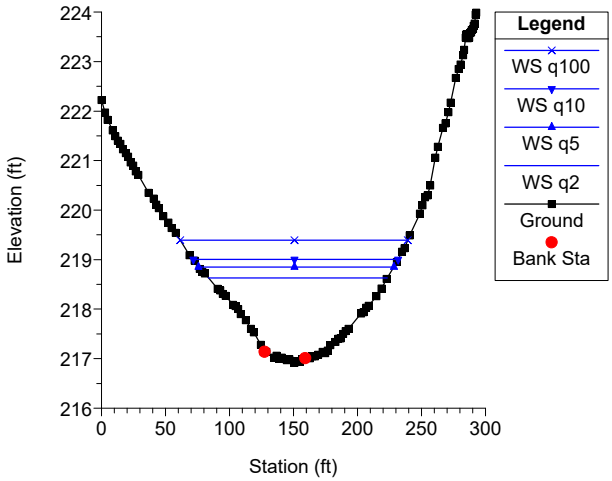
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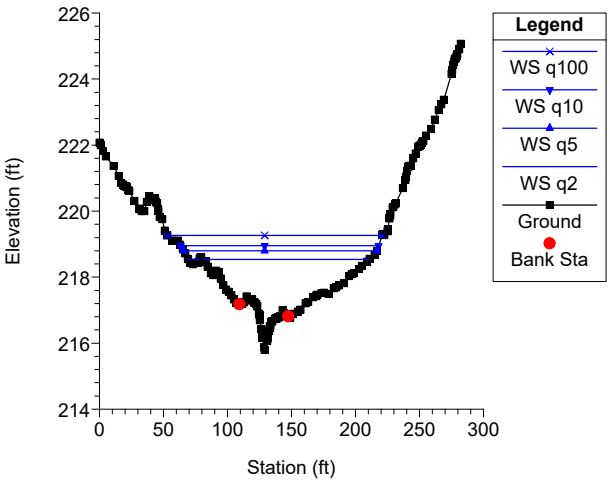
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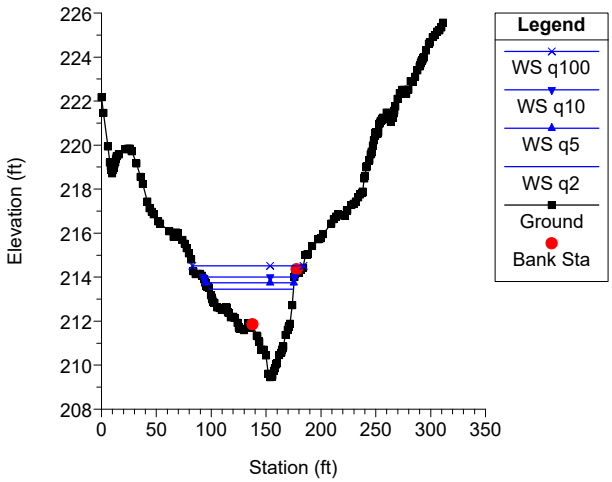
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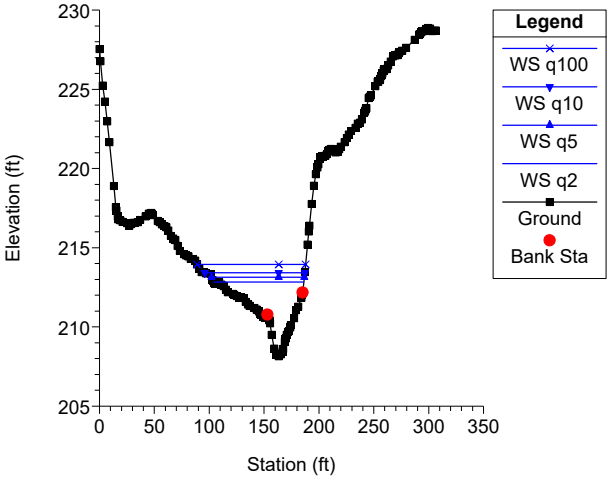
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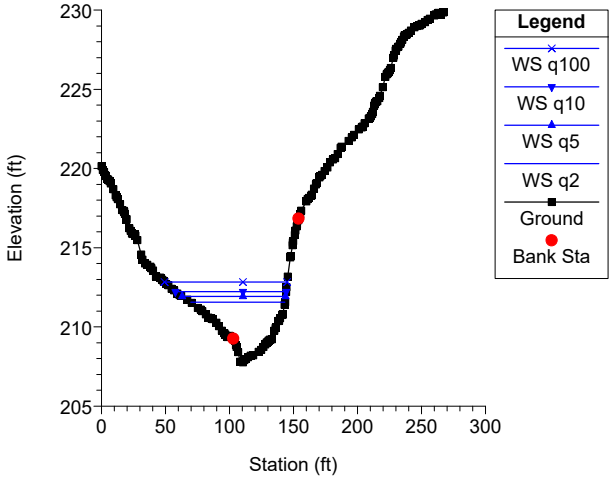
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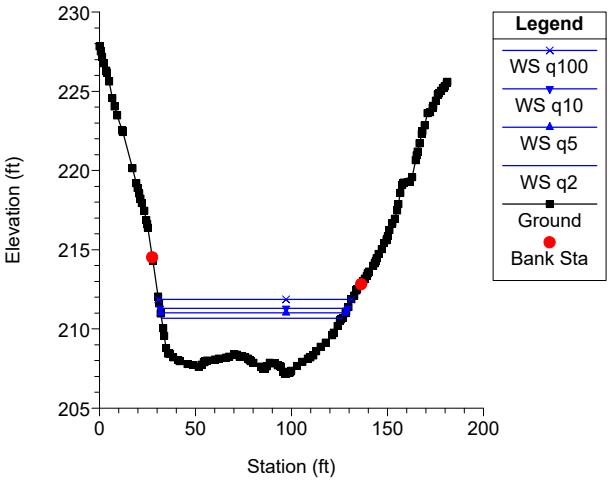
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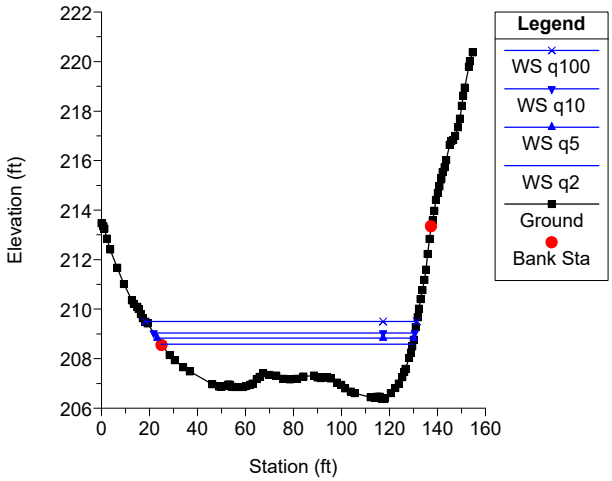
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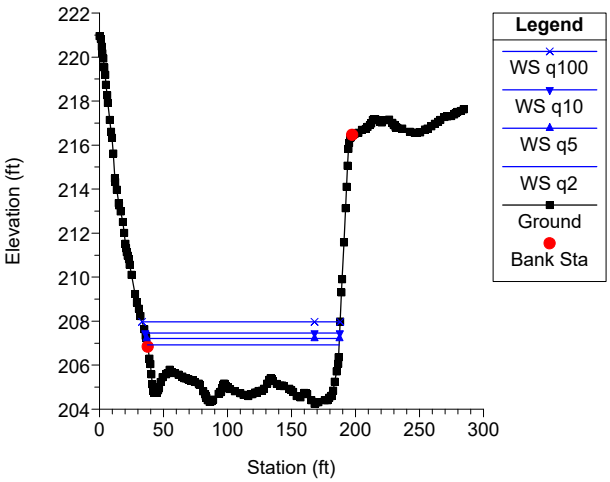
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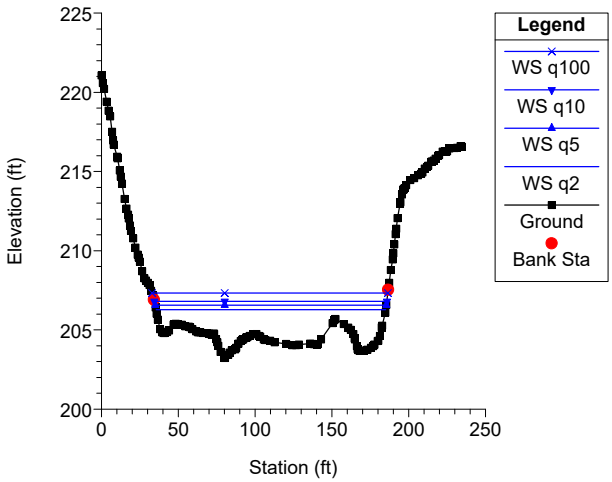
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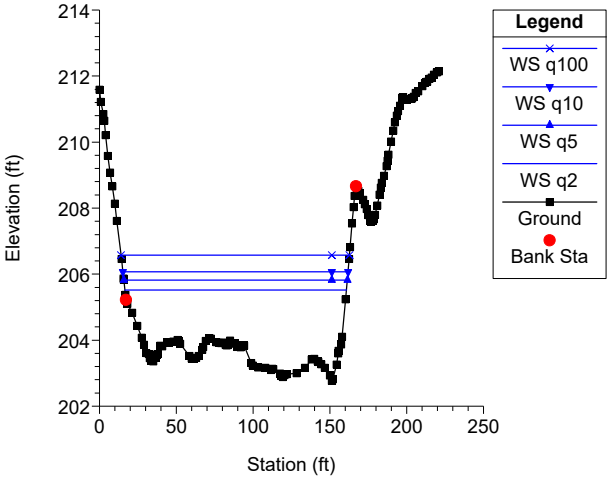
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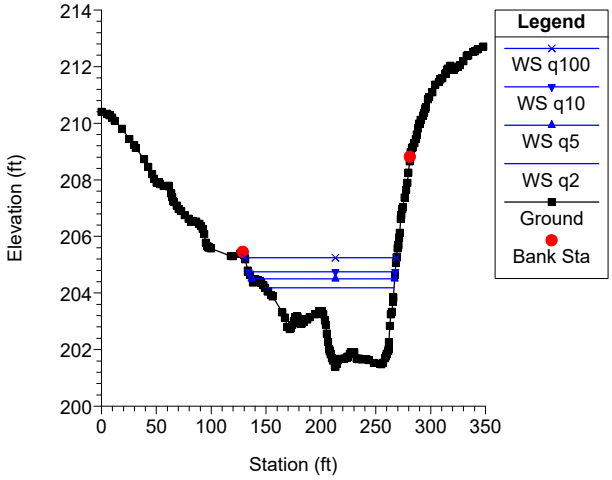
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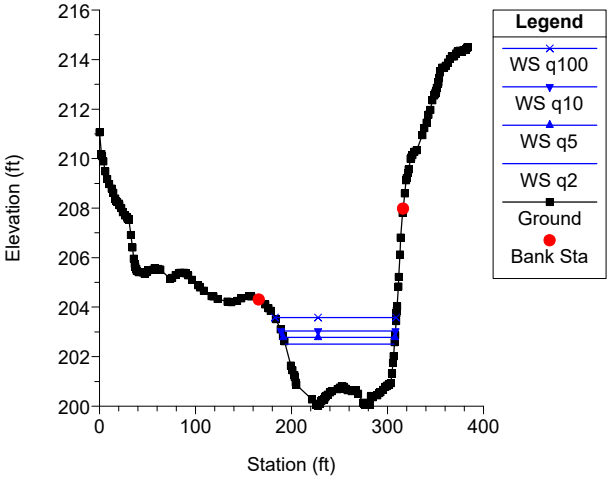
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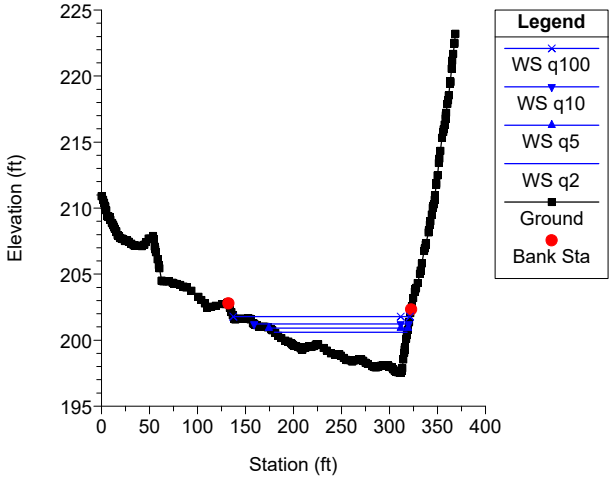
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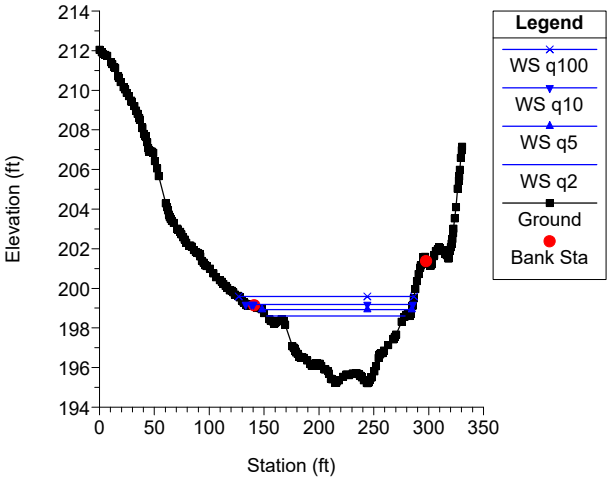
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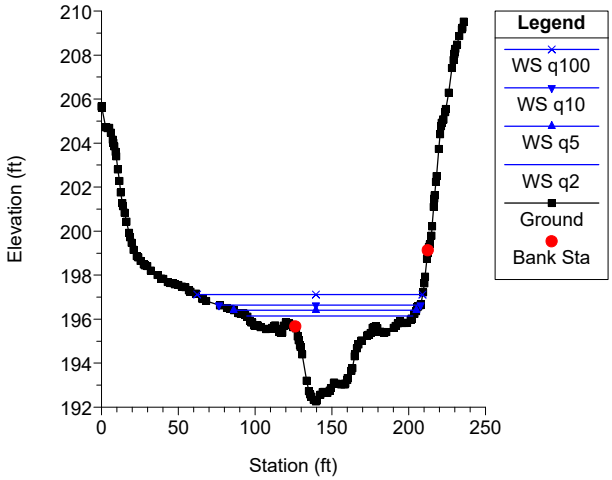
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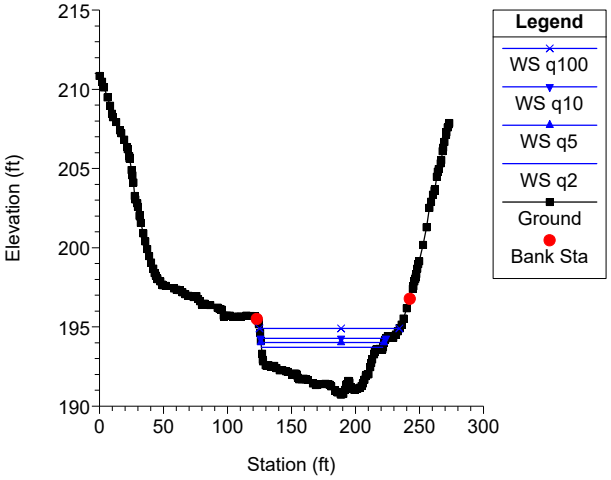
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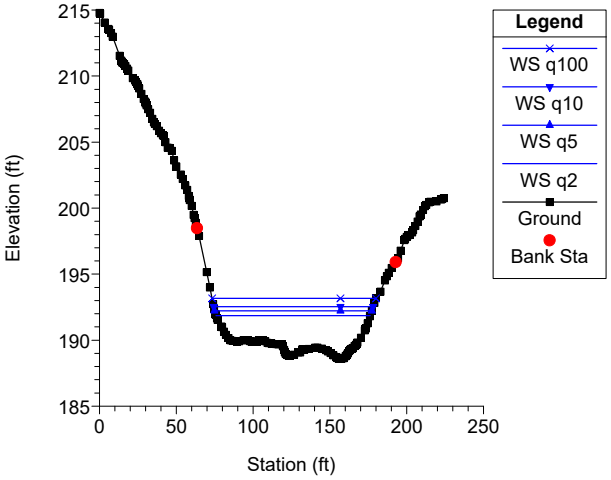
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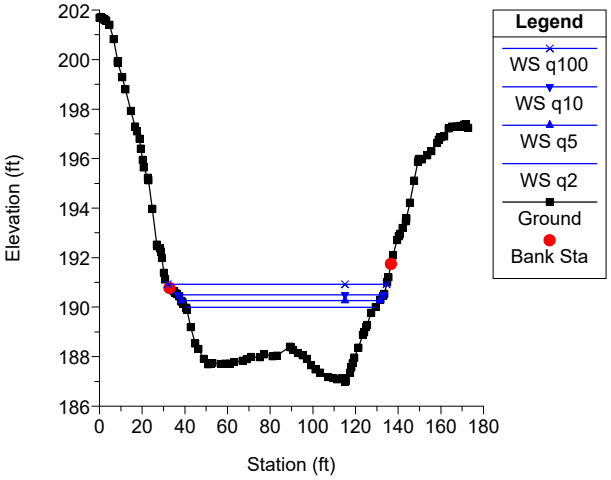
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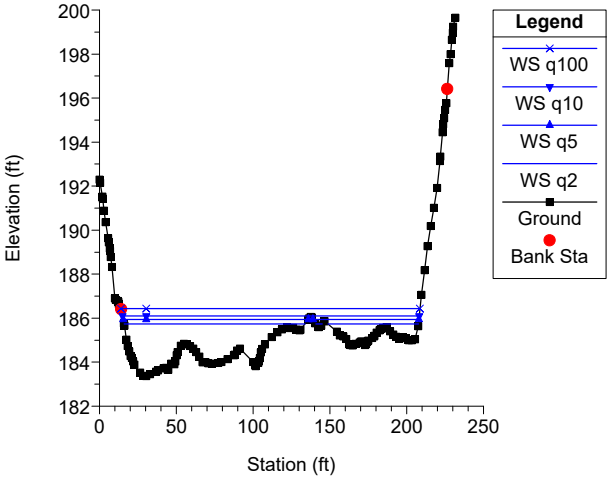
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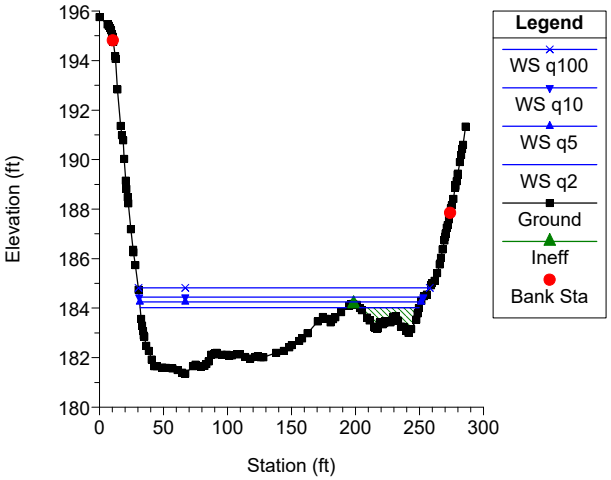
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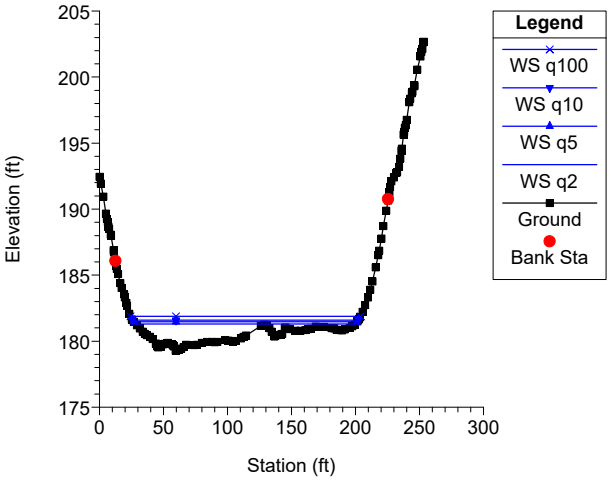
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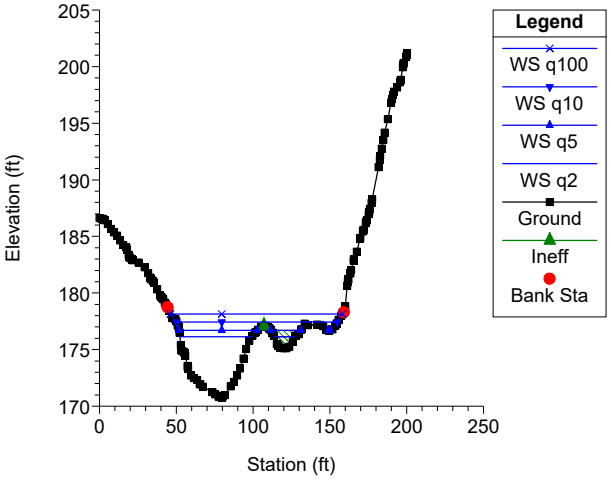
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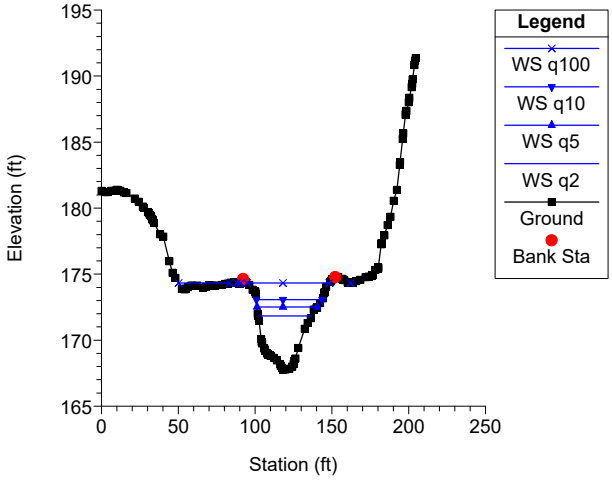
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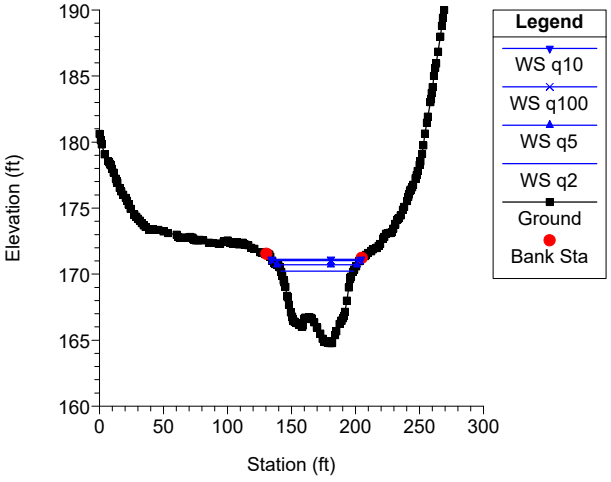
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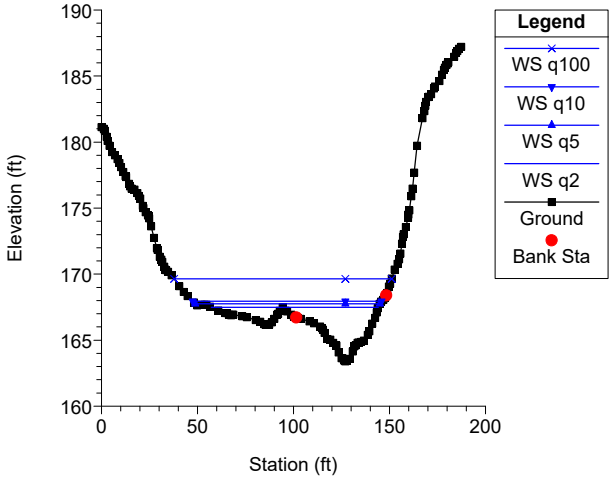
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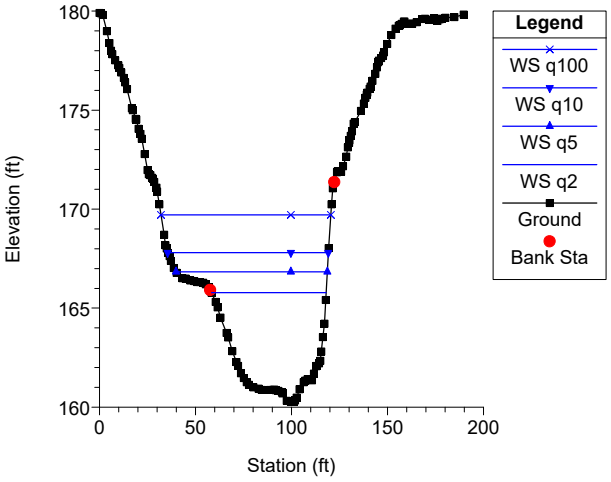
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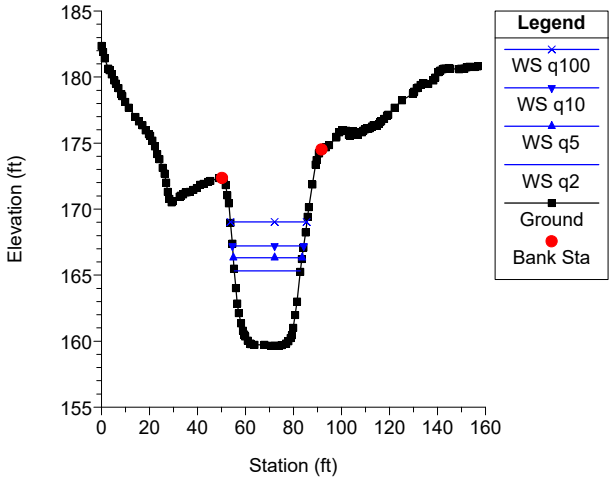
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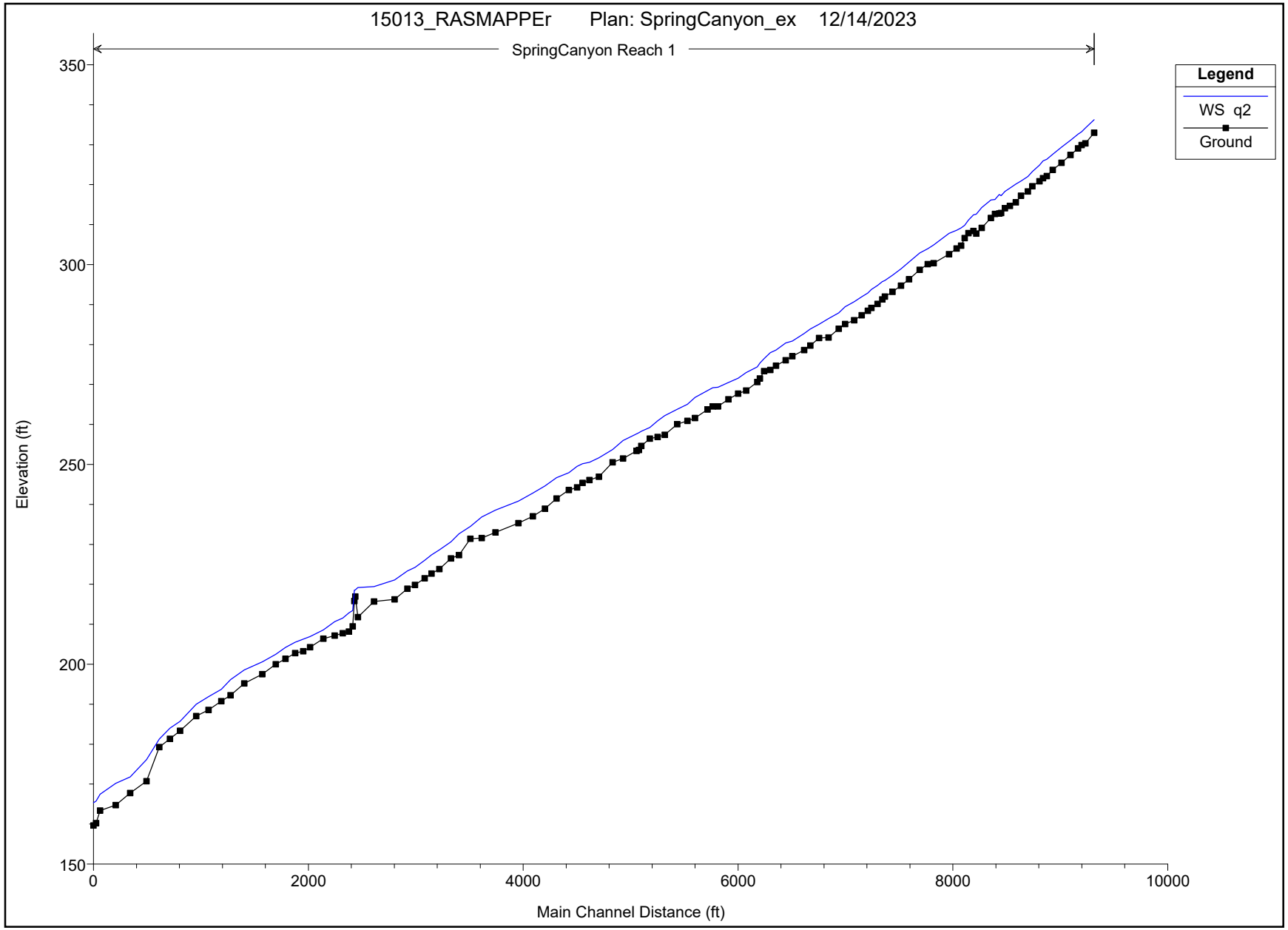


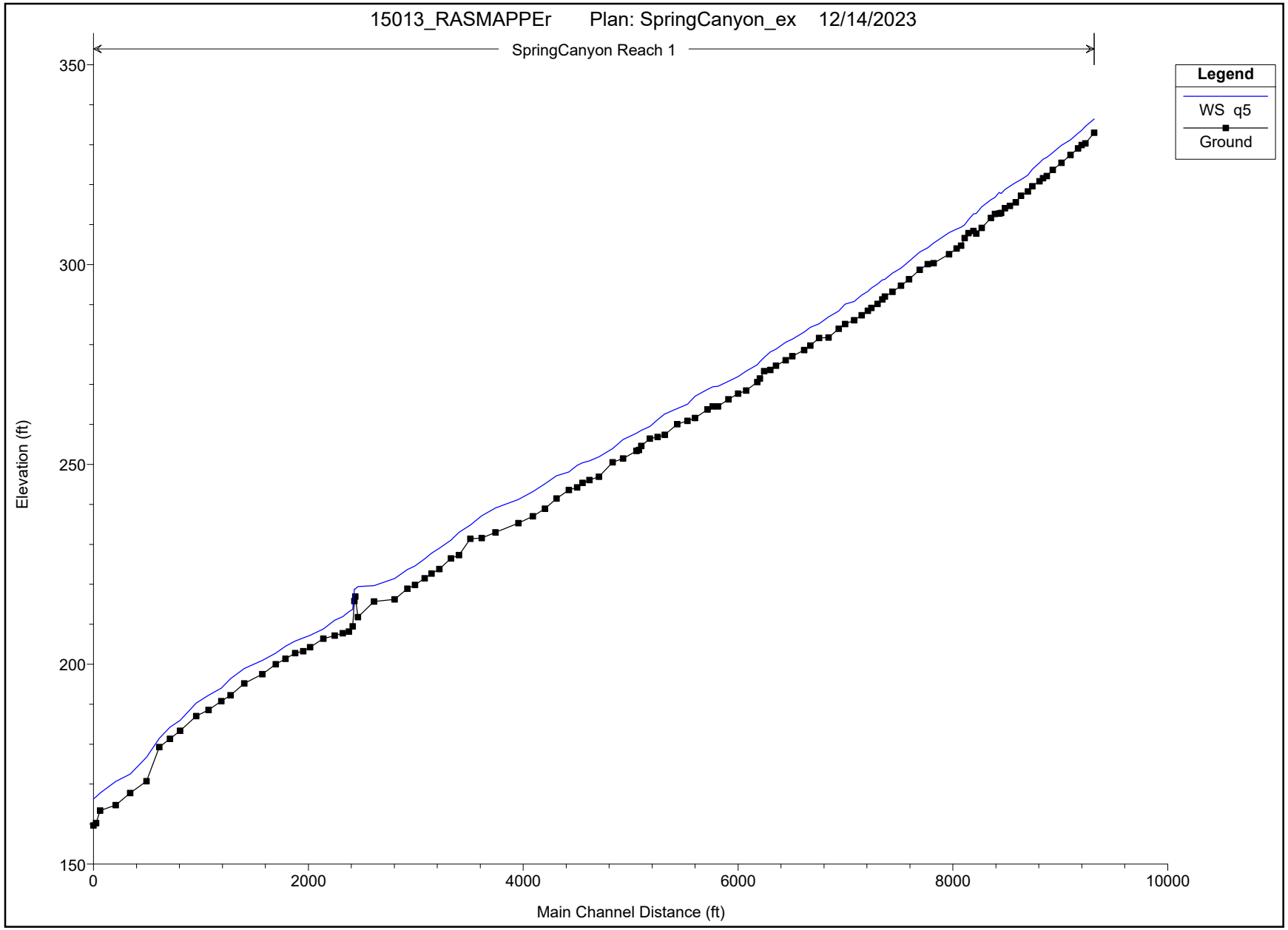
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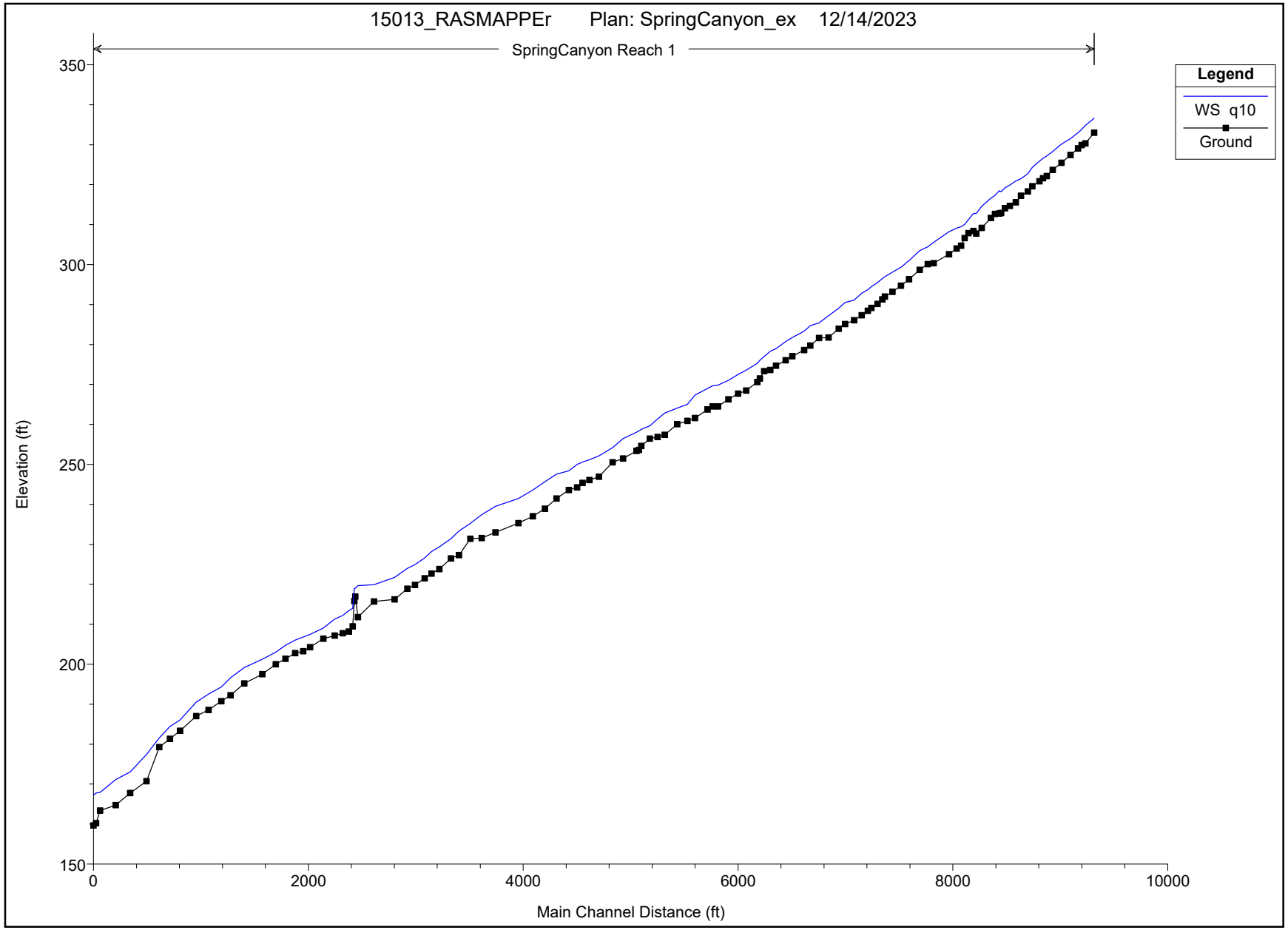


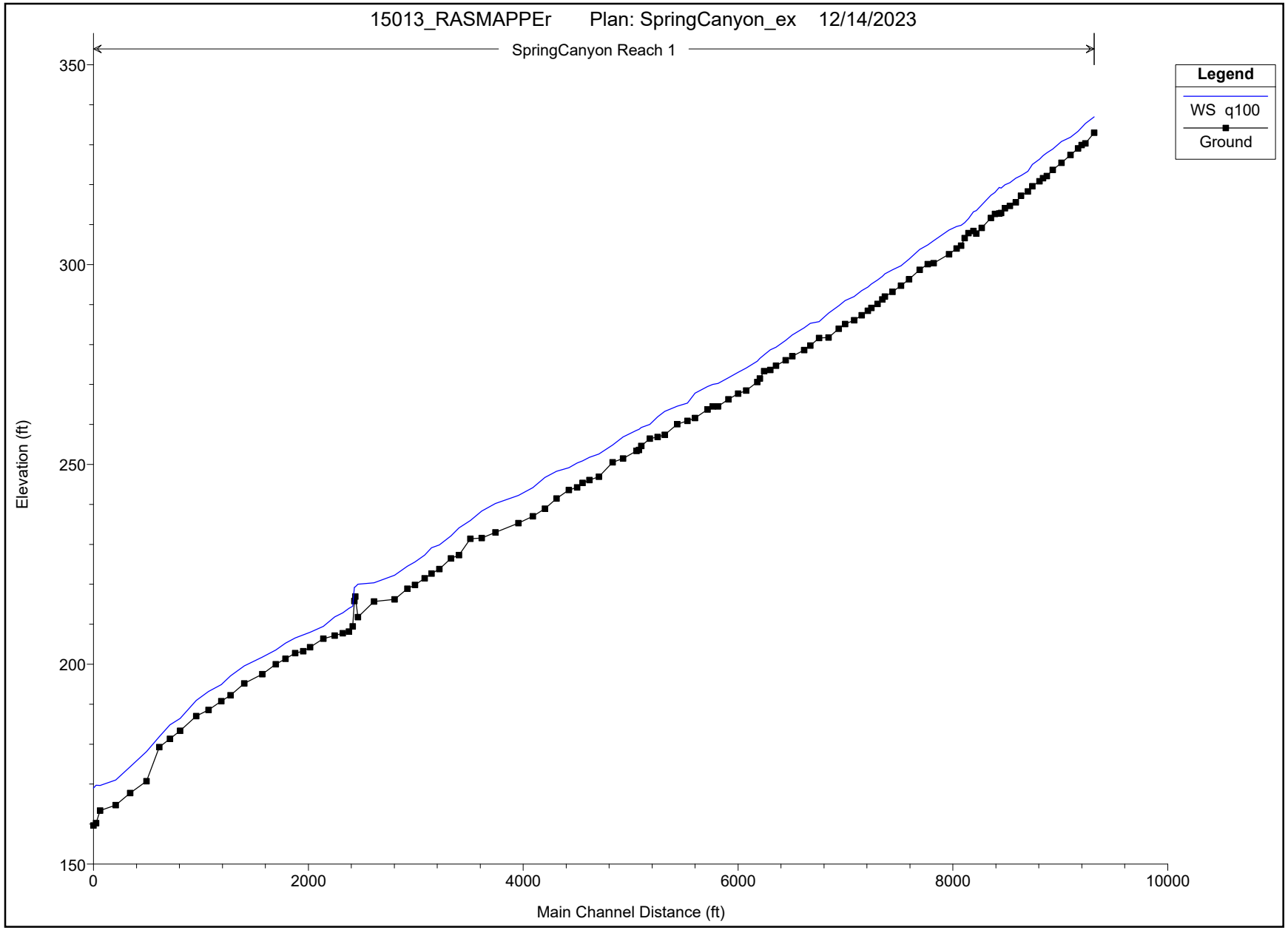
15013_RASMAPPEr Plan: SpringCanyon_ex 12/14/2023




15013_RASMAPPEr Plan: SpringCanyon_ex 12/14/2023
SpringCanyon Reach 1
Legend
WS q2
Ground
Elevation (ft)
350
300
250
200
150
0
2000
4000
6000
8000
10000
Main Channel Distance (ft)


15013_RASMAPPEr Plan: SpringCanyon_ex 12/14/2023
SpringCanyon Reach 1
Legend
WS q5
Ground
Elevation (ft)
350
300
250
200
150
0
2000
4000
6000
8000
10000
Main Channel Distance (ft)


15013_RASMAPPEr Plan: SpringCanyon_ex 12/14/2023
SpringCanyon Reach 1
Legend
WS q10
Ground
Elevation (ft)
350
300
250
200
150
0
2000
4000
6000
8000
10000
Main Channel Distance (ft)


15013_RASMAPPEr Plan: SpringCanyon_ex 12/14/2023
SpringCanyon Reach 1
Legend
WS q100
Ground
Elevation (ft)
350
300
250
200
150
0
2000
4000
6000
8000
10000
Main Channel Distance (ft)

ATTACHMENT 14

Response to USFWS and CDFW Comments Emailed May 10, 2023 for the Nakano Project, City of San Diego, California

RECON

An Employee-Owned Company

May 30, 2023; Revised July 24, 2023

Mr. David Zoutendyk
United States Fish and Wildlife Service
2177 Salk Avenue, Suite 250
Carlsbad, CA 92008

Ms. Karen Drewe
California Department of Fish and Wildlife
3883 Ruffin Road
San Diego, CA 92123

Reference: Response to USFWS and CDFW Comments Emailed May 10, 2023 for the Nakano Project, City of San Diego, California (RECON Number 3396-1)

Dear Mr. Zoutendyk and Ms. Drewe:

This letter is intended to provide additional information in response to the comments received from the United States Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW) on May 10, 2023, for the Nakano Project (project). This letter provides additional context regarding design changes made subsequent to the field meeting held April 7, 2023, as well as additional clarification in response to USFWS comments based on the revised Biologically Superior Option Analysis contained in the Biological Resources Technical Report for the Nakano Project dated July 24, 2023 (RECON 2023).

RESPONSES

The following provides numbered and lettered USFWS comments, followed by the response in italics.

USFWS Comment 1: Please describe how wetland avoidance and impact minimization has been incorporated in the design of the proposed wetland crossings.

a. Include a description of engineering design features (such as culverted head walls) that have been selected to minimize wetland impacts.

Subsequent to the site visit conducted with USFWS and CDFW on April 8, 2023, additional project design changes were incorporated to further avoid and minimize impacts to the on-site wetlands to the greatest extent feasible. The project reduced grading and eliminated amenities such as a dog park to avoid wetlands located in the northeastern portion of the property with an 18- to 40-foot buffer (RECON 2023, Figure 5-3). The project also incorporated fire-rated masonry block walls along the eastern development boundary to reduce the project's brush management requirements. Overall, this reduced the proposed wetland impacts by an additional 0.11 acre relative to the previous project design (Table 1).

Based on the updated project design, the project would avoid 0.25 acre of the on-site City of San Diego wetlands, including the highest quality area of southern willow scrub supporting the largest willow stand and San Diego marsh-elder, while minimizing unavoidable impacts to wetlands on-site. The primary and secondary access roads have been designed using minimum road widths and to cross the wetlands perpendicular at the

narrowest point of the drainage in areas supporting lower quality wetlands, such as the disturbed wetlands and the portion of the southern willow scrub containing trash and encampments. The development has been sited to the farthest west possible on the project site considering constraints associated with the Interstate 805 California Department of Transportation right-of-way. The main access road design near the wetlands incorporates the steepest manufactured slopes allowable (2:1) and a 20-foot retaining wall to minimize grading into the wetlands. To avoid brush management (zones 1 and 2) within the on-site wetlands, the project design has been revised to incorporate a 6-foot fire-rated masonry block wall along the entire easternmost edge of the development footprint to provide alternative compliance for brush management, ensuring that no thinning or brush management activities occur within the on-site wetlands. The block wall would also ensure that no human intrusion would occur in the on-site wetlands from the adjacent development.

Table 1
Comparison of Project Impacts to City of San Diego Wetlands

Jurisdictional Resource	Project Site (acres)	Previous Project Impacts (acres)	Re-designed Project Impacts (acres)
Wetlands/Riparian Habitat			
Arundo-dominated riparian	—	—	—
Mule fat scrub	0.11	0.11	0.03
Southern willow scrub	0.31	0.17	0.15
Emergent wetland	0.18	0.18	0.18
Disturbed wetland	0.05	0.05	0.04
Total	**0.65**	**0.51**	**0.40**

b. Include an analysis of a wetlands avoidance alternative that concentrates development on the western part of the site, with a minimum 100-foot buffer between the development and remaining wetland along the eastern property boundary.

The biological resources report has been revised to expand on the wetlands avoidance alternative required by the City of San Diego Biology Guidelines (City of San Diego 2018). Below is a summary of this alternative analysis.

A wetlands avoidance alternative was considered for the project site; however, due to project primary access with adjacent fill slopes that provide topographical access to the site, and secondary access requirements, complete avoidance of wetlands is not feasible. Due to the degraded and constrained nature of the existing wetland, extraordinary design features such as bridging the wetland, which would require a reduction of 37 units, the installation of two bridges, and associated retaining walls, are not warranted. The resulting wetlands would be linear and isolated, ranging from approximately 10 to 55 feet in width, and surrounded on three sides by dense urban development.

In addition, a wetlands avoidance alternative was also evaluated which would incorporate a 100-foot buffer from the wetlands, while accommodating the project's access requirements. As the project is constrained by the Interstate 805 California Department of Transportation right-of-way to the west, the project cannot be sited farther west and thus would be required to reduce the development footprint by 37 units to accommodate the 100-foot buffer, which would be economically infeasible. Furthermore, this reduction in units would only reduce project impacts to City of San Diego wetlands by 0.28 acre and would ultimately not result in a biologically superior mitigation design when compared with the proposed project mitigation for the following reasons:

- *Preservation of the on-site City of San Diego wetlands would provide a narrow, linear riparian corridor, ranging approximately 15 to 55 feet in width, surrounded by dense urban development. With this design, the overall corridor width (including buffer) would be less than 400 feet wide for a distance greater than 500 feet, and thus would be considered isolated per the City of San Diego's Biology Guidelines (City of San Diego 2018).*

- *By removing a portion of the development, a swath of disturbed land would remain between the development area and the existing wetland. As in the existing condition, this "unused" area could continue to support trespass and homeless encampments, being subjected to trash, pollutants and ongoing disturbances. The proposed project would be biologically superior because it would retain the highest quality portions of the disturbed drainage while providing an enhanced wetland buffer through revegetation with native coastal sage scrub species and drainage improvements. In addition to the on-site preservation, the project would provide off-site mitigation in Spring Canyon, a regional Multiple Species Conservation Program (MSCP) corridor located approximately 2.8 miles to the southeast. Spring Canyon is part of a larger canyon network that provides connectivity between a mosaic of vernal pools, grasslands, and coastal sage scrub (City of San Diego 1997). Furthermore, Spring Canyon is identified as a linkage for cactus wren by the MSCP (City of San Diego 1997) and has further been documented to support movements by large wildlife such as bobcats and coyotes (Wildlife Tracking Company 2020). Restoration of Spring Canyon would be consistent with the Specific Management Directives for Southern Otay Mesa in the City of San Diego MSCP Subarea Plan, which identifies restoration of disturbed areas in Spring Canyon as a priority (City of San Diego 1997). The existing riparian habitat within the restoration area ranges from approximately 70 to 150 feet in width, with adjacent uplands and conserved lands owned by the City of San Diego providing a buffer greater than 400 feet in width. Mitigation in Spring Canyon would provide restoration of the same type of wetland resource being impacted (e.g., southern willow scrub, mule fat scrub) in a regional corridor that supports species such as least Bell's vireo and yellow warbler. Least Bell's vireo and yellow warbler have been documented to be present in the vicinity of the proposed restoration area associated with biological surveys conducted for the Southwest Village Project. The locations of those documented species occurrences are shown in Figure 7 of the Wetland Mitigation Plan (RECON 2023, Attachment 14). In addition to the 0.80-acre restoration of City of San Diego wetlands as mitigation for project impacts, the project would also restore an additional 0.29 acre of wetlands in Spring Canyon, as well as pursue invasive species removal in upstream locations off-site as a project design feature in order to support the long-term viability of the Spring Canyon restoration effort. Thus, this area provides a more optimal configuration for restoration to support the long-term viability of on-site sensitive biological resources such as least Bell's vireo and yellow warbler.*

c. Include an analysis of a wetlands restoration/mitigation alternative that would impact the existing wetland but restore higher quality wetland onsite in a natural substrate channel with a minimum 100-foot buffer.

While there is potential to restore or enhance the on-site wetlands, this option would not be biologically superior. As detailed above, preservation of the City of San Diego wetlands would provide a narrow, linear riparian corridor, ranging approximately 15 to 55 feet in width, surrounded by dense urban development. While habitat restoration in this area could increase the narrower portions of the riparian corridor in width to some degree, the overall corridor width (including buffer) would be less than 400 feet wide for a distance greater than 500 feet, and thus would be considered isolated per the City of San Diego's Biology Guidelines. Furthermore, the on-site wetlands are present largely due to urban run-off and lack natural hydrology (as detailed in RECON 2023). Additionally, the wetlands on-site are located in an area of dense urban development, outside of the Multi-Habitat Planning Area (MHPA). The proposed mitigation would occur within the Spring Canyon, a regional riparian corridor identified by the MSCP, which provides higher enhancement or restoration potential due to its location in an unconstrained, regional corridor with natural hydrology.

In addition to consideration of an on-site mitigation option, the applicant has extensively explored opportunities to mitigate within the Otay River, within the adjacent parcel owned by the City of Chula Vista, referred to as the Davies parcel. After coordination with the City of Chula Vista, it was determined that Chula Vista wanted to retain their own land for City of Chula Vista wetland mitigation as opposed to mitigation for the project and would require an additional 3:1 of wetland mitigation to be provided to the City of Chula Vista or fee title to an equivalent piece of land. Furthermore, after investigation into the condition of the Davies parcel based on a review of a Phase I Environmental Site Assessment (Converse Consultants 2003) and a Soil and Groundwater Sampling Report (Converse Consultants 2006), which ultimately caused Tri Pointe Homes (formerly Pardee Homes) to not purchase the site in the 2003-2006 timeframe, it was determined that costs to remediate the site to a condition that would allow for wetland remediation would be economically infeasible. While the extent of the on-site contamination is not fully known at this time due to the age of referenced studies, there is evidence of hydrocarbon impacted soils and burn ash that could add substantial remediation costs and risk to a potential mitigation effort. Specifically, based on discussions with Converse Consultants in reference to the prior investigations, boring and trench logs indicate the presence of debris site wide from depths of 2 to 19 feet (deepest depth evaluated, groundwater encountered). Glass shards, wood, concrete and rock fragments, wire, resin, tar, etc., were encountered site wide. It appears that the site was backfilled with trash, dirt and burn ash to the current grade (10 to 15 feet above the south side of the Otay River, edge of the vegetation). Further, Converse Consultants expressed concern that there could be further unknown conditions. Based on the above information, wetland mitigation at the Davies parcel is not considered feasible for the project.

USFWS Comment 2: Please provide additional analysis of the proposed modular wetland compared to the existing channel.

a. Provide clarification on the extent of the existing channel compared to the configuration of the modular wetland.

The project incorporates two vegetated biofiltration basins and a modular wetlands unit and detention vault as part of the project's stormwater system for water quality treatment and pollutant control. The modular wetland unit, detention vault, and one biofiltration basin occur in the northwestern project boundary. The modular wetlands unit consists of a manufactured structure with plantings and media to filter water. An additional biofiltration basin occurs along the eastern project boundary adjacent to the onsite wetlands. These devices would be maintained by the Homeowner's Association (HOA) under a stormwater maintenance agreement, to ensure pollutant control is maintained.

Existing flows into the on-site wetlands would be maintained via an underground culvert under the proposed entrance road. The culvert would direct off-site flows to the north to a low-flow splitter that would regulate the

amount of run-on flowing into the on-site City of San Diego wetlands. A culvert under the secondary access road would maintain flows between the on-site City of San Diego wetlands, before flowing north into an additional culvert that directs flows to rip-rap, before sheet flowing north towards to Otay River (see RECON 2023, Figure 5-3). High flows would be culverted under the adjacent biofiltration basin through the development, before sheet flowing north via a headwall with rip-rap along the northern project boundary. These drainage improvements would control the rate of discharge into the on-site City of San Diego wetlands, as well as to provide pollutant control prior to discharge to the north in a manner that would also reduce erosion and siltation issues into the Otay River off-site.

b. Explain why wetland enhancement has been proposed for the purpose of improved water quality and flood control, but not mitigation. Will Biologically Superior conditions be maintained in perpetuity?

No on-site wetland enhancement has been proposed by the project. The drainage improvements (e.g., biofiltration basin and modular wetlands) would provide stormwater and pollutant control for the project. However, these features would contribute to the wetland buffer by improving both drainage conditions into the on-site wetlands and off-site Otay River, as well as improve the quality of the vegetation by providing native species in an area currently dominated by non-natives.

The on-site City of San Diego wetlands would be preserved in perpetuity by a Covenant of Easement, which would restrict future development. Furthermore, block walls would run the entire eastern length of the proposed development, preventing human intrusion from the adjacent development. The on-site biofiltration basins and modular wetlands unit would be maintained by the HOA under a stormwater maintenance agreement, to ensure pollutant control is maintained. The HOA would also be required to comply with the standards for brush management within the wetland buffer, and signage would be installed indicating applicable standards for wetlands avoidance during brush management. Thus, project design features related to the upland buffer would be maintained, and the City of San Diego wetlands would be preserved in perpetuity.

c. As discussed at the on-site meeting, please provide additional design and planting details for the modular wetland.

The modular wetland consists of a manufactured structure with plantings and media to filter water to provide stormwater and pollutant control. The biofiltration basin would be vegetated with a transitional native plant mix that includes San Diego marsh-elder, mule fat (Baccharis salicifolia), giant wildrye (Elymus condensatus), scarlet monkeyflower (Mimulus cardinalis), yerba mansa (Anemopsis californica), sedges (Carex spp.), rushes (Juncus spp.), and other native species.

USFWS Comment 3: Please provide evidence of previous agency review or approval of the Restoration and Mitigation Credit Agreement or demonstrate that standards for Mitigation Land Bank Agreements (i.e. the site has not been previously used for mitigation, will be protected in perpetuity with a conservation easement, funding and parties responsible for long-term management responsibilities identified) have been satisfied.

Pacific Highlands Ranch was the culmination of extensive coordination between the City of San Diego, Wildlife Agencies, California Department of Transportation, the Sierra Club, and many others that ultimately resulted in the citywide, voter-approved, Proposition M in 1998. Some of the extraordinary benefits made as part of the successful ballot measure, which allowed for a development agreement, included the relinquishment of Carmel Mountain Neighborhood 8 from development to conservation; establishment of right-of-way for State Route 56 within Pacific Highlands Ranch, as needed to avoid the sensitive area of Deer Canyon; and restoration of 130 acres of previously disturbed habitat. The Wildlife Agencies were involved in the review of the Pacific Highlands

Ranch (PHR) project, we have not been able to find definitive documentation showing that the agencies reviewed and approved the Restoration and Mitigation Credit Agreement. The PHR Restoration and Mitigation Credit Agreement was part of the Development Agreement reached between the City of San Diego and Tri Pointe Homes (formerly Pardee Homes) associated with approval of the PHR project. The restoration credit areas were not restored as mitigation for impacts resulting from PHR, rather they were restored under an agreement with the City of San Diego that the land could be used as mitigation for future Tri Pointe Homes projects since the restoration was in excess of project requirements. Approximately 130 acres of disturbed, prior agricultural lands were restored to native habitat, providing extraordinary benefit to the City and supporting build-out of the City's MSCP.

At one point during the processing of the PHR project, Tri Pointe Homes was considering establishing a mitigation bank with the 130-acre restoration area; however, an official bank was never pursued. Instead, the restoration credit area was established as an area that could be used by Tri Pointe Homes for that owner's subsequent development projects. The mitigation credits are administered by the City consistent with the MSCP Implementing Agreement Section 9.13 Contribution and Banking of Excess Mitigation, which states:

> *Lands contributed to the MHPA preserve system by public or private owners in excess of the mitigation requirements imposed by THE CITY OF SAN DIEGO in accordance with Section 10 of this Agreement may either be used by such owner as mitigation for that owner's subsequent development project(s), or it may be "banked" by those owners in accordance with Sections 9.14 and 10 of this Agreement. Such banked lands can later be used to provide mitigation for future development projects of other owners within the MSCP Area consistent with applicable USFWS and CDFG conservation banking policies.*

The restoration site meets the requirements and standards for mitigation lands including funding, protection in perpetuity and long-term management. Specifically, Tri Pointe Homes provided $250,000 in endowment funding to the City of San Diego to support long term management of all open space areas that were added to the MHPA as part of the PHR project. The endowment funding has been invested in a City of San Diego account that as of 2015 had a value of $419,000 (the City of San Diego can provide more updated accounting). As part of the PHR Development Agreement, the City of San Diego has agreed to serve as the long-term manager of PHR open space lands, including all areas restored pursuant to the PHR Restoration and Mitigation Credit Agreement. After use of the mitigation credits for the Nakano project, Tri Pointe Homes would pursue turning over ownership to the City of San Diego for long term management as part of the MSCP.

USFWS Comment 4: We request a site visit to the Pacific Highlands Ranch Bank.

A site visit to the PHR Mitigation Bank was conducted on May 17, 2023, with USFWS, CDFW, City of San Diego, and the applicant.

If you have any questions or require further information, please contact me at clyons@reconenvironmental.com or (619) 308-9333 extension 108.

Sincerely,

Cailin Lyons
Director, Biology Group

CML:jg

cc: Anita Eng, USFWS
Heather Schmalbach, CDFW
Kristy Forburger, City of San Diego
Dawna Marshall, City of San Diego
Allen Kashani, Tri Pointe Homes

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San Diego, City of
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Wildlife Tracking Study
2020 Spring Survey Report, Southwest Village Wildlife Movement/Crossing Study.

ATTACHMENT 15

Long-term Management and Monitoring Plan for the On-site Wetlands at the Nakano Project

Long-Term Management and Monitoring Plan for the On-Site Wetlands at the Nakano Project Chula Vista, California

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RECON Number 3396-1
December 13, 2023



Julia Gaudio, Biologist

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Acronyms and Abbreviations

APN	Assesor's Parcel Number
Cal-IPC	California Invasive Plant Council
CDFW	California Department of Fish and Wildlife
COE	covenant of easement
HOA	homeowners association
I-805	Interstate 805
LTMMP	Long-term Management and Monitoring Plan
project	Nakano Project
SWMDCMA	Storm Water Management and Discharge Control Maintenance Agreement
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 Introduction

This long-term management and monitoring plan (LTMMP) details the process for managing the on-site wetland and wetland buffer associated with implementation of portions of the Nakano Project (project). The project is in the City of Chula Vista and is bordered to the west, east, and south by the City of San Diego (Figures 1 through 4). The project proposes a residential development with supporting recreational amenities and infrastructure on the approximately 23.77-acre project site. Off-site improvements would be required to provide driveway access, as well as secondary emergency access and remedial grading. For the purposes of this report, it is assumed that the project would be annexed into the City of San Diego, with the off-site areas remaining in their respective jurisdictions.

Wetland buffer lands that exist within the project's development footprint will not be impacted by project activities (Figure 5). The wetland buffer consists primarily of manufactured slopes revegetated with native species and water quality features. A Storm Water Management and Discharge Control Maintenance Agreement (SWMDCMA) will be prepared for the City of San Diego for the water quality treatment features, which will guide maintenance of the stormwater basins and other features. A brush management plan has also been prepared for maintenance of the vegetation on the manufactured slopes in the wetland buffer that will be subject to fuel modification (Figure 6). The remaining lands between the development footprint and the property boundary will be placed in a covenant of easement (COE), which includes the on-site wetland (see Figure 5). These lands will not be used towards mitigation and will be protected from future development. The SWMDCMA and COE will be recorded against the property to ensure long-term management. The COE will reference the LTMMP to allow for maintenance activities such as invasive species removal.

After the implementation and five-year maintenance and monitoring program has been completed and deemed successful by the City, California Department of Fish and Game (CDFW), and the U.S. Fish and Wildlife Service (USFWS), the management area will be turned over to the homeowners association (HOA) which will be the future owner of the property. This LTMMP will then be implemented by the HOA in perpetuity.

1.1 Location and Existing Conditions

The project is located east of Interstate 805 (I-805), northwest of Dennery Road, and south of the Otay River (see Figure 1). The project area is within Sections 19 and 24 of Township 18 South, Range 1 and 2 West, of the Imperial Beach, California U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (see Figure 2). The project is proposed within a the 23.77-acre Assessor's Parcel Number (APN) 624-071-0200, as well as two off-site improvement areas (see Figures 3 and 4). Grading and improvements are proposed on 21.69 acres of the project site, in addition to off-site improvements including 0.39 acre of remedial grading and trail improvements within the City of Chula Vista to the north of the project site (APN 624-071-0100), and 1.27 acres of grading for the project's access road and secondary emergency access road within the City of San Diego (APNs 645-400-0100 and 645-400-0300) (Figure 5).



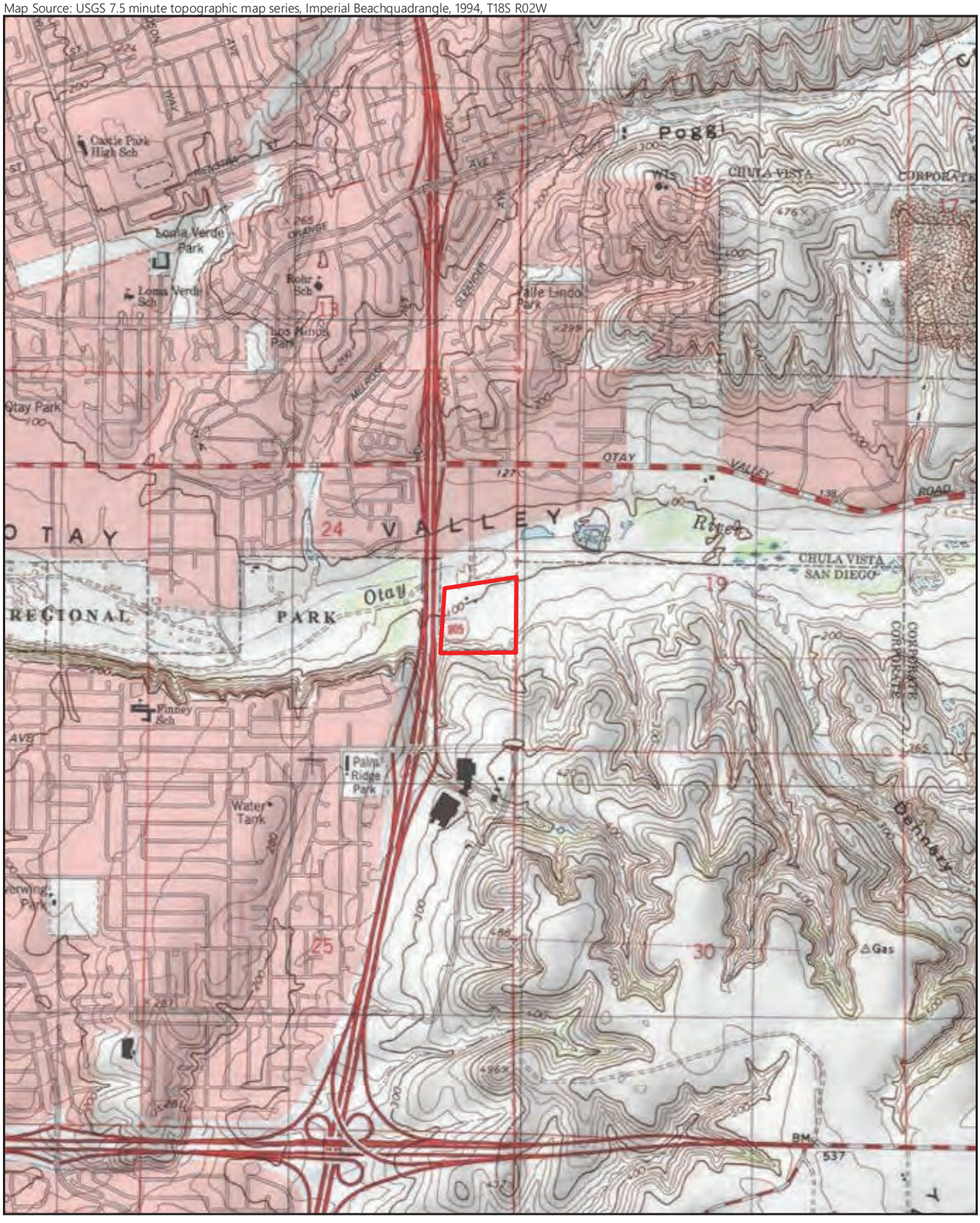
Project Location

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FIGURE 1
Regional Location

Map Source: USGS 7.5 minute topographic map series, Imperial Beachquadrangle, 1994, T18S R02W



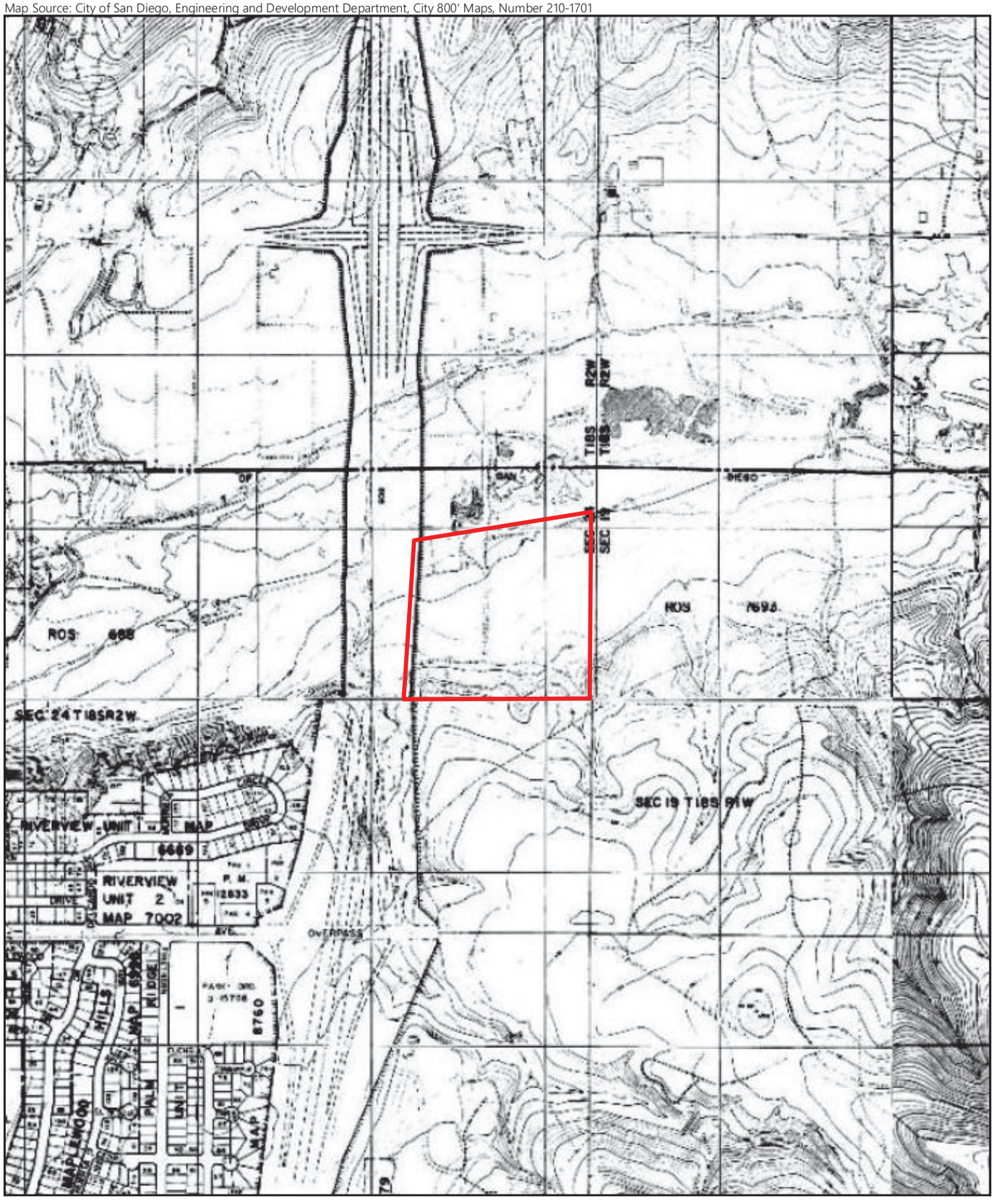
Project Boundary

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FIGURE 2
Project Location on USGS Map

Map Source: City of San Diego, Engineering and Development Department, City 800' Maps, Number 210-1701



Project Boundary

FIGURE 3

Project Location on City 800' Map

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Image Source: NearMap (flown May 2023)



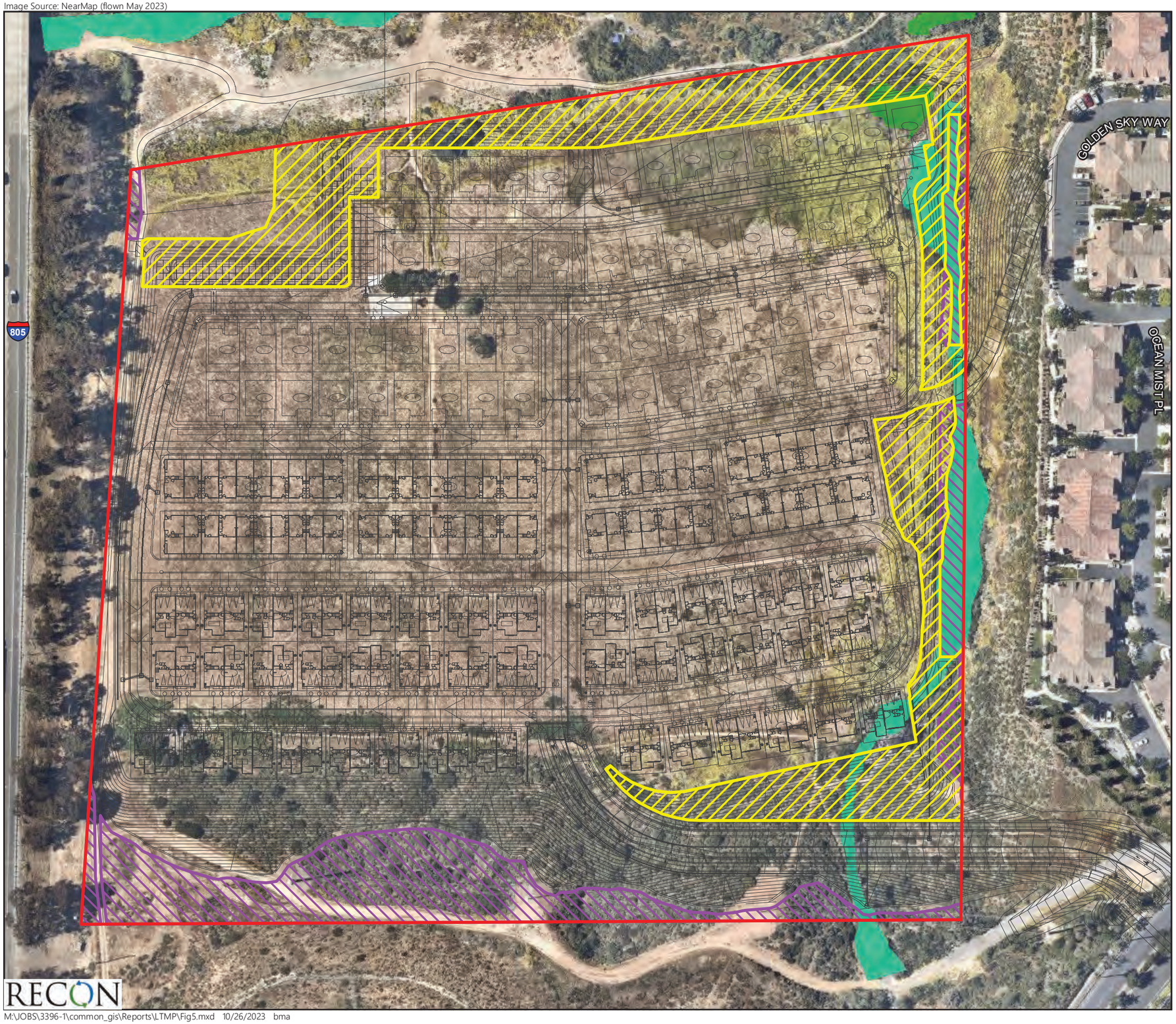
Project Boundary

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FIGURE 4
Project Location on Aerial Photograph

Image Source: NearMap (flown May 2023)



- Project Boundary
- Wetland Buffer Onsite
- Covenant of Easement
- Site Plan
- USACE Wetland Waters of the U.S./ RWQCB Wetland Waters of the State/ CDFW Riparian/ City of San Diego Wetland/ City of Chula Vista Wetland
- CDFW Riparian/ City of San Diego Wetland/ City of Chula Vista Wetland

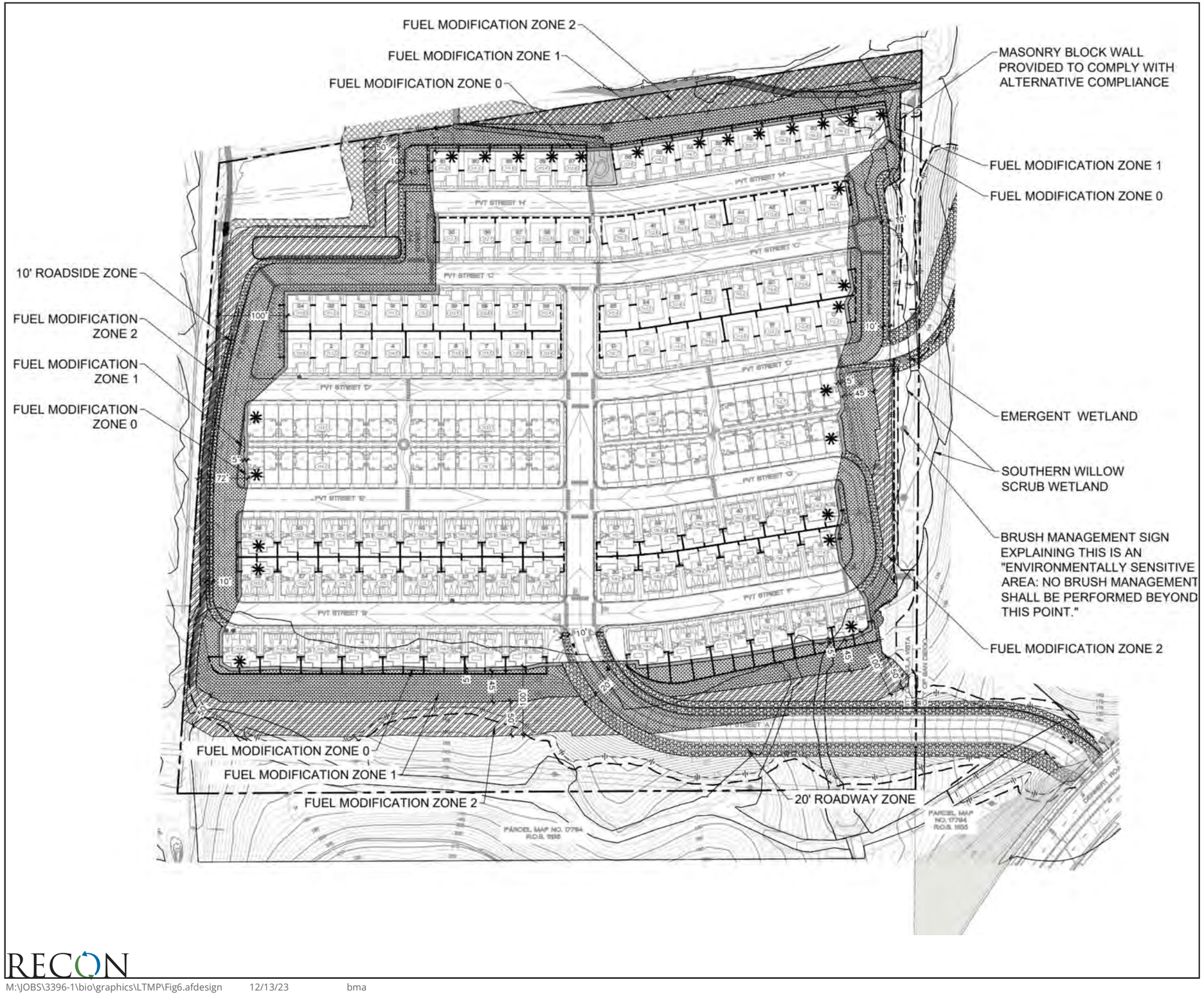
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FIGURE 5
Location of Management Area

Map Source: Project Design Consultants



10' ROADSIDE ZONE

20' ROADSIDE ZONE

FUEL MODIFICATION ZONE 0
(0 ' - 5', NON-COMBUSTIBLE)
THESE AREAS SHALL BE REGULARLY MAINTAINED BY THE HOME OWNER'S & HOA ADJACENT TO THE STRUCTURE, PLANTING WILL CONSIST OF ORNAMENTAL LANDSCAPING WITH PERMANENT IRRIGATION.

FUEL MODIFICATION ZONE 1
(5' - 50', PERMANENT IRRIGATION)
THESE AREAS SHALL BE REGULARLY MAINTAINED BY THE HOME OWNER'S & HOA ADJACENT TO THE STRUCTURE, PLANTING WILL CONSIST OF ORNAMENTAL LANDSCAPING WITH PERMANENT IRRIGATION. THE NORTHERN SLOPE AREA SHALL PROVIDE PERMANENT BUBBLER IRRIGATION FOR THE PROPOSED NATIVE TREES. THE 10' WIDE PEDESTRIAN TRAIL WILL CONSIST OF DECOMPOSED GRANITE.

FUEL MODIFICATION ZONE 2
(50' - 100', TEMPORARY IRRIGATION / THINNED VEGETATION)
HYDROSEED PLANTING SHALL BE TEMPORARILY IRRIGATED WITH AN OVERHEAD IRRIGATION SYSTEM UNTIL ESTABLISHED. ONLY NATIVE VEGETATION SHALL BE PLANTED OR HYDROSEEDING.

0 Feet 120

FIGURE 6
Location of Brush Management Zones

RECON

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The project site and off-site areas currently consist of vacant land, unpaved roads, and informal trails. The project site was used for agriculture until 2000 and is heavily disturbed. Surrounding land uses include a vacant site and the Otay Valley River Park to the north, I-805 directly to the west, multi-family residential to the east and southeast, and Kaiser medical offices to the south.

2.0 Responsible Parties

2.1 Owner

The Permittee, Tri Pointe Homes, will be responsible for the successful completion of initial management activities upon project entitlement prior to turnover to the long-term management entity, the HOA. In addition, the Permittee will establish the HOA budget for required maintenance of the features.

2.2 Management Entity

The HOA will be the successor to the Permittee and will be the future owner for the property common area where the wetland and wetland buffer are located. The HOA will be responsible for contracting a suitable landscape or restoration firm for carrying out the LTMMP on an annual basis. The qualifications for the landscape or restoration firm are as follows:

- Ability to carry out habitat monitoring and mitigation activities.
- Has at least one staff member with a degree in biology, ecology, or wildlife management, or has a Memorandum of Understanding with a qualified person with such a degree.
- Experience with "habitat management" in southern California, not just "landscape maintenance" which has a greater focus on aesthetics rather than habitat function in support of natural resources and wildlife.

2.3 Agencies

The City of San Diego, CDFW, and USFWS will be responsible for review and approval of the LTMMP.

2.4 Funding

Funding will be provided in perpetuity to pay for required management and monitoring. The Permittee will establish the HOA budget for required maintenance of the features.

3.0 Long-term Management and Monitoring Plan

The LTMMP proposes an adaptive management framework to guide maintenance and monitoring. Adaptive management is a flexible, iterative approach to the long-term management of biological

resources. Adaptive management is directed over time by the results of ongoing monitoring activities and direct observation of environmental stressors that are producing adverse results within the management area. Achieving the key goals of this plan and establishing self-sustaining native habitats will be the focus of all adaptive management decisions.

3.1 Long-term Monitoring and Reporting Requirements

Qualitative monitoring visits will determine maintenance activities needed to keep the management area healthy and functional. Monitoring will also occur during scheduled maintenance to guide maintenance activities.

A qualitative monitoring visit will be scheduled once per year prior to scheduled maintenance. In addition, incidental observations useful for guiding subsequent maintenance visits may be recorded during visits to monitor maintenance. General site assessment information shall be collected, including current or potential threats (such as invasive plants, dumping, off-highway vehicle activity, and trampling), and recommendations for management shall be generated. The management area shall be assessed for the following conditions and threats:

- Lighting: To prevent light pollution into the habitat, the management entity shall verify that all lighting adjacent to the management area is shielded and directed to shine away from the wetland areas.
- Wetland Buffer: A wetland buffer will be established at the edge of the development to protect the wetland from potential indirect impacts associated with the development. A 6-foot block wall running along the eastern boundary of the development will separate the wetlands from the development. Signage shall be posted that informs people of the sensitive nature of the adjacent wetland habitat and prohibits any brush management activities near the wetlands. This informational literature should provide the Permittee's and/or long-term manager's contact information for questions or reports of disturbance during their time of management. Monitoring visits will record evidence of trespassing and impacts to the wetland associated with development, assess the need to make repairs to barriers and signage, and recommend maintenance tasks to resolve existing issues and prevent future impacts on the habitat.
- Invasive Species: Native plant species are to be used in the landscape areas directly adjacent to the management area, and the landscape plans shall be reviewed by the project biologist to ensure that only native plant species are identified for this area of the development. Monitoring visits will assess the need to control invasive species appearing within the wetland and make recommendations for invasive species removal during subsequent maintenance visits. Monitors shall record the invasive species observed, and their locations and quantities within the habitat.
- Brush Management: To promote fire safety, flammable brush adjacent to structures is to be removed. This can be accomplished by pruning and thinning of vegetation and revegetation with low fuel volume plantings. Brush management zones within the site are depicted in Figure 6. During site visits, monitors will assess the need for brush management within these

zones and will make specific recommendations for brush management techniques to be implemented during maintenance.

- Trash: During each site visit, monitors are to record occurrences of trash including type, location, and management recommendations, and provide recommendations for removal during subsequent maintenance visits.
- Other: Any additional observed disturbances that could affect habitat quality shall be noted and recommendations provided to resolve each issue during subsequent maintenance visits.

3.1.1 Reporting

The management entity shall prepare an annual report (due by the end of January each year) summarizing the management and maintenance activities conducted within the management area during the preceding year, addressing successes or failures of management approaches, and listing any new management concerns. The report should include visual documentation of site conditions from the same photo points taken each year and propose any management adjustments for the next year. The report will be provided to the City of San Diego, who may forward it to other agencies and interested parties.

3.2 Long-term Maintenance Requirements

Long-term maintenance needs are assumed to be minimal; however, minor maintenance and monitoring activities may be required to control non-native vegetation, maintain barriers and fencing, and remove trash. These activities are outlined below. All maintenance requirements would be done in accordance with the LTMMP. Table 1 lists the annual schedule for maintenance and monitoring visits anticipated for this project.

Table 1
Annual Schedule of Maintenance Visits

Task	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Annual qualitative monitoring	X											
Weed control		X		X		X						
Brush management		X										
Trash and debris removal (as needed)						X						
Fence, signage, and trespassing repair (as needed)						X						
Maintenance oversight		X		X		X						
X = Anticipated month of occurrence.												

3.2.1 Weed Control

Monitoring visits will determine the need for treatment of non-native invasive species within the management area. Weed control will prioritize the removal of California Invasive Plant Council (Cal-IPC) high, moderate, or alert species currently present within the management area, which include Mexican fan palm (*Washingtonia robusta*), pampas grass (*Cortaderia selloana*), giant reed (*Arundo*

donax), and salt cedar (*Tamarisk ramosissima*). Treatment should prioritize removing these and other Cal-IPC high, moderate, or alert species.

Removal methods may include hand pulling, cutting, mechanical removal, and herbicide application. If herbicides are necessary, all safety and environmental regulations shall be observed. It is recommended to begin removal upstream and/or upwind, and to time removal based on the biology of each species (i.e., time of flowering and reproductive capacity). Seed heads for any Cal-IPC high, moderate, and alert species shall be bagged and removed from the site to avoid the spread of seed downstream. Removal activities can occur during the reproductive seasons of sensitive species (e.g., bird breeding season), but should consist of either herbicide application or hand pulling with no mechanized removal. This will allow annuals to be controlled before they set seed, while also avoiding potential impacts to sensitive species. If maintenance requires mechanized equipment or removal of mature vegetation, it can occur during the fall after bird breeding season. This requirement should remain in perpetuity.

3.2.2 Brush Management

Brush management in identified zones (see Figure 6) will occur as needed, determined by monitoring visits. No thinning or brush management activities will occur within the on-site wetlands. Timing of brush management should occur before the majority of non-native annuals have set seed and prior to the bird breeding season, which would be anticipated to occur in February. Brush management shall be implemented according to guidelines set forth in the City of San Diego Landscape Standards (City of San Diego 2016) and as outlined below.

- Invasive species are to be prioritized first for removal, and all Cal-IPC high, moderate, and alert species should be removed. If necessary, native and naturalized species may also be removed for fuel reduction, though native coverage is to be maintained to promote soil coverage and reduce visual, biological, and erosion impacts. Thinning methods should prioritize removing non-native invasive species growing between native shrubs and creating space between native shrubs by trimming and pruning the sides of the shrubs, as needed. Care should be taken to avoid killing native shrubs, which increases the amount of dry or dead plant material and promotes reinvasion by non-native species within the site.
- Brush management shall avoid the nesting seasons for coastal California gnatcatcher (*Polioptila californica californica*) (March 1 through August 15) and least Bell's vireo (*Vireo bellii pusillus*) (March 15 to September 15) to avoid the potential for direct or indirect impacts.
- Brush management shall be limited to the designated brush management zones and will completely avoid the on-site wetland.
- All dead branches, brush, debris, and trimmings shall be removed from the site or converted into mulch and evenly distributed. Seed heads for any Cal-IPC high, moderate, and alert species shall be bagged and removed from the site to avoid the spread of seed downstream.
- Native trees and tree-form shrubs shall be retained to the maximum extent practicable, while maintaining consistency with the City of San Diego's coverage and area limitations. Note that these limitations do not apply to native tree species (e.g., oaks [*Quercus* spp.], sycamores [*Platanus* spp.], willows [Salix spp.], and cottonwood [*Populus* spp.]).

3.2.3 Trash and Debris Removal

Trash will be removed from the management area, as needed. Care should be taken not to trample any plants or alter wetland hydrology.

3.2.4 Fence, Signage, and Trespassing Repair

Any damage caused to fencing and signage shall be repaired, per recommendations made following monitoring visits. Any new trails appearing within the habitat shall be closed. Any damage that alters hydrology will be assessed and measures implemented to resolve the problem.

4.0 References Cited

San Diego, City of
2016 City of San Diego Landscape Standards, San Diego, California. April 5.

U.S. Geographical Survey (USGS)
1996 7.5-minute topographic map Imperial Beach quadrangle.

ATTACHMENT 16

Mitigation Credit Availability at San Luis Rey River Mitigation Bank and Rancho Jamul Mitigation Bank

May 23, 2023

Via Electronic Mail

Jennifer Campos
Project Director
RECON Environmental, Inc.
3111 Camino del Rio North, Suite 600
San Diego, CA 92108-5726

RE: Confirmation of Mitigation Credit Availability at the San Luis Rey Mitigation Bank for the Nakano Project, San Diego County, California

Dear Jennifer:

Thank you for the opportunity to present you ("**Project Proponent**") with the mitigation credit availability for the Nakano project located in the Chula Vista area of San Diego County ("**Project**").

Wildlands SLR Holdings I, LLC ("**Wildlands**") has received approval of the San Luis Rey Mitigation Bank ("**SLRMB**") from the U.S. Army Corps of Engineers ("**Corps**") and the California Department of Fish and Wildlife ("**CDFW**") to provide wetland and non-wetland waters of the United States/State credits for sale as compensation for the loss of waters of the United States, waters of the State and/or State jurisdictional habitats. One credit is equivalent to one acre of habitat.

As of the date of this letter, SLRMB has sufficient credits available to provide 2 acres of mitigation credits. The current credit inventory is provided below; the agency-tracked creditt ledger can be accessed on the RIBITS (Regulatory In lieu fee and Bank Information Tracking System) website, maintained by the Corps at https://ribits.ops.usace.army.mil/.

WETLAND and NON-WETLAND WATERS CREDIT INVENTORY	
Credit Type	**Credits Available (Ac.)**
Rehabilitated River: Wetland Waters of the U.S./State	0.66
Re-established River: Wetland Waters of the U.S./State	7.63
Re-established Floodplain: Non-wetland Waters of the U.S./State	2.41

Please note, future credit availability is not guaranteed and is subject to change unless and until a binding contract is entered into by Project Proponent and Wildlands.

As you may know, the primary benefit of purchasing bank credits is that it terminates your liability as a Project Proponent of habitat mitigation. By acquiring mitigation from the SLRMB, the Project Proponent is relieved of environmental engineering expenses, the construction and development costs, and the contingent liabilities of guaranteeing the success of an onsite or offsite mitigation project. Wildlands is fully responsible for all financial and performance obligations of mitigation credits purchased from the San Luis Rey Mitigation Bank.

Please do not hesitate to contact me if you have any questions. I look forward to working with you to provide a mitigation solution for your project.

Very truly yours,



Julie Maddox
Director of Sales
Wildlands

2125 19th Street, Suite 200
Sacramento, CA 95818

Corporate Headquarters
6575 West Loop South, Suite 300
Bellaire, TX 77401
Main: 713.520.5400

MITIGATION CREDIT COMMITMENT LETTER
WETLAND MITIGATION
STATUS OF BANK ESTABLISHMENT

Rancho Jamul (Phase IIB) Mitigation Bank

To: Los Angeles District of the U.S. Army Corps of Engineers and California Department of Fish and Wildlife

Credit Provider: RES-RLH West Coast, L.L.C. ("**Bank Sponsor**")
Property Owner: California Department of Fish and Wildlife
State and Federal Permitting Agencies Anticipated (collectively the "Permitting Agencies"):
- Los Angeles District of the U.S. Army Corps of Engineers ("**Corps**")
- Region IX of the U.S. Environmental Protection Agency ("**USEPA**")
- California Department of Fish and Wildlife ("**CDFW**")

Bank Location: RJMBII is located at 14715 Campo Road, San Diego County, state of California, designated Assessor's Parcel No(s). 597-160-06; 598-040-03; 598-040-04; 598-040-05.

BANK Providing Credits: Rancho Jamul Phase IIB Mitigation Bank (RJMBII)

The RJMBII is anticipated to be Established and receive the Initial Release by or before December 31, 2024. Whereas RJMBII is willing to sell credits to TriPointe Homes, LLC ("**TPH**") and TPH seeks to purchase same credits for a project of unknown name and location ("**Project**"), the following is true:

1. The Initial credit release is anticipated to result in the release of the following:
- 2.367 Wetlands 404/401 credits
- 2.412 non-wetland 404/401 credits
- 4.7805 Stream/Riparian (CDFW) credits
- 2.1 Riparian Habitat (CDFW) credits

2. Reserved: The City of San Diego ("**City**") has previously reserved the right to purchase 3.3 credits of unknown type and the remaining credits from the initial release will become available for sale to other buyers.

3. The Bank Sponsor currently notes that there remain 0.4 wetland credits that are not under reservation by another Permittee and are currently available for TPH to sign a Reservation Agreement that secures the right to purchase the credits once the bank is Established and the initial release has occurred.

RES-RLH West Coast, L.L.C.
By: Mandi Martinez

Mandi Martinez, RES West Region Client Solutions Manager
Resource Environmental Solutions, L.L.C.
2125 19th Street, Suite 200
Sacramento, CA 95818
Date: 03/27/2024

ATTACHMENT 17

Mitigation Proposal for Sensitive Uplands under the Annexation Scenario

RECON

An Employee-Owned Company

February 24, 2023

Ms. Kristen Forburger
City of San Diego
Planning Department – MSCP
9485 Aero Drive, M.S. 413
San Diego CA 92123

Reference: Uplands Mitigation for the Nakano Project Under the Annexation Scenario (RECON Number 3396-1)

Dear Ms. Forburger:

This memo documents the proposed mitigation for impacts to sensitive upland vegetation associated with the Nakano project under the Annexation Scenario. The applicant, Tri Pointe Homes, proposes to use excess mitigation credits available associated with the Pacific Highlands Ranch (PHR) project located in the City of San Diego. The mitigation credit area is located in the Del Mar Mesa area of the City of San Diego. The regional location of the mitigation site is shown in Figure 1. Refer to the Biological Resources Technical Report for the Nakano Project (Biology Report; RECON 2022) for additional detail about the Nakano project and overall impacts to biological resources.

A Restoration and Mitigation Credit Agreement was executed between Tri Pointe Homes (formerly known as the Pardee Construction Company) and the City of San Diego on June 14, 2001. Refer to Attachment 1 for a copy of the Restoration and Mitigation Credit Agreement. To date, Tri Pointe Homes has not used any of the 131-acre mitigation credit area. As written, the agreement allows Tri Pointe Homes to use 131 acres of mitigation credit as Tier II or Tier III mitigation for development activity occurring on Tri Pointe Homes ownership within the Citywide MSCP Subarea or caused by any development activity or project within Subarea III (refer to page 2, Section 2.1 of Attachment 1).

The location of the 131-acre restoration and mitigation credit area is depicted on Figure 2. As shown, the mitigation credits available within Area 6 are located entirely within the MHPA and are proposed for use with the Nakano project. A total of 21 acres has been restored within Area 6 as Diegan coastal sage scrub habitat and City of San Diego sign-off of the restoration effort was obtained in July 2022. Detailed accounting of the available acreage of mitigation credits within the PHR areas is provided in Attachment 2. Refer to Figure 3 for the proposed mitigation location on an aerial photograph and Figure 4 for the existing vegetation communities.

The Nakano project would impact 3.41 acres of Diegan coastal sage scrub (Tier II), 0.17 acre of Diegan coastal sage scrub: Baccharis-dominated (Tier II), and 13.59 acres of non-native grassland (Tier IIIB). Under the Annexation Scenario (where the project would be annexed to the City of San Diego), uplands mitigation requirement would be satisfied by the City of San Diego consistent with the City of San Diego's Subarea Plan and Biology Guidelines. As detailed in the project's Biological Resources Technical Report (RECON 2022), SD-BIO-1 identifies the proposed mitigation for sensitive upland vegetation under the Annexation Scenario as follows:

SD-BIO-1 **Sensitive Upland Vegetation.** Prior to the issuance of any land development permits or development activities by the City of San Diego for the Annexation Scenario, including clearing, grubbing, grading, and/or construction permits the project shall mitigate for impacts to sensitive upland vegetation in accordance with the City of San Diego's 2018 Biology Guidelines. The project applicant shall mitigate

> direct impacts to Diegan coastal sage scrub and Diegan coastal sage scrub: *Baccharis*-dominated at a 1:1 mitigation ratio, and non-native grassland at a 0.5:1 ratio inside the MHPA. Mitigation for 3.41 acres of Diegan coastal sage scrub (Tier II), 0.17 acre of Diegan coastal sage scrub: *Baccharis*-dominated (Tier II), and 13.59 acres of non-native grassland (Tier IIIB) will be achieved through the preservation of 10.38 acres of Diegan coastal sage scrub habitat (Tier II) at the PHR Restoration and Mitigation Credit Area (City of San Diego 2001). The applicant is required to provide proof of mitigation credit purchase to the City of San Diego via a mitigation ledger prior to issuance of any land development permits.

Consistent with SD-BIO-1 the project proposes to use 10.38 acres of Diegan coastal sage scrub habitat within Area 6 of the PHR Restoration and Mitigation Credit Area. A ledger documenting the proposed use of these credits is included as Attachment 3, consistent with the requirements of Section 4 of the PHR Restoration and Mitigation Credit Agreement.

If you have any questions or require further information, please contact me at jcampos@reconenvironmental.com or (619) 308-9333 extension 123.

Sincerely,

Jennifer Campos
Environmental Project Director

JYC:jg

Attachments

REFERENCE CITED

RECON Environmental (RECON)
2023 Restoration and Mitigation Credit Agreement Pacific Highlands Ranch executed June 14, 2001.



Project Location

RECON

M:\JOBS\3396-1\common_gis\Reports\Mitigation_PHR_memo\Fig1.mxd 02/24/2023 bma

FIGURE 1
Regional Location

Image source: Nearmap (flown January 2023)



Proposed Nakano Mitigation Area
Restoration Uplands Parcels
Restoration Completed
Restoration In Progress
City of San Diego MHPA
(#) PHR Area

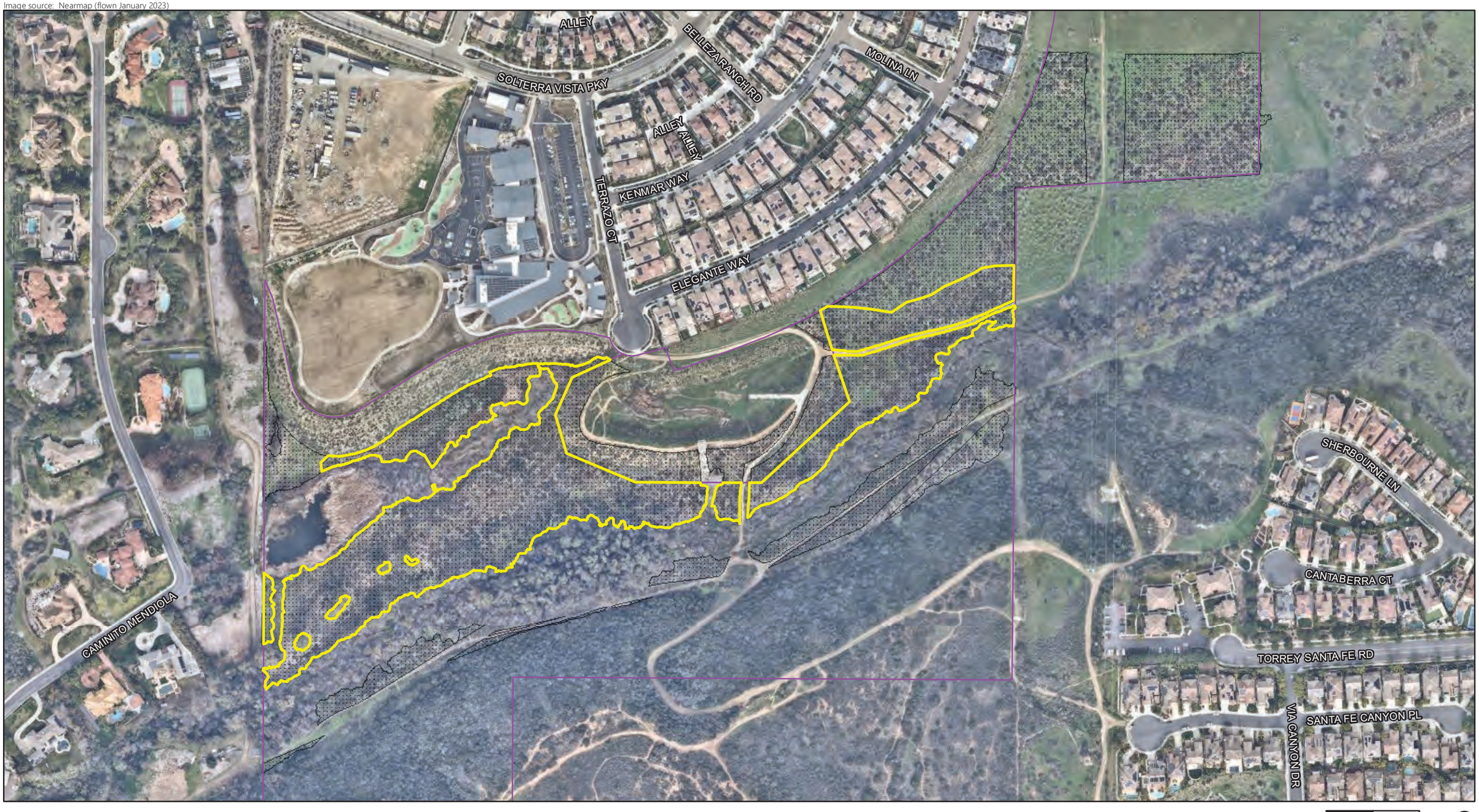
0 Feet 1,000

RECON

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FIGURE 2
Pacific Highlands Ranch 130 Acre Mitigation Credit Area

Image source: Nearmap (flown January 2023)



RECON

M:\JOBS\3396-1\common_gis\Reports\Mitigation_PHR_memo\Fig3.mxd 02/24/2023

FIGURE 3
Proposed Nakano Mitigation Area on Aerial Photograph

Image source: Nearmap (flown January 2023)



RECON

M:\JOBS\3396-1\common_gis\Reports\Mitigation_PHR_memo\Fig4.mxd 02/24/2023

FIGURE 4
Proposed Nakano Mitigation Area Vegetation Communities

ATTACHMENTS

ATTACHMENT 1

Pacific Highlands Ranch Restoration
and Mitigation Credit Agreement

RESTORATION AND MITIGATION CREDIT AGREEMENT
PACIFIC HIGHLANDS RANCH

PARDEE CONSTRUCTION COMPANY/CITY OF SAN DIEGO
(131 ACRES)

THIS RESTORATION AND MITIGATION CREDIT AGREEMENT ("Agreement") is made and entered into this _____ day of _____, 2001 ("Effective Date"), by and between PARDEE CONSTRUCTION COMPANY, a California corporation ("Pardee"), and THE CITY OF SAN DIEGO, a municipal corporation ("City"). Pardee and City may hereinafter be referred to individually as "Party" and collectively as the "Parties."

RECITALS

This Agreement is made with reference to and in contemplation of the following facts and circumstances.

A. Pardee and City are parties to that certain development agreement, in substantial part relating to Pacific Highlands Ranch, approved by Ordinance No. 0-18571, effective November 3, 1998 ("Development Agreement").

B. Pursuant to Section 5.2.6 of the Development Agreement, Pardee agreed to revegetate and restore 131 acres of the Pardee ownership in the Multi-Habitat Planning Area ("MHPA") of Pacific Highlands Ranch. The 131 acre revegetation area is generally described on **Exhibit "1"** attached hereto and incorporated herein (hereinafter the "Restoration and Mitigation Credit Area").

C. The Development Agreement contemplates that Pardee may utilize or sell mitigation credits from the Restoration and Mitigation Credit Area. Pardee is required by the Development Agreement to convey to the City title to the restored acreage no later than the time the Restoration and Mitigation Credit Area is utilized for mitigation credits.

D. The Parties desire to enter into this Agreement to set forth the terms and conditions pursuant to which the 131 acre Restoration and Mitigation Credit Area will be established, restored, protected, maintained, managed and preserved.

NOW, THEREFORE, it is agreed by the Parties as follows:

AGREEMENT

1. Evaluation and Acceptance. City has evaluated and approved the Master Restoration Plan for Pacific Highlands Ranch-Subarea III dated October 31, 2000 attached hereto as **Exhibit "2"** and incorporated herein (hereinafter the "MRP"). Pardee agrees to restore and maintain the 131 acre Restoration and Mitigation Credit Area in accordance with the MRP. City acknowledges and agrees that upon satisfying the criteria contained within the MRP the revegetation area(s) will possess biological values which support mitigation credits. No further evaluation or assessment by City shall be required as a prerequisite to the use of the mitigation credits or for City's acknowledgment and acceptance thereof provided the 131 acre Restoration

and Mitigation Credit Area, or any portion thereof, is restored and maintained in accordance with the MRP.

2. Mitigation Credits.

2.1 City agrees to accept each acre of land within the 131 acre Restoration and Mitigation Credit Area as the functional equivalent of one acre of off-site mitigation for adverse biological impacts to MSCP Tier II or TIER III resources caused by development activity occurring upon Pardee's real property ownership within the Citywide MSCP Subarea or caused by any development activity or project within Subarea III.

2.2 Mitigation credit will be available for use as the restored habitat achieves the minimum success criteria identified in the MRP. City agrees to accept mitigation credits from the 131 acre Restoration and Mitigation Credit Area, or any portion thereof, upon achievement of the minimum success criteria identified in the MRP.

2.3 The Parties acknowledge that the level of mitigation credits provided to Pardee hereunder has been negotiated with the express understanding that enhancement and maintenance of the 131 acre Restoration and Mitigation Credit Area, or any portion thereof, by Pardee shall occur in substantial accordance with the MRP in order to utilize the mitigation credits.

2.4 Nothing contained in this Agreement shall be deemed to limit or to restrict the ability of the City, the California Department of Fish and Game ("CDFG") and the United States Fish and Wildlife Service ("USFWS") to fully discharge their responsibilities under applicable law, including, without limitation, CEQA, NEPA, CESA and ESA, respectively.

2.5 The use of mitigation credits shall be accounted for in accordance with Section 4 below. Once all mitigation credits have been used, no further mitigation credits shall be acknowledged by City.

3. Management of Mitigation Bank.

3.1 Upon conveyance of title to City for all or any portion of the 131 acre Restoration and Mitigation Credit Area, City shall be solely and exclusively responsible to oversee, manage, protect and maintain in perpetuity the area conveyed to preserve its habitat and conservation values. City and Pardee shall meet and confer from time to time, upon the request of either Party, to revise the MRP to better preserve the habitat and conservation values of the Restoration and Mitigation Credit Area.

3.2 Pardee shall prepare and provide annually to City, on or before February 15th of each year, a Management Report for those portions of the 131 acre Restoration and Mitigation Credit Area remaining in Pardee's ownership or for which mitigation credits have not been used. The Management Report shall include the following, if applicable:

3.2.1 A general description of the status of the biological resources;

3.2.2 The results of any biological monitoring or studies conducted;

3.2.3 A description of all management actions undertaken;

3.2.4 A description of any management problems encountered; and

3.2.5 A description of management actions that will be undertaken, in accordance with the MRP, in the coming year.

3.3 Pardee shall not be responsible for overseeing, managing, protecting or maintaining, and shall not be subject to any liability with respect to, those portions of the 131 acre Restoration and Mitigation Credit Area for which title has been transferred to the City.

4. Database for Mitigation Bank Transactions. A database shall be established by Pardee in the following manner for purposes of tracking the utilization of mitigation credits. Pardee shall be responsible for maintaining a database ("Ledger"), which shall include a numerical accounting of (i) all mitigation credits; (ii) the balance of unused mitigation credits available; (iii) the name, address, and telephone number of the person or entity using the mitigation credits; and (iv) the location for which the mitigation credits were used. Pardee shall make the Ledger available to City within ten (10) business days of City's written request therefor. Upon use of mitigation credits, Pardee shall deliver to City an updated accounting of all mitigation credits used as of the date of the most recent use of mitigation credits. This information shall be sent to City within thirty (30) days after each use of mitigation credits. Pardee shall, on or before February 15th of each year, deliver to City a report ("Annual Ledger Report") covering the prior calendar year that contains all of the information described above. Pardee shall be responsible for maintaining a numerical accounting of mitigation credits used and the remaining balance of available mitigation credits.

5. Cooperation. City agrees to reasonably cooperate with Pardee and Pardee agrees to reasonably cooperate with City in the implementation of this Agreement.

6. Implementing Agreement. This Agreement is entered into by the Parties for purposes of implementing and satisfying the provisions of Section 5.2.6 of the Development Agreement. City agrees that Pardee's performance under this Agreement fully satisfies the provisions of Section 5.2.6 of the Development Agreement. From time to time, other implementing agreements may be entered into by the Parties for purposes of implementing other provisions of the Development Agreement.

7. Default. The provision of Section 7 of the Development Agreement relating to defaults (i.e., 7.1 Events of Default, 7.2 Procedure Upon Default and 7.3 Institution of Legal Action) shall be applicable to this Agreement in the event of a potential default by either Party.

8. Mitigation Credits. In the event of termination or a default under this Agreement, City shall honor all mitigation credits utilized prior to the date of any such termination or default.

9. Expiration. This Agreement shall expire and shall be fully performed upon Pardee's sale, transfer, or utilization of all mitigation credits and filing of its Final Annual Ledger Report to City.

10. Interpretation and Headings. The language in all parts of this Agreement shall in all cases be simply construed according to its fair meaning and not strictly for or against any of the Parties. Headings of the sections of this Agreement are for the purposes of convenience only,

and the words contained in such headings shall in no way be held to explain, modify, amplify, or aid in the interpretation, construction, or meaning of the provisions of this Agreement.

11. Modification. This Agreement is not subject to modification except in a writing signed by the Parties, and any attempted modification not in compliance with this requirement shall be void.

12. Notices. All notices, demands, or requests in connection with this Agreement may be personally delivered or sent by facsimile, recognized overnight delivery service, or mail, certified or registered, postage prepaid, to the persons set forth below, and shall be deemed received upon personal delivery, confirmation of facsimile transmission, one (1) day following deposit with an overnight delivery service, and two (2) days after deposit with the United States mail. All notices shall be addressed as follows or as the Parties may from time to time specify in writing:

If to Pardee:	Pardee Construction Company 12220 El Camino Real, Suite 300 San Diego, California 92130 Attn: Beth Fischer Facsimile No: (858) 794-2599 Telephone No: (858) 794-2500
With a copy to:	Seltzer Caplan McMahon Vitek 750 B Street, Suite 2100 San Diego, California 92101 Attn: Thomas F. Steinke, Esq. Facsimile No: (619) 702-6819 Telephone No: (619) 685-3038
If to City:	City of San Diego 202 C Street, MS 5A San Diego, California 92101 Attn: Gary Halbert Facsimile No: (619) 236-6478 Telephone No: (619) 533-6497

The Parties may change the address to which such notices, payments, or other communications may be sent by giving each other written notice of such change. The Parties agree to accept facsimile transmitted signed documents and agree to rely upon such documents as if they bore original signatures.

13. Successors and Assigns. This Agreement and each of its covenants and conditions shall be binding on and shall inure to the benefit of the Parties and their respective successors and assigns.

14. Exhibits. All Exhibits referred to in this Agreement are attached to this Agreement and are incorporated herein by reference.

15. Counterparts. This Agreement may be executed by the Parties in several counterparts, all of which together shall be deemed to be an original executed document.

16. Governing Law. This Agreement shall be governed by and construed in accordance with the laws of the State of California.

17. Naming Rights. Pardee shall retain sole and exclusive naming rights to the 131 acre Restoration and Mitigation Credit Area.

18. Effective Date. The effective date of this Agreement is as set forth above. In the event a date is not inserted as the effective date, then the latest date entered on a signature line for this Agreement will be the effective date.

IN WITNESS WHEREOF, this Agreement is executed by the City of San Diego and by Pardee Construction Company.

PARDEE CONSTRUCTION COMPANY,
a California corporation

By: _____

Its: Gregory P. Sorich
Vice President

By: _____

Its: Assistant Vice President

CITY OF SAN DIEGO,
a municipal corporation

By: _____

Its: Chief Deputy Director
Planning Department

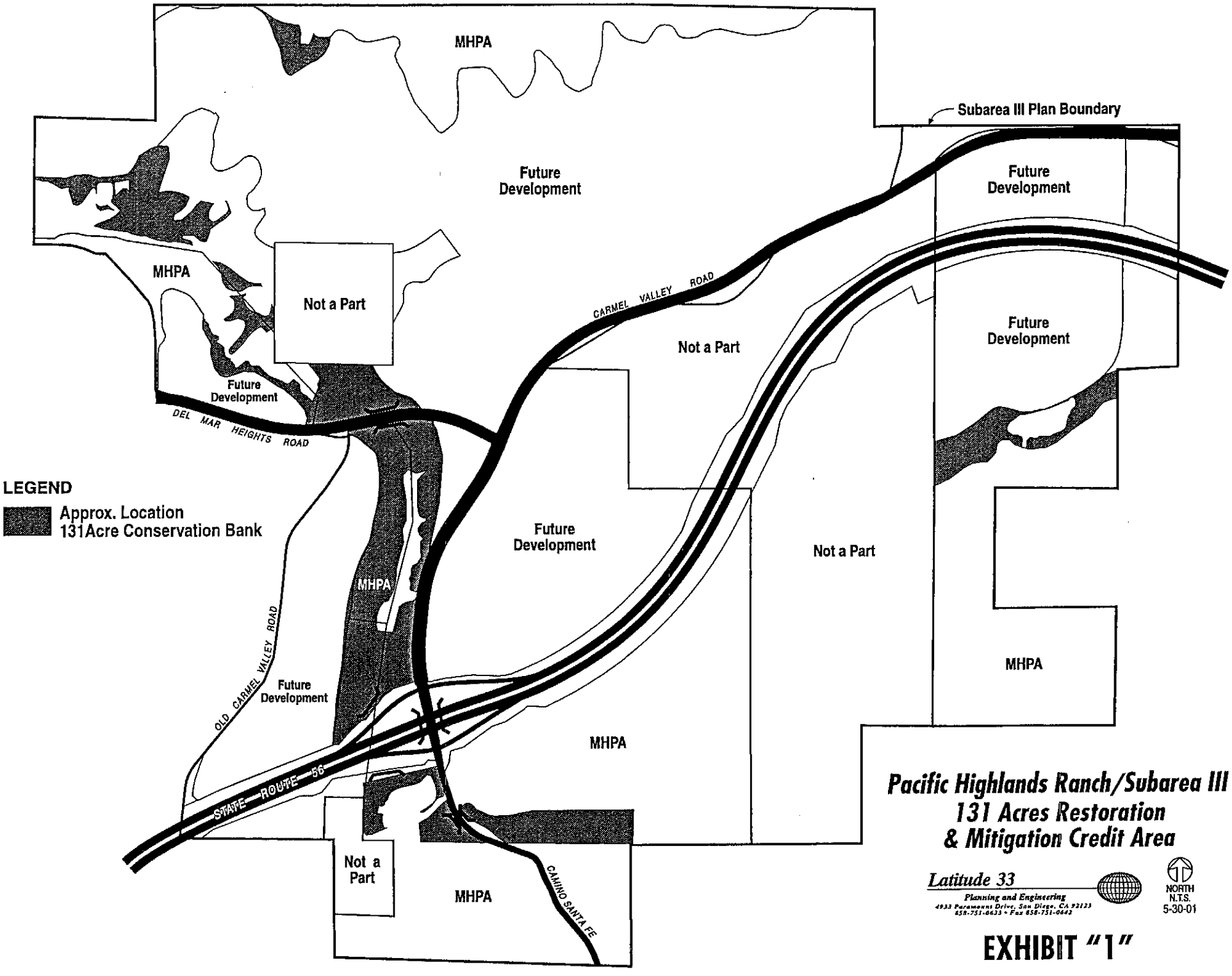
Approved as to form and legality this 14 day of JUNE, 2001.

CASEY GWINN, CITY ATTORNEY

By: _____

Deputy City Attorney

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Pacific Highlands Ranch/Subarea III
131 Acres Restoration
& Mitigation Credit Area

Latitude 33
Planning and Engineering
4933 Paramount Drive, San Diego, CA 92123
858-751-0633 • Fax 858-751-0642

NORTH
N.T.S.
5-30-01

EXHIBIT "1"

ATTACHMENT 2

Pacific Highlands Ranch Restoration and Mitigation Credit Detail

Pacific Highlands Ranch Restoration and Mitigation Credit Detail

Pacific Highlands Ranch (PHR) Area	Legal Description	Area (Ac)	Vegetation Community	Tier (City of San Diego 2012)	City Sign-off/Acceptance of Restoration Effort
1 (PHR Units 1 &7)	Lot 101 of Map 14311	28.6	Chamise Chaparral	IIIA	Complete
	Lot 'D' of Map 14816				
2 (PHR UNITS 2, 3, & 12)	Lot 'A' of Map 14484	12.8	DCSS	II	Complete
	Lot 'B' of Map 14994	5.1	DCSS	II	Complete
	Lot 'B' of Map 14635	10.4	DCSS	II	Complete
	Parcels 1-3 of PM 21001	16.1	DCSS	II	Complete
6 (PHR Unit 28)	Lot 'A' of Map 16085	21	DCSS	II	7/11/2022
9 (PHR Units 9A & 9B)	Lot 'B' of Unit 9A map	1.3	Chamise Chaparral	IIIA	Anticipated Spring 2023
		2	Chamise Chaparral	IIIA	Anticipated Spring 2023
	Lot 'A' of Unit 9B Map	0.5	Chamise Chaparral	IIIA	Anticipated Spring 2023
		1.4	Chamise Chaparral	IIIA	Anticipated Spring 2023
10 (PHR Units 8D & 9C)	Lot 'A' of Unit 8D Map	17.8	Chamise Chaparral	IIIA	7/11/2022
	Lot 'D' of Unit 9C Map	2.2	Chamise Chaparral	IIIA	7/11/2022
	Lot 'D' of Unit 9C Map and Lot 'A' of Unit 8D Map	10.4	Chamise Chaparral	IIIA	7/11/2022
	Credits Remaining	**129.6**			

Areas Turned over to City of SD [1]	Legal Description	Area (Ac)	Vegetation Community	Tier (City of San Diego 2012)	Ownership Turnover Date
8 (PHR Units 18 & 20)		0.6	Chamise Chaparral	IIIA	2021
	Lot 'G' of Map 16107	1	Chamise Chaparral	IIIA	2021
[1] Turned over areas are no longer eligible for mitigation credit					

ATTACHMENT 3

Pacific Highlands Ranch Restoration and Mitigation Credit Ledger

PHR Mitigation Credit Ledger

Total Credits	**131**
Credits Turned Over to the City	**1.6**
Credits Used	**10.38**
Credits Remaining	**119.02**

Last Name	First Name	Company	Address	City	State	Zip Code	Phone Number	Email Address	Acreage Credits Used	Credit Location	Date Used
Kashani	Allen	Tri Pointe Homes	13520 Evening Creek Drive North, Suite 300	San Diego	CA	92128	858-794-2510	allen.kashani@tripointehomes.com	10.38	Area 6	2023 /TBD
								TOTAL CREDITS USED	**10.38**		

Mitigation Credit Agreement Excerpts:

Section 2.2. "Mitigation credit will be available for use as the restored habitat achieves the minimum success criteria identified in the MRP. City agrees to accept mitigation credits from the 131 acre Restoration and Mitigation Credit Area, or any portion thereof, upon achievement of the minimum success criteria identified in the MRP."

Section 4: "Database for Mitigation Bank Transactions. A database shall be established by Pardee in the following manner for purposes of tracking the utilization of mitigation credits. Pardee shall be responsible for maintaining a database ("Ledger"), which shall include a numerical accounting of (i) all mitigation credits; (ii) the balance of unused mitigation credits available; (iii) the name, address, and telephone number of the person or entity using the mitigation credits; and (iv) the location for which the mitigation credits were used. Pardee shall make the Ledger available to City within ten (10) business days of City's written request therefor. Upon use of mitigation credits, Pardee shall deliver to City an updated accounting of all mitigation credits used as of the date of the most recent use of mitigation credits. This information shall be sent to City within thirty (30) days after each use of mitigation credits. Pardee shall, on or before February 15th of each year, deliver to City a report ("Annual Ledger Report") covering the prior calendar year that contains all of the information described above. Pardee shall be responsible for maintaining a numerical accounting of mitigation credits used and the remaining balance of available mitigation credits."

ATTACHMENT 18

Otay Tarplant Mitigation Plan for the Nakano Project

Otay Tarplant Mitigation Plan for the Nakano Project
San Diego, California

Prepared for
Tri Pointe Homes
13400 Sabre Springs Parkway, Suite 200
San Diego, CA 92128

Prepared by
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RECON Number 3396.1
June 10, 2022

Vanessa Tang, Habitat Restoration Assistant

Meagan Olson, Restoration Project Director

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Acronyms and Abbreviations

CBP	Customs and Border Protection
MHPA	Multi-Habitat Planning Area
mitigation site	Otay tarplant mitigation site
MMC	Mitigation Monitoring Coordination
MSCP	Multiple Species Conservation Program
PEP	Plant Establishment Period
plan	Otay Tarplant Mitigation Plan
USFWS	U.S. Fish and Wildlife Service

1.0 Introduction

This mitigation plan (plan) details the process for mitigating impacts to Otay tarplant (*Deinandra conjugens*) resulting from implementation of portions of the Nakano Project (project). The project is in the city of Chula Vista and is bordered to the west, east, and south by the city of San Diego (Figures 1 and 2). The project proposes a residential development with supporting recreational amenities and infrastructure on the approximately 23.77-acre project site (Figures 1 and 2). Off-site improvements would be required to provide driveway access, as well as secondary emergency access and remedial grading. The project proposes two scenarios: the Annexation Scenario, with the project site being annexed into the city of San Diego, and the No Annexation Scenario, with the project site remaining in the city of Chula Vista. Off-site areas would remain in their respective jurisdictions in both scenarios.

To provide access to the project site via Dennery Road, off-site access improvements would be required within Assessor's Parcel Number 645-400-0500, located in the city of San Diego to the east of the project site. Impacts to Otay tarplant would result from construction of the driveway (impact site). Therefore, the impacts to Otay tarplant would occur within the city of San Diego in both scenarios, and mitigation for impacts to Otay tarplant would be subject to the requirements of the City of San Diego's Multiple Species Conservation Program (MSCP) Subarea Plan (City of San Diego 1997), and as implemented through the Land Development Code–Biology Guidelines (City of San Diego 2018). In addition, the mitigation design described in this plan incorporates recommendations included in the U.S. Fish and Wildlife Service (USFWS) Recovery Plan for *Deinandra conjugens* (Otay tarplant) (USFWS 2004).

As currently planned, the project will cause permanent impacts to 14 individuals of Otay tarplant (Table 1). Impacts to Otay tarplant shall be restored at a 4:1 ratio to ensure protection of this narrow, endemic plant species. The methods for implementing and maintaining this mitigation are laid out in this plan and include population monitoring measures and protections against edge effects as required by the City of San Diego's MSCP Subarea Plan Appendix A conditions of coverage for Otay tarplant (City of San Diego 1997). If any mitigation credits are not needed for this project, they will be available for future Tri Pointe Homes projects.

Table 1
Impacts and Required Mitigation

Direct Impacts to Otay Tarplant (*Deinandra conjugens*)	Mitigation Ratio[1]	Required Otay Tarplants to Fulfill Mitigation
14 individuals	4:1	56 individuals

[1]Mitigation ratios are consistent with the City of San Diego's MSCP Subarea Plan, Appendix A and per discussions with the City of San Diego's MSCP Subarea Plan staff.

Mitigation will be accomplished through seed collection and five years of maintenance and monitoring. This plan includes a discussion of existing conditions, an implementation and maintenance plan, ecological performance standards, monitoring requirements, and adaptive management.

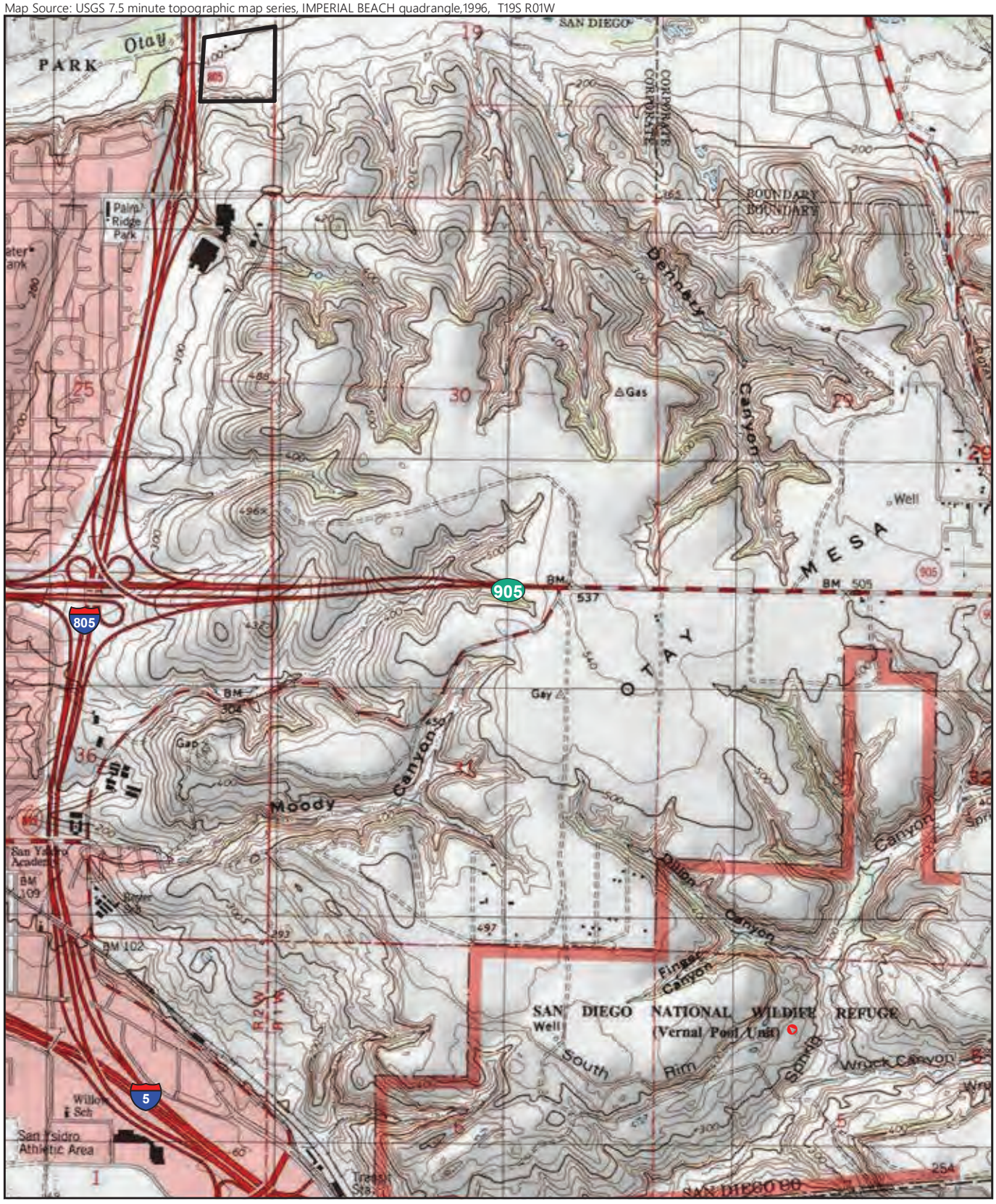


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FIGURE 1
Regional Location

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



0 Feet 2,000

Mitigation Site

Nakano Project Site

FIGURE 2

Mitigation Site Location on USGS Map

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1.1 Project Location

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

The mitigation site totals 0.001 acre, and is immediately adjacent to the 0.82 acre Southwest Village Otay tarplant mitigation site (RECON 2022a). Both sites are surrounded by a weed maintenance buffer that extends 30 feet beyond the boundary of the mitigation site. The mitigation site is located within open space, approximately 2.9 miles southeast from the impact site. The mitigation site occurs within non-native grassland on Linne clay loam, which is known to historically support Otay tarplant, as stated in the USFWS Recovery Plan for *Deinandra conjugens* (Otay tarplant) (USFWS 2004).

1.2 Otay Tarplant Biology and Status

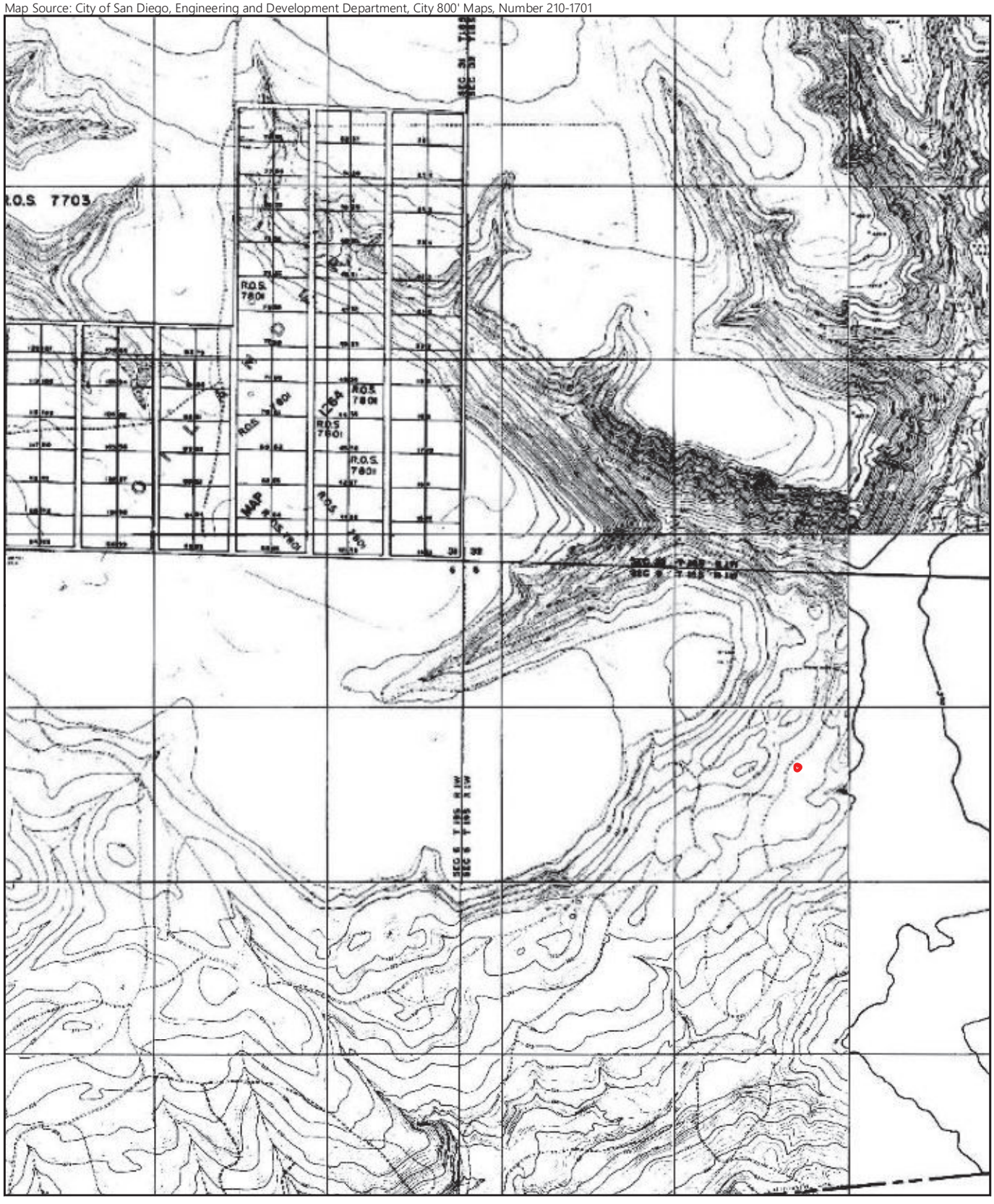
Otay tarplant is listed as a California endangered species and a federally threatened species (California Department of Fish and Wildlife 2019). It is a California Rare Plant Rank 1B.1 species (California Native Plant Society 2019) and is a covered species and narrow endemic species under the City of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

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

1.3 Mitigation Requirements

The project would result in direct impacts to approximately 14 Otay tarplant individuals which occupy 0.0002 acre (Figure 5; see Table 1). These impacts would be mitigated through off-site mitigation at a 4:1 ratio for establishment of 56 individuals within a total of 0.001 acre of Otay tarplant habitat to reduce these impacts to less than significant.

Map Source: City of San Diego, Engineering and Development Department, City 800' Maps, Number 210-1701



Mitigation Site

FIGURE 3
Mitigation Site Location
on City of San Diego 800' Map

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Image Source: NearMap (flown April 2022)



FIGURE 4

Mitigation Site Location on Aerial Photograph

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Image Source: NearMap (flown April 2022)



0 Feet 250

Project Boundary
Project Impacts
Otay Tarplant (*Deinandra conjugens*)

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FIGURE 5
Impacts to Otay Tarplant

The mitigation for impacts to Otay tarplant will be met through establishment of Otay tarplant within non-native grassland habitat. The non-native grassland will be replaced with native grasses and forbs to create a native ecosystem that supports Otay tarplant. While Otay tarplant impacts occurred outside of the MHPA, all mitigation will occur within the MHPA. This plan assumes that mitigation will occur concurrently with the Southwest Village Otay tarplant mitigation site; however, this mitigation could proceed independent of Southwest Village through alternative measures as coordinated with the City of San Diego (RECON 2022a). Alternative measures may include the purchase of mitigation credits or the selection of an alternative mitigation site, as approved by the City of San Diego.

2.0 Existing Conditions

This section describes the existing physical and biological conditions of the impact site and the mitigation site. This includes a summary of land use, topographical features, and soils observed during biological surveys conducted in 2020 and 2022 (RECON 2022b).

2.1 Impact Site Environmental Conditions

The impact site consists primarily of disturbed land and Diegan coastal sage scrub with areas of southern willow scrub, mule fat scrub, emergent wetland, disturbed riparian, non-native grassland, Eucalyptus woodland, ornamental, developed, and disturbed habitat. Within the impact site where Otay tarplant will be impacted, the Otay tarplant are located within revegetated coastal sage scrub supported by Salinas clay loam, on 9.6-degree, west-facing slopes.

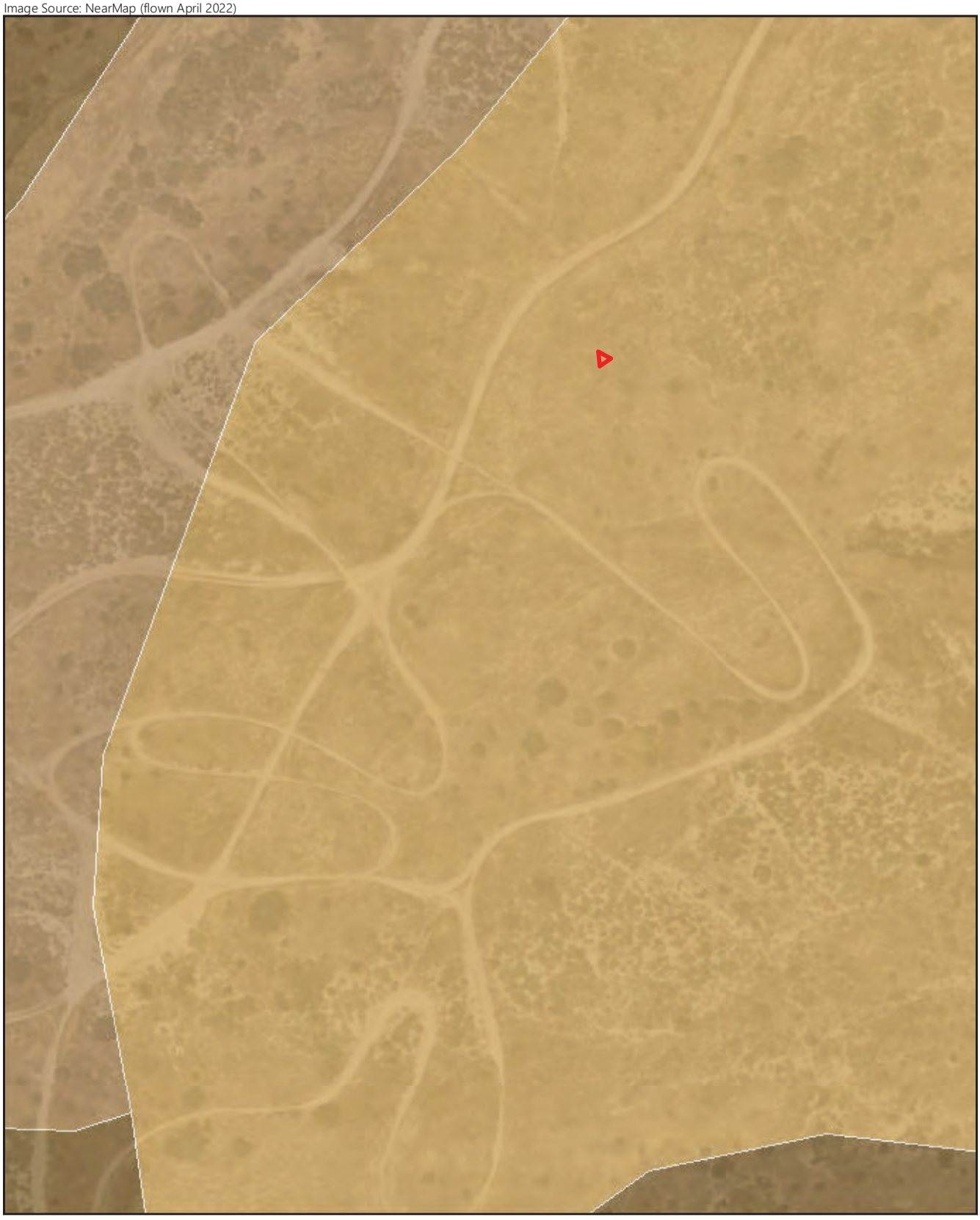
2.2 Mitigation Site Description

The mitigation site occurs on one undeveloped parcel (Assessor Parcel Number 667-040-13) owned by Tri Pointe Homes (see Figure 4). The 0.001 acre Nakano Otay tarplant mitigation site is immediately adjacent to 0.82 acre of Otay tarplant mitigation planned for the Southwest Village development project, for a total of 0.891 acre of mitigation for Otay tarplant. The total mitigation site is approximately 2.9 miles southeast of the impact site. The mitigation site occurs on undulating topography, to the southwest of planned vernal pool and coastal cactus wren (*Campylorhynchus brunneicapillus sandiegensis*) mitigation areas. The mitigation site and adjacent areas are located within the MHPA (see Figure 4). The mitigation site has been subjected to some recent and historic disturbances, mostly off-highway vehicle use.

2.3 Topography and Soils

The mitigation site is characterized by east- and south-facing slopes. Two soil types occur within the mitigation site: Linne clay loam, 30 to 50 percent slopes (LsF), and Olivenhain cobbly loam, 9 to 30 percent slopes (ohE; Figure 6; U.S. Department of Agriculture 1973). Linne clay loam soils formed from calcareous sandstone and shale and are located on hillslopes. The soil is typically well drained with medium to very rapid runoff and moderately slow permeability. Olivenhain cobbly loam soils formed in ancient cobbly and gravelly alluvium and are located on marine terraces and mesas. The topsoil is typically well-drained cobbly loam with a very cobbly clay subsoil (U.S. Department of Agriculture 1973).

Image Source: NearMap (flown April 2022)



Mitigation Site

Soil Type

- Linne clay loam, 30 to 50 percent slopes
- Olivenhain cobbly loam, 9 to 30 percent slopes
- Olivenhain cobbly loam, 30 to 50 percent slopes

0 Feet 100

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FIGURE 6

Mitigation Site Location on Soils Map

2.4 Biological Conditions

Non-native grassland is the dominant existing vegetation community within the mitigation site (Figure 7). The non-native grassland is dominated by dense non-native annual grasses, such as slender wild oat (*Avena barbata*) and wall barley (*Hordeum murinum*), as well as patches of black mustard (*Brassica nigra*), Russian thistle (*Salsola tragus*), tocalote (*Centaurea melitensis*), and fennel (*Foeniculum vulgare*). There are occurrences of native species within the non-native grassland including California encelia (*Encelia californica*), San Diego bur-sage (*Ambrosia chenopodifolia*), jojoba (*Simmondsia chinensis*), and bladderpod (*Peritoma arborea*). In addition, a complex of dirt roads and unauthorized pedestrian and off-road vehicle trails traverse the site.

2.5 Rationale for Expecting Success

2.5.1 Restoration Goals

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

2.5.2 Restoration Site Suitability

The proposed location of the mitigation site is within approximately 2.9 miles of the impact location within the City of San Diego's MHPA (see Figure 4). The mitigation site was chosen based on the Linne clay loam (see Figure 6), which is known historically to support Otay tarplant (USFWS 2004), and therefore appropriate for Otay tarplant growth and establishment. The existing non-native grassland within the mitigation site supports few native species and contains evidence of anthropogenic impacts, through the presence of unauthorized trails used by pedestrians and vehicles. Such anthropogenic impacts result in loss of native habitat and designated pollinators. The restoration activities described in this plan will remove the fragmentation and effects of the anthropogenic impacts to create one contiguous patch of native plant species that supports Otay tarplant. In addition, it is anticipated that restoration of the disturbed lands and non-native grassland to native habitat will reduce the extent of non-native invasive plants and will increase the habitat quality of the vegetation communities. These improvements will increase connectivity between populations of Otay tarplant and their pollinators, increasing their ability to reproduce.

Image Source: NearMap (flown April 2022)



Mitigation Site

Sensitive Plants

- San Diego Bur-sage (*Ambrosia chenopodiifolia*)
- San Diego County Viguiera (*Bahiopsis laciniata*)
- Palmer's Grapplinghook (*Harpagonella palmeri*)

Vegetation Communities

- Diegan Coastal Sage Scrub
- Maritime Succulent Scrub
- Disturbed Maritime Succulent Scrub
- Mule Fat Scrub
- Non-native Grassland
- Wetland
- Seasonal Basin
- Disturbed Land

0 Feet 100

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FIGURE 7
Existing Biological Resources

The mitigation site is considered suitable for Otay tarplant restoration; factors that support this assessment include the following:

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

Existing U.S. Customs and Border Protection (CBP) roads and planned MHPA trails occur near the proposed mitigation site (see Figure 4); these roads will facilitate maintenance access for restoration activities while existing roads located within the mitigation site will be closed off and their disuse will be coordinated with CBP and the City of San Diego. The mitigation site was planned with a buffer between planned MHPA trails located at the northwest end of the site to provide protection for Otay tarplant from pedestrians.

2.5.3 Restoration Viability

The viability of the mitigation site was assessed during the preparation of this plan per the City of San Diego's Land Development Code – Biology Guidelines (City of San Diego 2018). The assessment included consideration of the mitigation site's connectivity to larger planned open space and the surrounding land uses. While the project site boundary will occur approximately 2.9 miles to the northwest of the mitigation site, land uses immediately adjacent are planned as open space per the Southwest Village Specific Plan and City of San Diego's MHPA (see Figure 4). The location of the mitigation site adjacent to the larger open space preserve will reduce fragmentation of this sensitive plant species. By increasing habitat connectivity, necessary gene flow for the self-incompatible Otay tarplant will increase, which improves viability and longevity of the species and habitat quality. The MHPA trail system runs within 59 feet of the northern boundary of the mitigation site. No utility easements are present within the mitigation site (mitigation credit is not allowed within any easements) and potential future development in adjacent areas was taken into consideration when identifying the mitigation site.

The design of the mitigation site includes several modifications to preserve the restored habitat from the adjacent non-native grasslands, including a weed maintenance buffer from the edge of the mitigation site. The weed maintenance buffer will be maintained for broadleaf and perennial weeds to prevent their encroachment within the mitigation site.

3.0 Roles and Responsibilities

3.1 Project Proponent and Financial Responsibility

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

3.2 Responsible Agencies

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

Contacts: Ms. Liz Shearer-Nguyen
City of San Diego
Development Services Department
1222 First Avenue, MS 501
San Diego, CA 92101

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

3.3 Restoration Specialist

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

3.4 Installation/Maintenance Contractor

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

During the installation, the contractor will be responsible for initial weed control/dethatching, seeding, as well as maintenance of the restoration site during the 120-day Plant Establishment Period (PEP) and five-year maintenance period.

Following installation, the contractor will submit marked up as-builts for all activities that occurred during implementation to the City of San Diego. Following formal sign-off of the 120-day PEP, the contractor will maintain the mitigation site for five years. During this period, the contractor will service the entire mitigation site according to the maintenance schedule (Section 5.0, below). Service will include, but not be limited to, weed control, trash removal, watering, remedial seeding, and pest and disease management. All activities conducted will be seasonally appropriate and approved by the restoration specialist.

4.0 Implementation Plan

This section describes the design of the proposed restoration and how it will be implemented. Implementation of the restoration efforts would be conducted under the direction of the qualified habitat restoration specialist. Seed collection should commence at least one season prior to the initiation of project impacts. All other restoration activities would commence the first summer-fall season prior to, or concurrently with, construction. The proposed restoration design is shown on Figure 8.

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

4.1 Preliminary Design

Mitigation for impacts to Otay tarplant will consist of improvements to native habitat through restoration efforts that support germination, flowering, and seed set of Otay tarplant. Restoration for the project will occur on approximately 0.001 acre of non-native grasslands, adjacent to the 0.82 acre mitigation site for the Southwest Village project to create contiguous 0.821 acre of Otay tarplant habitat. Non-native grassland will be restored to native grassland habitat that supports Otay tarplant and clay-tolerant native grasses and annuals with pockets of native shrubs. Restoration will occur through native seed introduction and weed maintenance. Decompaction of disturbed areas that are currently unauthorized trails or roads will occur, as needed. The mitigation site will be maintained throughout the five-year maintenance and monitoring period to native habitat that supports Otay tarplant, as described in Section 5.0.

Image Source: NearMap (flown April 2022)



FIGURE 8
Otay Tarplant (*Deinandra conjugens*)
Mitigation Site Design

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4.2 Implementation Activities

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

Table 2
Restoration Implementation Activities Schedule

Task	Time of Year
1. Seed Collection and Bulking	Fall through Spring
2. Dethatching	Summer/Fall
4. Barrier/Signage Installation	Fall
5. Seed Installation	Winter, after first winter rains and prior to a predicted rain event

4.2.1 Seed Collection and Bulking

Once the Otay tarplant have set seed, typically between August and November with variability due to seasonal weather patterns, seed will be collected from the existing plant populations found within the impact area. In addition to Otay tarplant seed, the native species listed in Table 3 will also be collected. The collected seed will be taken to an approved native plant nursery, rough cleaned, and stored until the fall. In the fall, when temperatures cool and conditions begin to favor native plant germination, a portion of the seed will be sown into flats to germinate over the winter for seed bulking. Individuals will be properly cared for through flowering and seed set and seed will be collected and rough cleaned. The bulking process will continue until adequate seed quantities are obtained to meet the project requirements, which may require several seasons (at least two) of bulking. Seed collection and bulking activities will be closely coordinated between the restoration specialist and native plant nursery to ensure proper timing of collection, bulking, and storage activities.

Table 3
Plant Species Targeted for Collection

Scientific Name	Common Name
Achillea millefolium[1]	yarrow
Ambrosia chenopodiifolia	San Diego bur-sage
Amsinckia menziesii[1]	common fiddleneck
Apiastrum angustifolium[1]	mock-parsley
Artemisia californica	coastal sagebrush
Bloomeria crocea	common goldenstar
Cryptantha intermedia[1]	nievitas cryptantha
Convolvulus simulans	small-flowered morning-glory
Daucus pusillus	rattlesnake weed
Deinandra conjugens[1]	Otay tarplant
Dichelostemma capitatum	blue dicks
Encelia californica	California encelia

Table 3 Plant Species Targeted for Collection	
Scientific Name	Common Name
Eriophyllum confertiflorum[1]	long-stem golden yarrow
Grindelia camporum[1]	common gumplant
Lasthenia gracilis[1]	common goldfields
Lupinus succulentus	arroyo lupine
Lupinus truncatus	collar annual lupine
Microseris douglasii	small-flowered microseris
Peritoma arborea	bladderpod
Plantago erecta[1]	dot-seed plantain
Simmondsia chinensis	jojoba
Sisyrinchium bellum	western blue-eyed grass
Stipa pulchra[1]	purple needlegrass
NOTE: Quantities to be determined based on seed collection and bulking quantities as discussed in Section 5.3 [1]Species for which seed will be bulked.	

4.2.2 Dethatching

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

Cut material will be raked into piles, removed from the site, and taken to a landfill or put into a green waste dumpster for disposal. Removal of the thatch aides in preparing the site for seeding and reducing future weed growth that may inhibit establishment of Otay tarplant.

4.2.3 Barrier Installation

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

4.2.4 Seed Installation

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

Table 4
Maintenance Schedule

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

[1]Minimum frequency

4.3 As-Built Reporting

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

4.4 120-day Plant Establishment Period

The 120-day PEP will begin once the implementation activities are approved by the City of San Diego, likely once all site preparation and native seeding have been completed. The 120-day PEP shall last for 120 calendar days and shall consist of all maintenance activities and methods discussed in Section

5.0. Regular (at least every other week) qualitative monitoring will be conducted to assess native seed establishment and non-native weed germination and to make recommendations for maintenance activities, as needed (see Table 4). Year 1 will begin after successful completion of the 120-day PEP and after any required remedial seed installation has been completed. At the completion of the 120-day PEP, the restoration specialist will prepare a letter report for submittal to the City of San Diego to document activities conducted during the PEP and the site progress towards final success criteria.

5.0 Maintenance Plan

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

5.1 Weed Control

Weed control will be performed consistent with the following:

- All herbicide and pesticide use will be under the direction of a licensed qualified applicator and will be applied by personnel trained to apply herbicide. All weeding personnel will be educated to distinguish between native and non-native species with a particular focus on protecting Otay tarplant.
- Herbicide will only be applied when wind speed is less than five miles per hour, and spray nozzles will be of a design to maximize the size of droplets, to reduce the potential for drift of herbicide to non-target plants. Application of herbicide will not occur if rain is projected within 12 hours of the scheduled application.
- Weeds will only be removed by hand from within areas with dense concentration of Otay tarplant seedlings.
- Weeding will be done at a frequency and duration to ensure that weeds are not allowed to flower and set seed within the site. During the growing season this may be as frequently as every other week, depending on weather patterns. Any weeds that have set seed will be removed by hand and disposed of off-site.

5.2 Watering

Hand-watering will be performed consistent with the following:

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

5.3 Supplemental Seeding

Remedial seeding will be performed consistent with the following:

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

5.4 Supplemental Planting

Supplemental planting will be performed consistent with the following:

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

5.5 Trash Removal and Barrier/Sign Maintenance

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

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

5.6 Adaptive Management Approach

An adaptive management approach will be implemented if areas of the site are not attaining the desired native habitat cover. Adaptive management is defined, for the purposes of this plan, as a flexible, iterative approach to the long-term management of biological resources that is directed over time by the results of ongoing monitoring activities and direct observation of environmental stressors that are producing adverse results within the mitigation site.

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

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

6.0 Performance Standards

At the end of the five-year monitoring period, a minimum of 56 Otay tarplant individuals should be present within the mitigation site. This number may be adjusted based on the results of the pre-construction survey.

7.0 Monitoring Requirements

A minimum commitment of five years of monitoring of the mitigation site will be completed. Biological monitoring goals will include qualitative vegetation monitoring, Otay tarplant counts, and photographic documentation. The monitoring schedule is presented in Table 5.

Table 5
Monitoring Schedule

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

Table 5 Monitoring Schedule					
Task	Year 1	Year 2	Year 3	Year 4	Year 5
Photograph Documentation	As Needed	Spring	Spring	Spring	Spring
[1]Quantitative monitoring to begin in Year 1.					

7.1 Qualitative Monitoring

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

- Qualitative monitoring will occur every other week during the growing season in Years 1 and 2 (January–June), monthly thereafter with additional visits conducted during the growing season, as needed to ensure project success (see Table 5).
- Monitoring will include, but not be limited to, assessment of native seed germination, weed presence, and unauthorized trespassing. Monitoring results will be used to determine the timing and frequency of maintenance activities.

7.2 Quantitative Monitoring

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

7.3 Photographic Documentation

One permanent photo point will be established prior to the start of restoration activities. Representative photographs will be taken before implementation, at the completion of implementation, at the completion of the 120-day PEP, and annually to visually document the progress of vegetation cover development over the monitoring period.

7.4 Reporting

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

8.0 Notification of Completion

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

Following receipt of the final annual report, the City of San Diego MMC shall be invited to visit the mitigation site to confirm completion of the mitigation effort. The Otay tarplant mitigation requirements shall be deemed complete once the final success criteria are met and after written approval by the City of San Diego MMC has been received.

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