ATTACHMENT 18

Wetland Plan for the Southwest Village Specific Plan

RECON

Wetland Plan for the Southwest Village Specific Plan San Diego, California Project No. 614791

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October 15, 2024

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Acronyms and Abbreviations

Cal-IPC	California Invasive Plant Council
CDFW	California Department of Fish and Wildlife
City	City of San Diego
CNPS	California Native Plant Society
CRAM	California Rapid Assessment Method
DSD	Development Services Department
GPS	Global Positioning System
MHPA	Multi-Habitat Planning Area
MSCP	Multiple Species Conservation Program
PEP	Plant Establishment Period
project	implementation of portions of the Southwest Village Specific Plan
RECON	RECON Environmental, Inc.
Specific Plan	Southwest Village Specific Plan
USACE	U.S. Army Corps of Engineers
USBP	U.S. Border Patrol
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 Introduction

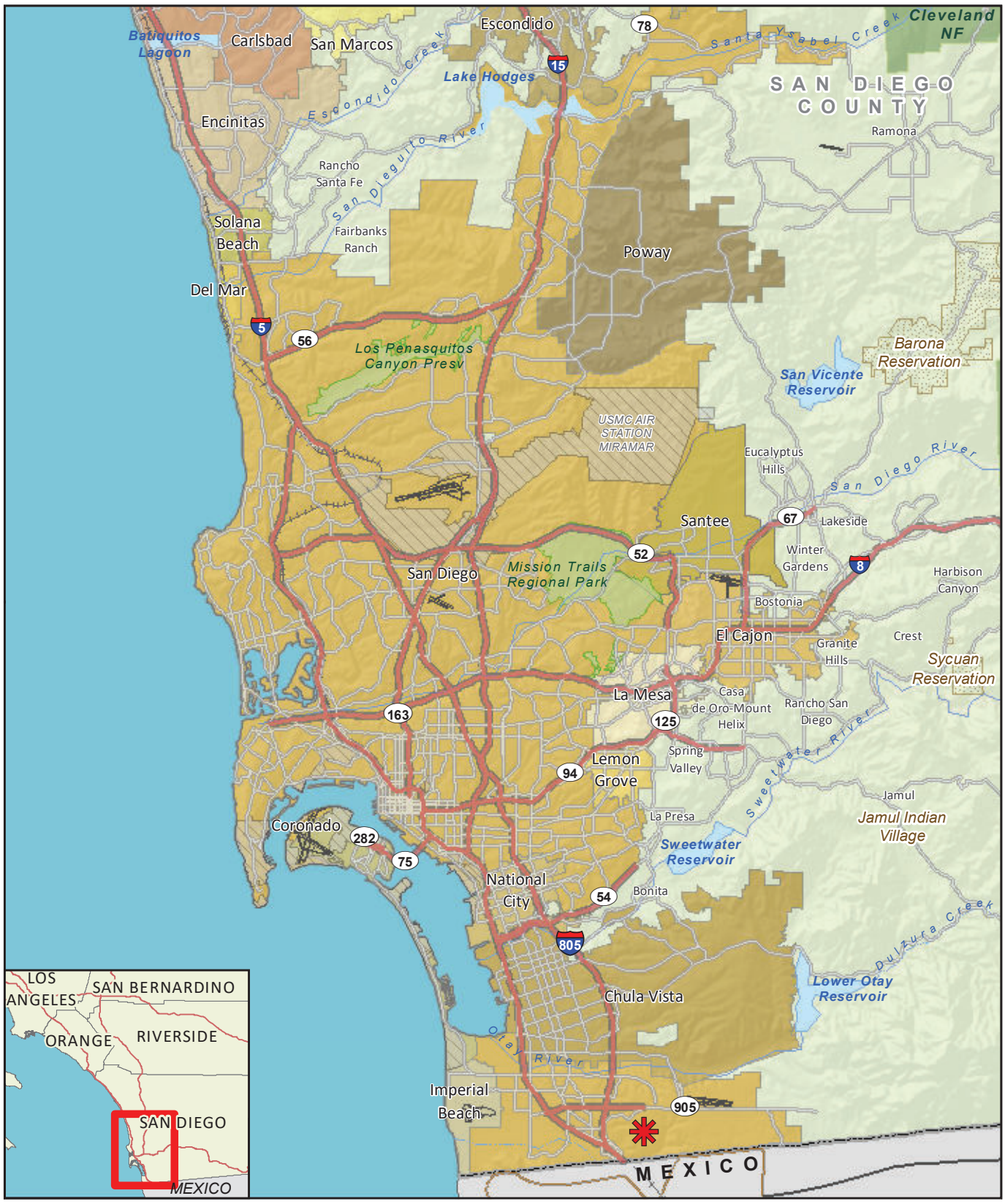
This wetland plan details the process for mitigating impacts to wetlands resulting from implementation of portions of the Southwest Village Specific Plan (project). The proposed Southwest Village Specific Plan (Specific Plan) is in the community of Otay Mesa, within the city of San Diego (Figures 1 and 2). The project includes the adoption of the Specific Plan, which is a policy framework intended to guide the future development of residences, commercial and retail spaces, public facilities including an elementary school, parks, and trails, and open space and habitat conservation areas within a 490-acre area. Additionally, the project includes development of a portion of the Specific Plan owned by Tri Pointe Homes, in addition to construction of an extension of Beyer Boulevard connecting San Ysidro to the Specific Plan area, which is a planned City of San Diego (City) public Mobility Element roadway.

The Biological Resources Report for the Southwest Village Specific Plan (RECON Environmental, Inc. [RECON] 2024a) analyses implementation of a portion of the Specific Plan in addition to off-site improvements including Beyer Boulevard at the project-level, while other portions of the Specific Plan are evaluated at the program-level. The project-level components of the project would result in permanent impacts to 0.36 acre of wetland habitat under City, Regional Water Quality Control Board (RWQCB), and California Department of Fish and Wildlife (CDFW) jurisdiction and 0.43 acre of non-wetland waters/streambed under RWQCB and CDFW jurisdiction. These impacts are proposed for mitigation in Spring Canyon. Remaining wetland resources (vernal pools and disturbed wetlands) impacted by the project-level components would be mitigated within the proposed vernal pool restoration area which is addressed under a separate mitigation plan.

This plan is prepared in accordance with the California Environmental Quality Act and the City's Multiple Species Conservation Program (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 state waters would require a Waste Discharge Requirement from RWQCB and a 1602 Streambed Alteration Agreement from CDFW. The following mitigation for impacts to 0.36 acre of wetlands and 0.43 acre of non-wetland waters/streambed is proposed:

- Impacts to 0.36 acre of City, RWQCB, and CDFW wetlands (wetland waters of the state) would be mitigated through the creation (establishment)[1] and enhancement (rehabilitation) of wetland habitat within Tri Pointe Homes property along Spring Canyon. To satisfy City, RWQCB and CDFW mitigation requirements, at least 0.36 acre of wetland habitat creation (establishment) and 0.37 acre of wetland habitat enhancement would occur in Spring Canyon. The mitigation provided by combining the wetland creation (establishment) and wetland enhancement (rehabilitation) in Spring Canyon would total at least 0.73 acre,

[1] U.S. Army Corps of Engineers (USACE) and RWQCB terminology is provided in parentheses for RWQCB use during project permitting. City definitions for wetland restoration and wetland enhancement correspond to USACE definitions for wetland re-establishment and wetland rehabilitation, respectively.



Project Location

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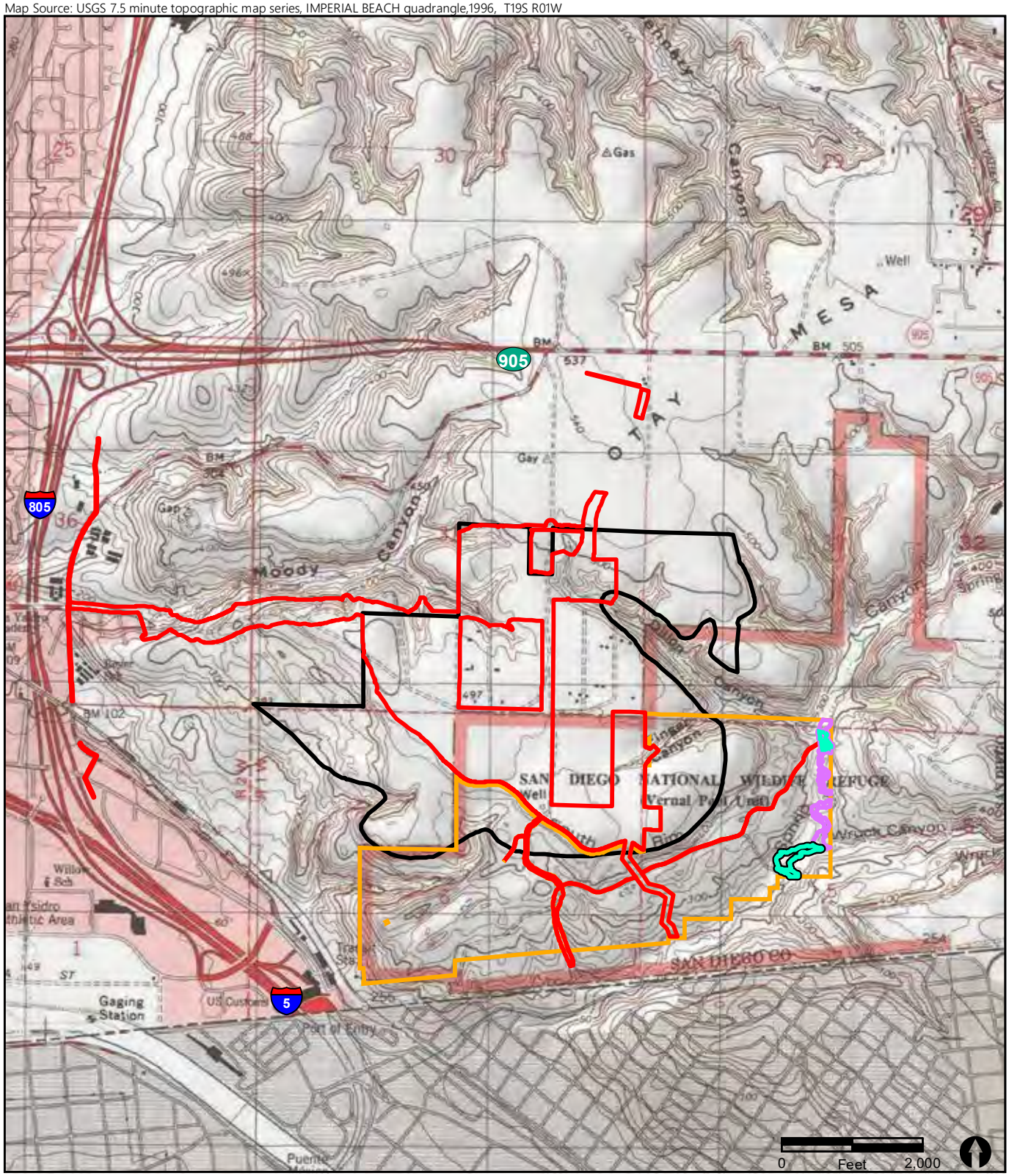
FIGURE 1
Regional Location

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



Project-level Analysis Area

Land to be Conserved and Managed by the City

Specific Plan Boundary

Southwest Village Wetland Plan Area (2.179 ac)

Wetland Plan Area (2.179 ac)

Nakano Wetland Plan Area (3.920 acres)

Creation (Establishment) Area for Southwest Village to be Implemented Concurrent with Nakano Project (0.458 ac)

Remaining Nakano Wetland Plan Area (3.462 acres)

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FIGURE 2

Project Location on USGS Map

which corresponds to a 2:1 ratio of mitigation to impacts, with the exception of a small amount of southern willow scrub impacts that would be mitigated at a 3:1 ratio.

The 0.36 acre minimum of wetland creation (establishment) required as mitigation for impacts to wetlands would be implemented in the upstream portions of Spring Canyon concurrent with the implementation of the Tri Pointe Homes Nakano Wetland Plan (RECON 2024b; Attachment 1). While 0.36 acre is the City minimum creation (establishment) requirement, 0.46 acre of creation (establishment) is proposed in the northern segment of the drainage as detailed in the Nakano Wetland Plan. This restoration area is highly suitable for wetland creation (establishment). Due to the Nakano wetland plan restoration being located upstream of the Southwest Village wetland plan area, the entirety of the Nakano Wetland Plan would be implemented before the restoration detailed in this plan. Implementing the Nakano wetland plan area first would ensure proper hydrological and ecological connectivity between the two wetland plan areas and would ensure upstream invasives do not affect downstream restoration areas. Details of upstream restoration implementation are contained in the Nakano Wetland Plan (RECON 2024b) and summarized below. The Nakano Wetland Plan would be required to be initiated (e.g., invasives removal complete) prior to the Southwest Village wetland plan area described in this plan.

- The 0.37 acre minimum of wetland enhancement (rehabilitation) required as mitigation for impacts to wetlands would be implemented in downstream portions of Spring Canyon concurrent with the implementation of the project. While 0.37 acre is the City minimum enhancement (rehabilitation) requirement, 0.62 acre of enhancement (rehabilitation) is proposed. The proposed enhancement (rehabilitation) area is highly suitable for wetland enhancement (rehabilitation) as it is currently dominated by tamarisk (*Tamarix ramosissima*), with lesser quantities of castor bean (*Ricinus communis*), and pepper trees (*Schinus* spp.) mixed in to the tamarisk scrub along the channel invert. In the enhancement (rehabilitation) area, four monoculture stands of tamarisk scrub would be removed.

- Impacts to 0.43 acre of RWQCB and CDFW non-wetland waters/streambed would be mitigated at a 1:1 ratio through the creation (establishment) of at least 0.43 acre of wetland habitat in Spring Canyon, of which 0.10 acre would be implemented in the upstream portion of the drainage concurrent with the Nakano Wetland Plan (RECON 2024b; Attachment 1). The remaining 0.33 acre of required RWQCB mitigation for impacts to non-wetland waters/streambed would be implemented in the downstream reaches of the Tri Pointe Homes Spring Canyon ownership, as detailed in this wetland plan. This downstream creation area consists of non-native grassland habitat that would be recontoured in order to reconnect it with the adjacent wetland habitat.

In addition to fulfilling the minimum mitigation requirements, the project also proposes the following project design features intended to support the long-term viability of the mitigation effort: (1) while a minimum of 0.36 acre of wetland creation (establishment) and 0.37 acre of wetland enhancement (rehabilitation) is required to meet the City's mitigation requirements, a total of 1.44 acres of creation (establishment) and enhancement (rehabilitation) is proposed in Spring Canyon, which exceeds the minimum mitigation of 0.73 acre; (2) the wetland plan area would also incorporate an additional 1.20 acres of adjacent areas of riparian scrub and wetland buffer where weed control would be conducted

as a project design feature (not counted toward any proposed mitigation credits); and (3) the project would pursue invasive species removal in upstream locations off-site on publicly owned lands as a project design feature.

The mitigation and project design features proposed within Spring Canyon would be consistent with the priorities set forth in the City 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. The activities outlined in this plan would create (establish) and enhance (rehabilitate) degraded areas of Spring Canyon currently supporting large and dense stands of invasive species and non-native grassland to high-quality mule fat scrub and southern willow scrub habitat with diverse native wetland vegetation layers and plant diversity. In both the creation (establishment) and enhancement (rehabilitation) areas, non-native species would be replaced with native riparian species potentially suitable to support least Bell's vireo (*Vireo bellii pusillus*), yellow-breasted chat (*Icteria virens*) and yellow warbler (*Setophaga petachia*), which are known to occur in Spring Canyon, including within the wetland plan area.

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

1.1 Wetland Plan Area Location

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

Mitigation for the project is proposed to be conducted in Spring Canyon. As depicted in Figure 2, the Southwest Village Wetland Plan area described in this plan is located within a 2.18-acre area in the downstream portions of the drainage. The 3.92-acre Nakano Wetland Plan area is located directly upstream and would include a 0.46-acre portion of the Southwest Village creation (establishment) requirement, consisting of 0.36-acre of creation (establishment) required by the City, CDFW and RWQCB as mitigation for 0.36-acre of impacts to wetlands and 0.10-acre of creation (establishment) only required by RWQCB and CDFW as part of the 0.43-acre of mitigation required for impacts to non-wetland waters (RECON 2024b; Attachment 1). These areas are shown on Figures 2 through 4. The Southwest Village Wetland Plan Area is in the downstream portion of the Tri Pointe Homes ownership in Spring Canyon, and the Nakano Wetland Plan Area is in the upstream portion of the

Tri Pointe Homes ownership in Spring Canyon. All mitigation and project design features detailed in this plan are located within the Southwest Village and Nakano Wetland Plan Areas.

The 2.18-acre Southwest Village Wetland Plan Area consists of the following:

1. Wetland enhancement (rehabilitation) required by the City, RWQCB, and CDFW totaling 0.62 acre.
2. Wetland creation (establishment) required only by RWQCB and CDFW (0.36 acre); (Note: a total of 0.43 acre of creation (establishment) is required by RWQCB and CDFW which would be satisfied by this 0.36-acre area plus a 0.10-acre portion of the Southwest Village creation (establishment) area located in the Nakano wetland plan area).
3. The wetland plan area would also incorporate an additional 1.20 acres of adjacent areas of riparian scrub and riparian buffer where weed control would be conducted as a project design feature (not counted toward any proposed mitigation credits).

As portion of the Southwest Village mitigation requirement (0.46 acre of creation) would be implemented as part of the Nakano wetland plan. The Southwest Village project would be conditioned to require that the Nakano wetland plan be implemented prior to or concurrent with the Southwest Village wetland plan. Therefore, all components of the 3.92-acre Nakano wetland plan would be project design features required to be implemented by Southwest Village.

In addition to implementation of the above-referenced components, the project would conduct additional invasive species removal in upstream tributaries to the wetland plan area to support the long-term viability of the mitigation effort. In coordination with the City, 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 wetland plan area (City, U.S. 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 wetland plan area as observed during a project planning visit in 2023.

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

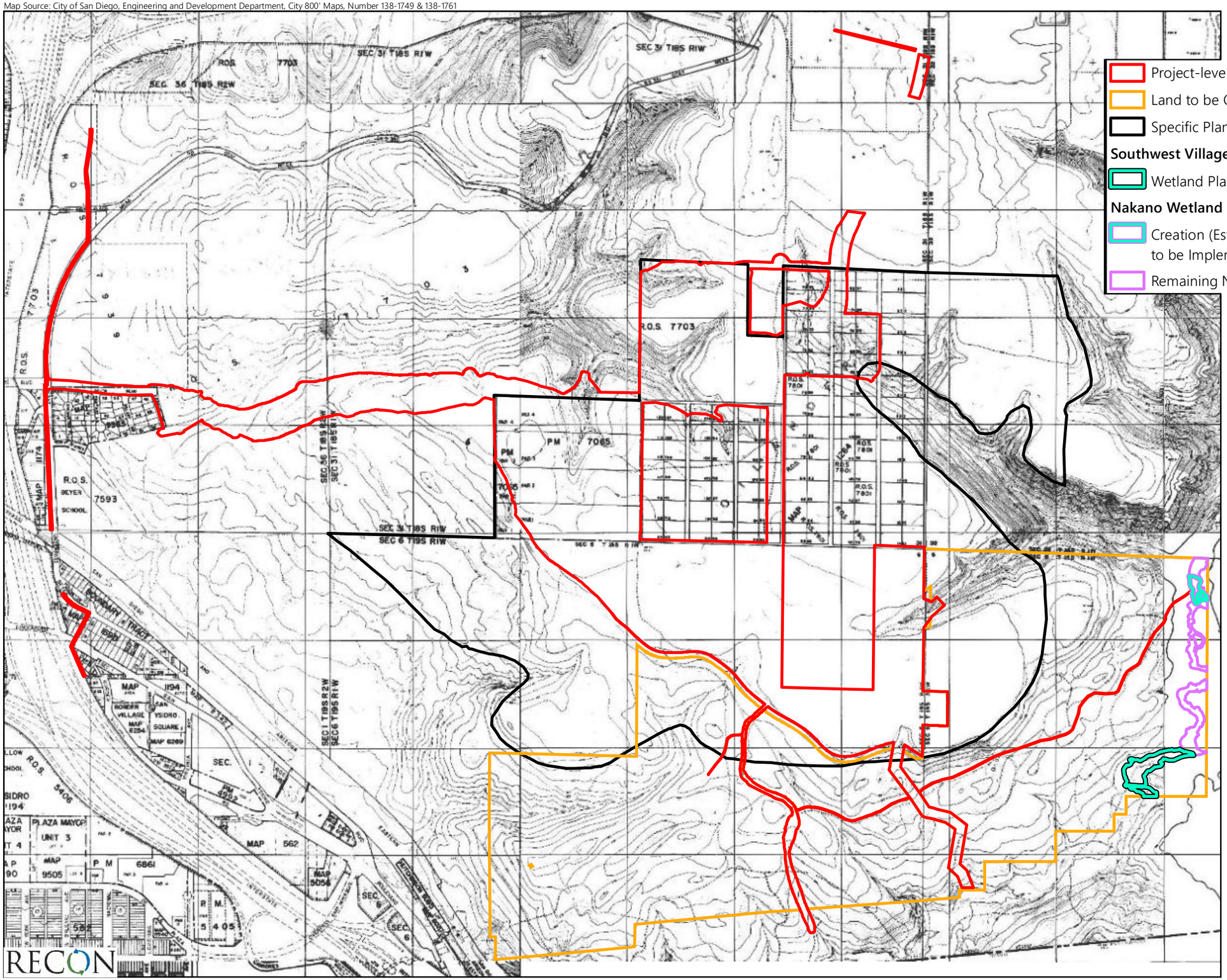

Image Source: NearMap (Flown May 2024)

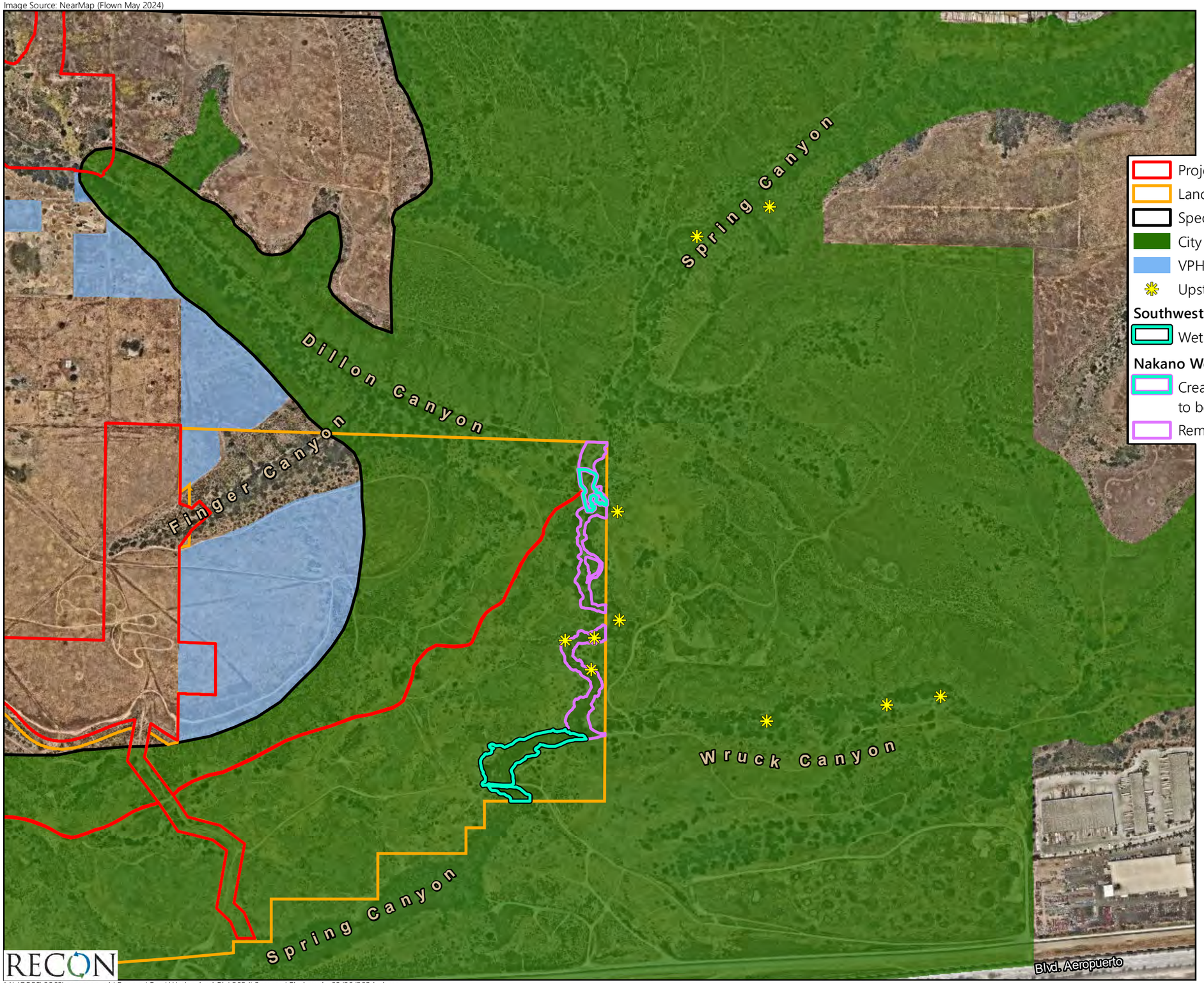

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FIGURE 4
Project Location on Aerial Photograph

1.2 Mitigation Requirements

The project would impact 0.36 acre of City and RWQCB/CDFW wetland waters of the state, and 0.43 acre of non-wetland waters of the state/streambed subject to RWQCB and CDFW jurisdiction (Table 1; Figure 5).

Table 1
Wetland Impacts by Jurisdiction

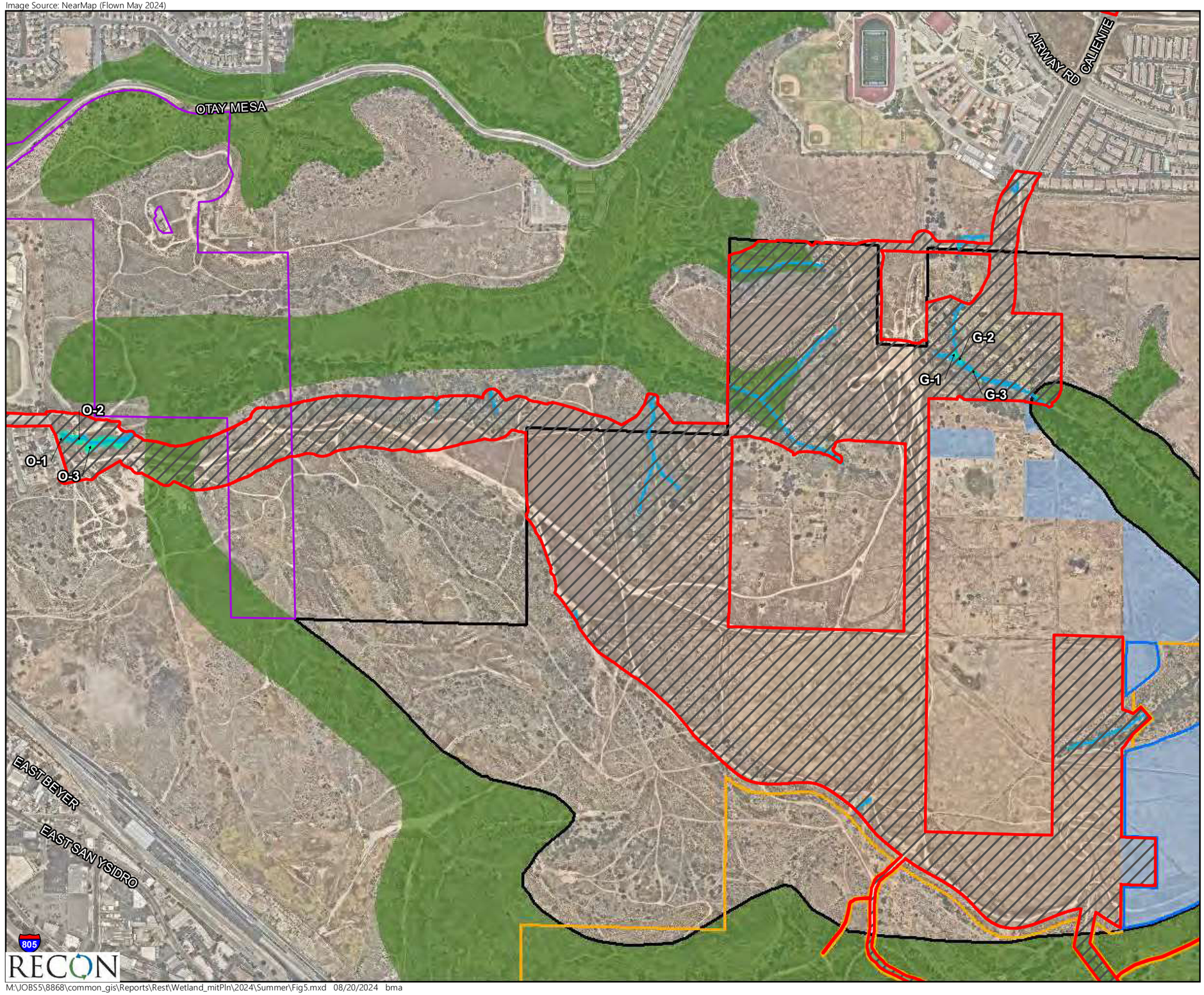
Jurisdictional Resource	Total Impacts (Acres)	Impacts by Jurisdiction		
		City of San Diego Wetlands (Acres)	RWQCB Waters of the State Wetland (Acres)	CDFW Waters of the State Riparian (Acres)
Mule Fat Scrub (riparian scrub)	0.36	0.36	0.36	0.36
Non-wetland Waters/ Streambed	0.43	-	0.43	0.43
TOTAL	**0.79**	**0.36**	**0.79**	**0.79**

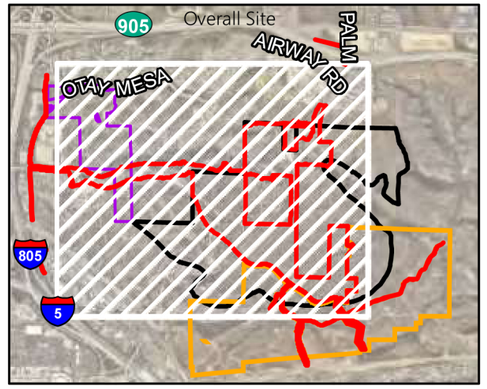
The mitigation required for these impacts is summarized in Table 2 and as follows:

- Per the City's Biology Guidelines (City of San Diego 2018), the project's impacts to jurisdictional wetlands must be mitigated at a minimum ratio of 2:1 for riparian scrub habitat (mule fat scrub) with at least one component of the wetland mitigation effort (at a minimum 1:1 ratio) consisting of wetland creation (i.e., establishment) or wetland restoration (i.e., re-establishment). The RWQCB requires a minimum of 1:1 ratio of creation (establishment) to mitigate for any net loss of wetlands; per the Executive Order W-59-93, commonly referred to as California's "no net loss" policy for wetlands, this mitigation requirement ensures that the Water Boards' regulation of dredge or fill activities will be conducted in a manner "to ensure no overall net loss and long-term net gain in the quantity, quality, and permanence of wetlands acreage and values…" The remaining balance may occur as wetland restoration in the form of re-establishment or enhancement. A small (<0.01 acre) of the project impacts would affect southern willow scrub that requires a 3:1 mitigation ratio, with 1:1 consisting of restoration and the remaining consisting of enhancement.

- Per the State Policy for Water Quality Control (State Water Resources Control Board 2021) the project impacts to non-wetland waters/streambed must be mitigated at a minimum 1:1 ratio consisting of wetland creation (i.e., establishment) or wetland restoration (i.e., re-establishment) to avoid the net loss of waters of the state.

Image Source: NearMap (Flown May 2024)





- Project-level Analysis Area
- Impacts
- Vernal Pool Restoration Areas
- Land to be Conserved and Managed by the City
- Specific Plan Boundary
- Furby North Preserve
- City of SD MHPA
- VPHCP MHPA

CDFW/SWRCB Waters of the State and City of San Diego Wetland

- Wetland Waters (0.37 acre)

CDFW/SWRCB Waters of the State

- Non-wetland Waters (0.43 acre)

0 Feet 600

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FIGURE 5
Impacts to Wetland Habitat

Table 2 Wetland Impacts and Required Mitigation					
Wetland Type	Impacts (Acres)	Minimum Required City Mitigation Ratio in Spring Canyon[1]	Additional RWQCB Mitigation Ratio No Net Loss of Non-wetland Waters/ Streambed[2]	Total Mitigation Ratio	Required Mitigation[3] (Acres)
Wetland (Riparian)	0.36	1:1 Restoration	-	1:1	0.36
		1:1 Enhancement[4]	-	1:1[4]	0.37
Non-wetland Waters/ Streambed	0.43		1:1 Creation	1:1	0.43
TOTAL	**0.79**	**-**	**-**	**-**	**1.16**

[1]Consistent with the City Biology Guidelines (Section III.B.1.(a) Table 2a).
[2]Consistent with U.S. Army Corps of Engineers (USACE) Compensatory Mitigation Standard Operating Procedures (USACE 2016) and State Policy for Water Quality Control (SWRCB 2021).
[3]Mitigation requirements would be achieved through at least 0.36 acre of wetland creation (establishment) and at least 0.37 acre of wetland enhancement (rehabilitation) to satisfy City, RWQCB, and CDFW mitigation requirement for impacts to wetlands. A total of 0.43 acre of wetland creation (establishment) is proposed satisfy RWQCB/CDFW mitigation requirements for impacts to non-wetland waters/streambed. Wetland creation (establishment) for City plus RWQCB requirements would total at least 0.79 acre (0.36 + 0.43) and would include the conversion of non-native grassland habitat to native riparian habitat within Spring Canyon, while the 0.37-acre minimum of wetland enhancement (rehabilitation) would include the conversion of tamarisk scrub to native wetland habitat. Of the minimum 0.79 acre of creation (establishment) required for Southwest Village project impacts to wetlands and non-wetland waters/streambed, 0.46 acre would be implemented concurrently with the Tri Pointe Homes Nakano project, which proposes wetland mitigation in the northern segment of Spring Canyon (RECON 2024b, Attachment 1).
[4]Includes a small impact to southern willow scrub that will be mitigated at a 3:1 mitigation ratio, 2:1 of which would be enhancement.

The project's mitigation requirements would be achieved within Spring Canyon through at least 0.36 acre of wetland creation (establishment) to be implemented concurrent with the Nakano project and at least 0.37-acre wetland enhancement (rehabilitation) to satisfy City, RWQCB, and CDFW mitigation requirement for impacts to wetlands, included as part of this wetland plan. Additionally, 0.43 acre of creation (establishment) is required to satisfy RWQCB/CDFW mitigation requirements for impacts to non-wetland waters/streambed and is not required by the City; this 0.43-acre creation (establishment) component is would be provided partly by the Nakano wetland plan (0.10 acre) and partly by this wetland plan (0.33 acre).

Table 3 summarizes the proposed mitigation, which exceeds the mitigation requirements presented in Table 2, as well as project design features proposed to be implemented by the project. All Nakano wetland plan components would be required to be implemented prior to Southwest Village as a project design feature to ensure upstream seed bank and invasives are controlled prior to downstream restoration.

Table 3 Proposed Mitigation and Project Design Features			
Mitigation/Project Design Components	Proposed In Nakano Wetland Plan[1]	Proposed in this SWV Wetland Plan	Total
Mitigation			
Wetland Creation/Establishment	0.46[2]	0.36[3]	0.83[4]
Wetland Enhancement/Rehabilitation	-	0.62	0.62[5]
Subtotal	0.46[2]	0.98	1.45[6]
Project Design Features			
Weed Control	2.21	1.20	3.41
Wetland Creation/Establishment	0.45[7]	-	0.45[7]
Wetland Enhancement/Rehabilitation	0.80[7]	-	0.80[7]
Subtotal	3.46	1.20	4.66
Total Plan Area	**3.92**	**2.18**	**6.11**

NOTE: Totals may not add due to rounding
SWV = Southwest Village
[1]Wetland Plan implementation would be conditioned to require all components of the Nakano Wetland Plan to be implemented before the Southwest Village Wetland Plan components.
[2]The Nakano Plan addresses the City requirement for 0.36 acre of restoration for SWV. The remaining creation/establishment proposed in the Nakano Plan (0.10) is to address anticipated RWQCB/CDFW requirements.
[3]The 0.36 acre of creation identified in the SWV plan is to satisfy Regional Water Quality Control Board/California Department of Fish and Wildlife mitigation requirements for SWV. These acreages are not part of City requirements.
[4]Exceeds the required City and Regional Board/CDFW total restoration/creation (establishment) of 0.79 acre (see Table 2).
[5]Exceeds the required City restoration of 0.36 acre (see Table 2).
[6]Exceeds the required mitigation of 1.16 acre (see Table 2).
[7]These project components are mitigation for the Nakano project (RECON 2024b).

The minimum combined wetland creation (establishment) acreage required as mitigation for impacts to wetlands and non-wetland waters/streambed would total 0.79 acre. A total of 0.46 acre of that requirement would be satisfied through implementation of the Wetland Plan for the Nakano Project within the Nakano Wetland Plan Area (see Figure 4; RECON 2024b). The remaining 0.33-acre wetland creation (establishment) acreage required to meet RWQCB and CDFW requirements would be satisfied by the proposed 0.36 acre of wetland creation/establishment proposed in this plan. The 0.36 acre of wetland creation (establishment) would include the conversion of disturbed and non-native grassland habitat to native riparian habitat within Spring Canyon through topographic recontouring, invasive species removal, and native species planting. The 0.37-acre minimum of wetland enhancement (rehabilitation) would include the conversion of tamarisk scrub to native wetland habitat through invasive species removal and native species planting. An additional 1.20 acres of weed control is included as a project design feature. Due to the 0.46-acre of wetland creation for Southwest Village proposed to be implemented with the Nakano Wetland Plan, the remaining components of the Nakano Wetland Plan are identified as project design features in Table 3 as these upstream components of the restoration would be required to be implemented regardless of whether the Nakano project were to proceed.

1.2.1 Site Selection (Watershed Approach)

According to the State Supplemental Dredge or Fill Guidelines, Subpart J, a watershed approach must be applied to evaluate the concept of "no net loss" (SWRCB 2021). The loss of waters of the State must be offset by creating wetlands to achieve "no net loss" of wetlands overall. The watershed approach considers the needs of a watershed when making mitigation decisions to achieve a balance between wetland impacts and protecting ecological functions over time.

Spring Canyon was selected as a suitable wetland plan area for the project because it is close to the impact areas (less than two miles) and located in the same watershed as the impacts (the Tijuana River Watershed). The City of San Diego supports the selection of Spring Canyon based on the City's MSCP Subarea Plan's Specific Management Directives for southern Otay Mesa as a priority area for restoration (City of San Diego 1997).

1.2.2 Mitigation and Restoration Definitions

The mitigation activities proposed in this plan would create (establish) and enhance (rehabilitate) the wetland functions and values within the wetland plan area in line with City and USACE/RWQCB definitions, which are provided as follows:

- Per the City's Biology Guidelines Section III.B.1.(a), wetland creation is an activity that results in the formation of new wetlands in upland areas. An example is excavation of uplands adjacent to existing wetlands to lower the surface elevation in a manner to allow for surface waters, and the establishment of native wetland vegetation that would be sustained by the new surface flows, and wetland enhancement is an activity that improves the self-sustaining habitat functions of an existing wetland (City of San Diego 2018).

- Per the USACE Compensatory Mitigation Standard Operating Procedures, which are applied by RWQCB during the permitting process, creation (establishment) is the manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area and functions.

- Per the USACE, restoration is the manipulation of the physical, chemical or biological characteristics present to develop an aquatic resource that previously existed as a wetland site. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation:

    - 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.

City definitions for wetland creation and wetland enhancement correspond to USACE/RWQCB definitions for wetland establishment and wetland rehabilitation, respectively. USACE/RWQCB terminology is provided in parentheses after each use of the City terms "creation" and "enhancement."

The proposed creation (establishment) and enhancement (rehabilitation) would result in hydrological and morphological changes to the creek through the conversion of non-native grasslands by lowering the floodplain, and by removing dense stands of perennial invasive plant species, namely tamarisk, located within the floodplain that currently reduce water flow through the area. Topographic recontouring of non-native grassland uplands within the creation (establishment) area using mechanized equipment would facilitate the establishment and recruitment of native wetland species by bringing the surface closer to groundwater levels and increasing the frequency and length of groundwater to surface flow connection during rain events. 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 stands of tamarisk from the enhancement (rehabilitation) areas, hydraulic resistance values would be reduced for improved hydrologic function. The removal of the halophytic tamarisk and resulting improved flushing capacity would also reduce soil salinity for improved recruitment of native wetland vegetation and establishment of native wetland plantings. Large invasive species such as tamarisk would be cut at the stump and treated with herbicide, but the stump and roots would not be removed to avoid disturbing the creek system. No manual or mechanical equipment would be used to modify the creek system within the enhancement (rehabilitation) areas.

2.0 Existing Conditions

2.1 Wetland Plan Area Description

The wetland plan area is located within Spring Canyon, in the City MHPA Preserve, on land owned by Tri Pointe Homes (see Figure 4). The mitigation site detailed in this plan focuses on a 2.18-acre area located in the downstream reach of the Tri Pointe Homes Spring Canyon ownership consists of a mixture of native riparian habitat, monoculture stands of tamarisk scrub, and non-native grassland with a history of disturbances including off-road vehicle use and erosion. However, due to a 0.46-acre portion of the Southwest Village wetland restoration requirement (0.36 acre required to satisfy City requirements, plus 0.10 acre for RWQCB/CDFW mitigation) being located in the upstream portion of the drainage, the Nakano Wetland Plan area is depicted on figures in this report for reference, and details of the Nakano plan, which are required project design features of this project, are summarized in Table 3.

Stands of invasive non-native species have also been identified upstream of the wetland plan area, off-site on publicly owned lands, where weed removal is recommended and would provide long-term benefits to the wetland plan area (see Figure 4).

2.1.1 Topography and Soils

The wetland plan 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 2020), two soil types was mapped in the wetland plan area: Olivenhain cobbly loam 30 to 50 percent slopes and Diablo clay, 30 to 50 percent slopes (Figure 6). The Olivenhain series is the dominant soil type within the wetland plan area and consists of well-drained, moderately deep cobbly clay loam derived from soft calcareous sandstone and shale, with rapid runoff and consist of and are (USDA 1973). The Diablo series consists of well-drained, moderately deep to deep clays derived from soft, calcareous sandstone and shale (USDA 1973).

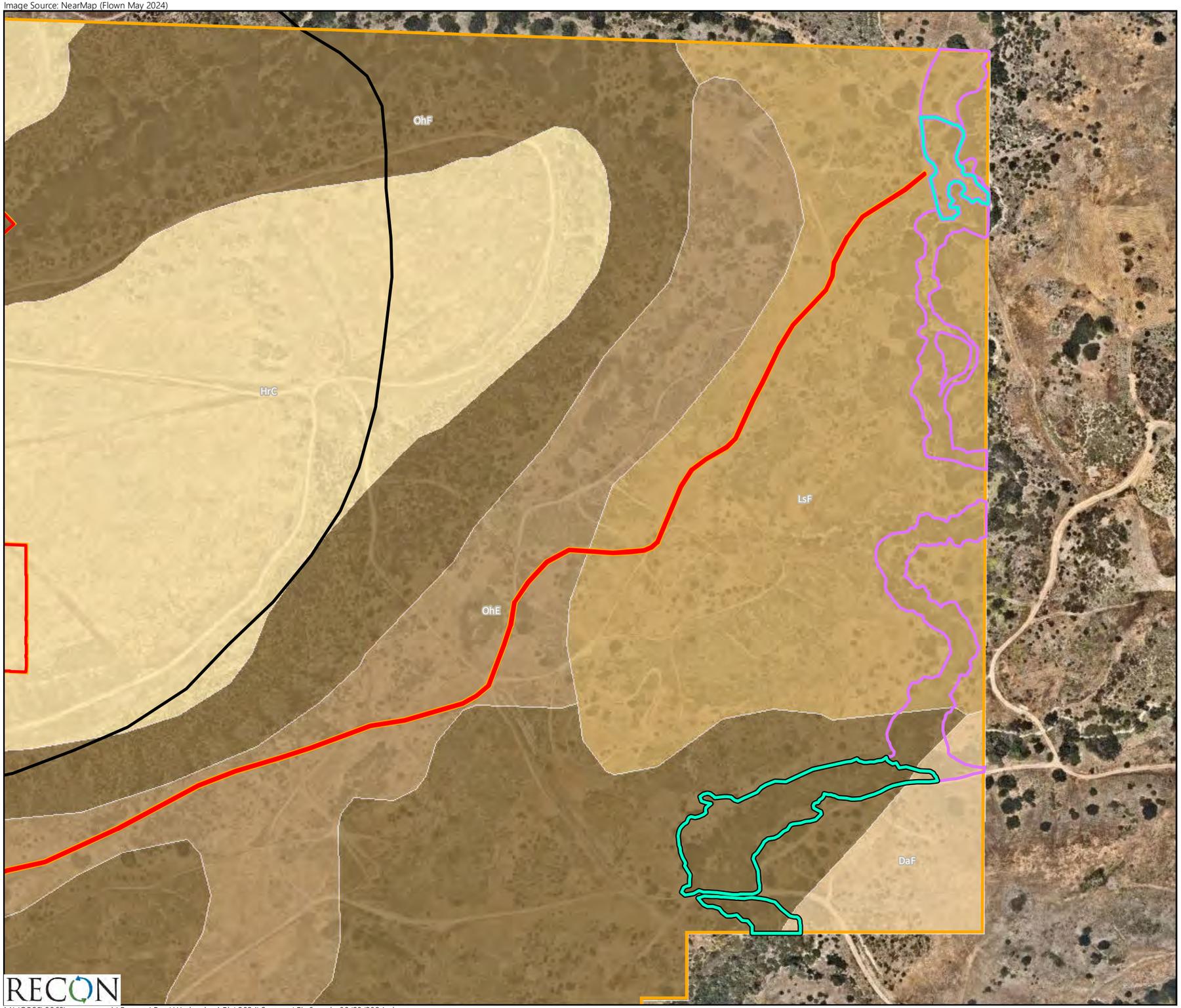
2.1.2 Hydrology

The wetland plan area is located within Spring Canyon, with additional nearby tributaries including Dillon Canyon, Finger Canyon, and Wruck Canyon (see Figure 4). Existing hydrology within the northern portion of the drainage associated with the Nakano Wetland Plan area is depicted on Figure 7.1. Hydrology within the Southwest Village wetland plan area is mapped on Figure 7.2 and depicts the natural flood channel and two-year floodplain limits. Waters in this area include City wetlands, CDFW mapped riparian habitats, and natural flood channel. City waters are mapped throughout Spring Canyon based on vegetation composition, which consists of a high concentration of mule fat scrub and tamarisk scrub found within the wetland plan area (Figure 8.2) and directly upstream of the wetland plan area (Figure 8.1). The watershed immediately surrounding the canyon is largely undeveloped and provides upland buffers that protect water quality.

A hydraulic analysis was performed by RICK identifying the limits of inundation for the 2-, 5-, and 10-year flood events (see Figures 7.1 and 7.2; Attachment 2). The hydraulic analysis indicates that

most of the wetland plan area lies within the 2-year flow limits, indicating adequate hydrologic functions to establish native riparian habitats.

Image Source: NearMap (Flown May 2024)



Project-level Analysis Area

Specific Plan Boundary

Land to be Conserved and Managed by the City

Southwest Village Wetland Plan Area (2.179 ac)

Wetland Plan Area (2.179 ac)

Nakano Wetland Plan Area (3.920 acres)

Creation (Establishment) Area for Southwest Village to be Implemented Concurrent with Nakano Project (0.458 ac)

Remaining Nakano Wetland Plan Area (3.462 acres)

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 250

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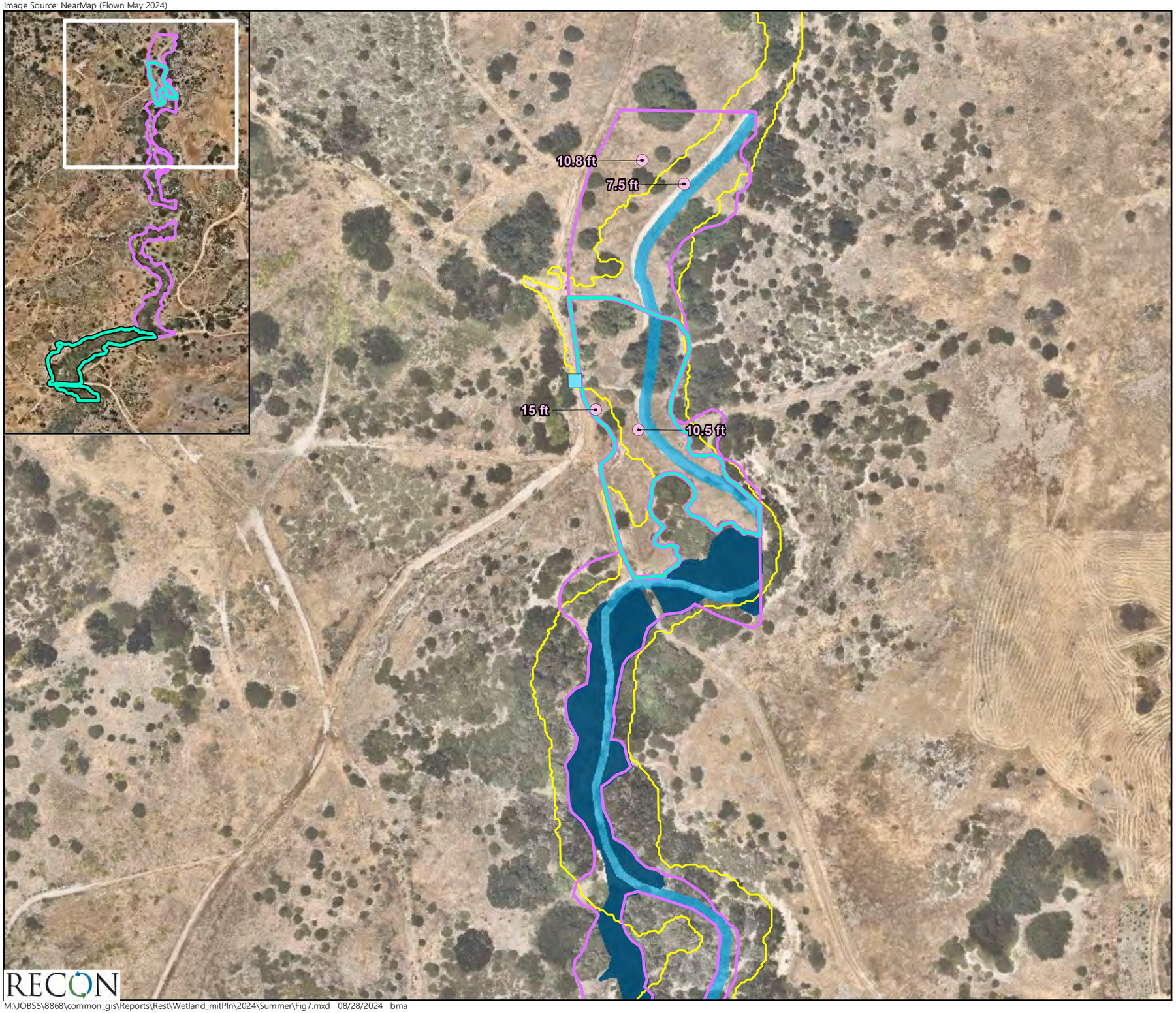
FIGURE 6
Wetland Plan Area Location on Soils Map

Image Source: NearMap (Flown May 2024)



June 2024 Groundwater Drilling Location (Depth to Groundwater)

Culvert

Natural Flood Channel

2-year Floodplain

City of San Diego Wetlands / CDFW Riparian

Southwest Village Wetland Plan Area (2.179 ac)

Wetland Plan Area (2.179 ac)

Nakano Wetland Plan Area (3.920 acres)

Creation (Establishment) Area for Southwest Village to be Implemented Concurrent with Nakano Project (0.458 ac)

Remaining Nakano Wetland Plan Area (3.462 acres)

0 Feet 100

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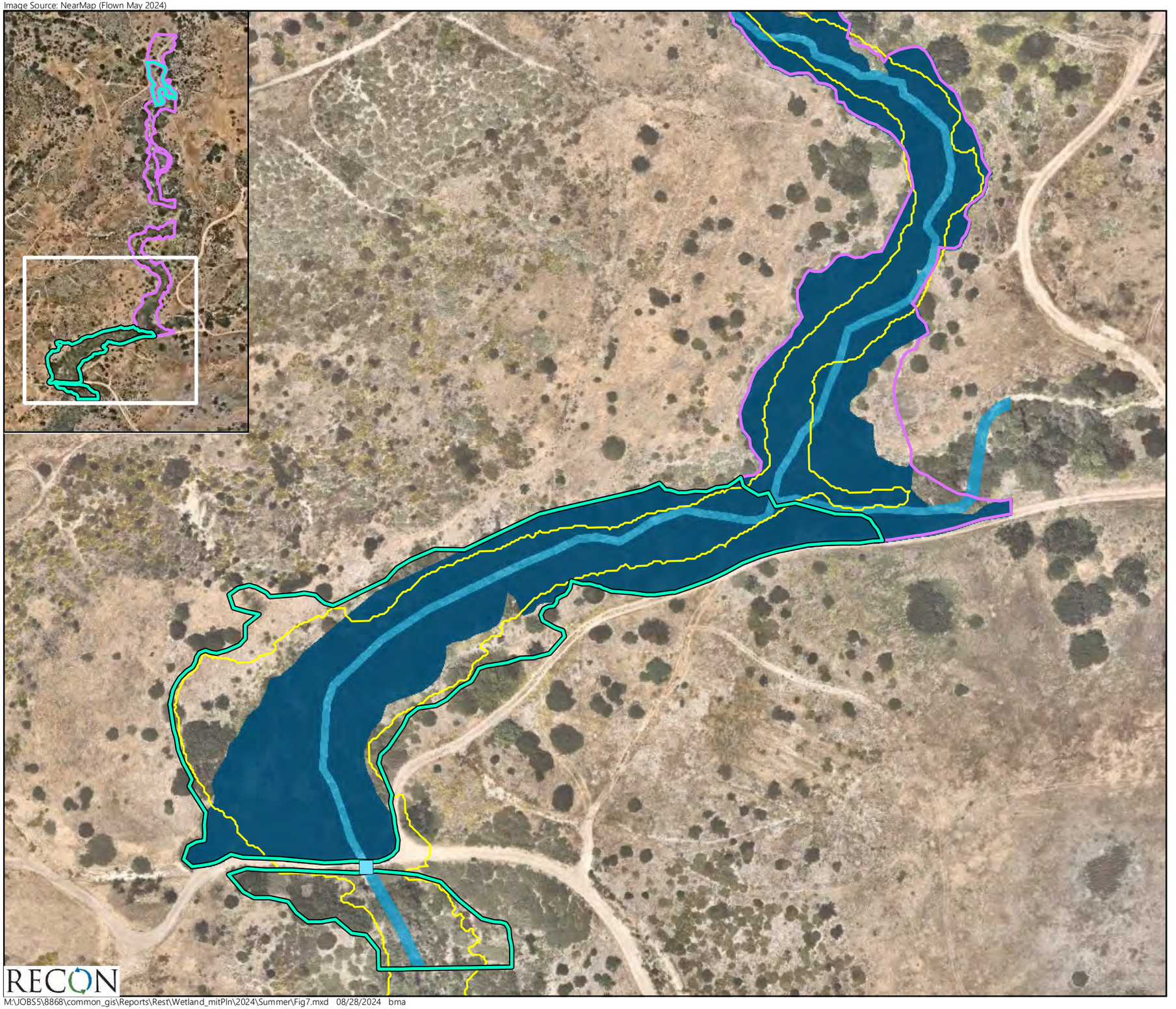
FIGURE 7.1
Wetland Plan Area Existing Hydrology

Image Source: NearMap (Flown May 2024)



Culvert

Natural Flood Channel

2-year Floodplain

City of San Diego Wetlands / CDFW Riparian

Southwest Village Wetland Plan Area (2.179 ac)

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Remaining Nakano Wetland Plan Area (3.462 acres)

0 Feet 100

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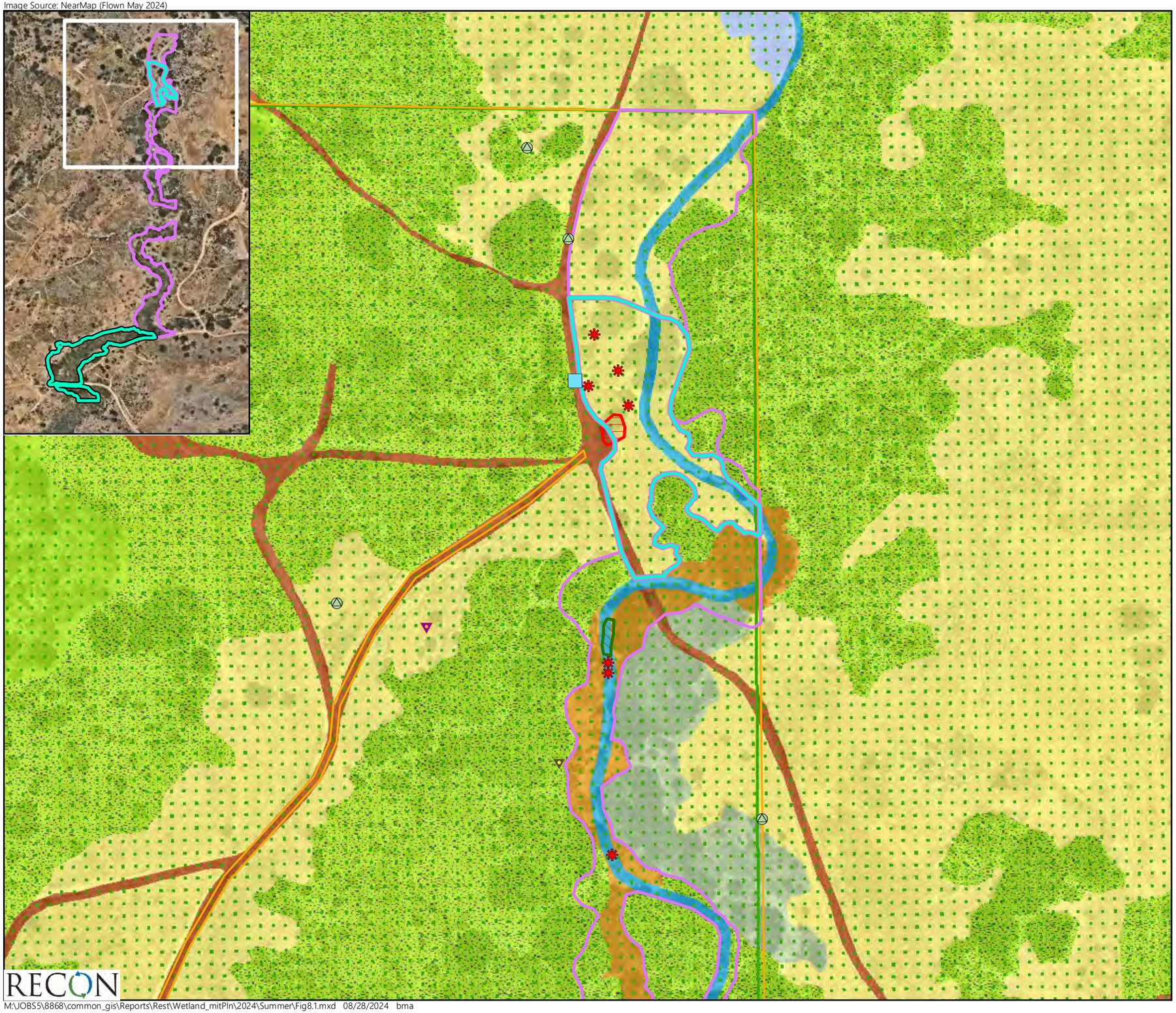
FIGURE 7.2
Wetland Plan Area Existing Hydrology

Image Source: NearMap (Flown May 2024)



- Culvert
- Land to be Conserved and Managed by the City
- City of SD MHPA

Southwest Village Wetland Plan Area (2.179 ac)

- Wetland Plan Area (2.179 ac)

Nakano Wetland Plan Area (3.920 acres)

- Creation (Establishment) Area for Southwest Village to be Implemented Concurrent with Nakano Project (0.458 ac)
- Remaining Nakano Wetland Plan Area (3.462 acres)

Vegetation Communities

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

Sensitive Animals

Birds

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

Sensitive Plants

- San Diego Bur-sage (*Ambrosia chenopodiifolia*)

Invasive Plants

- Castor Bean
- Fennel

0 Feet 100

RECON

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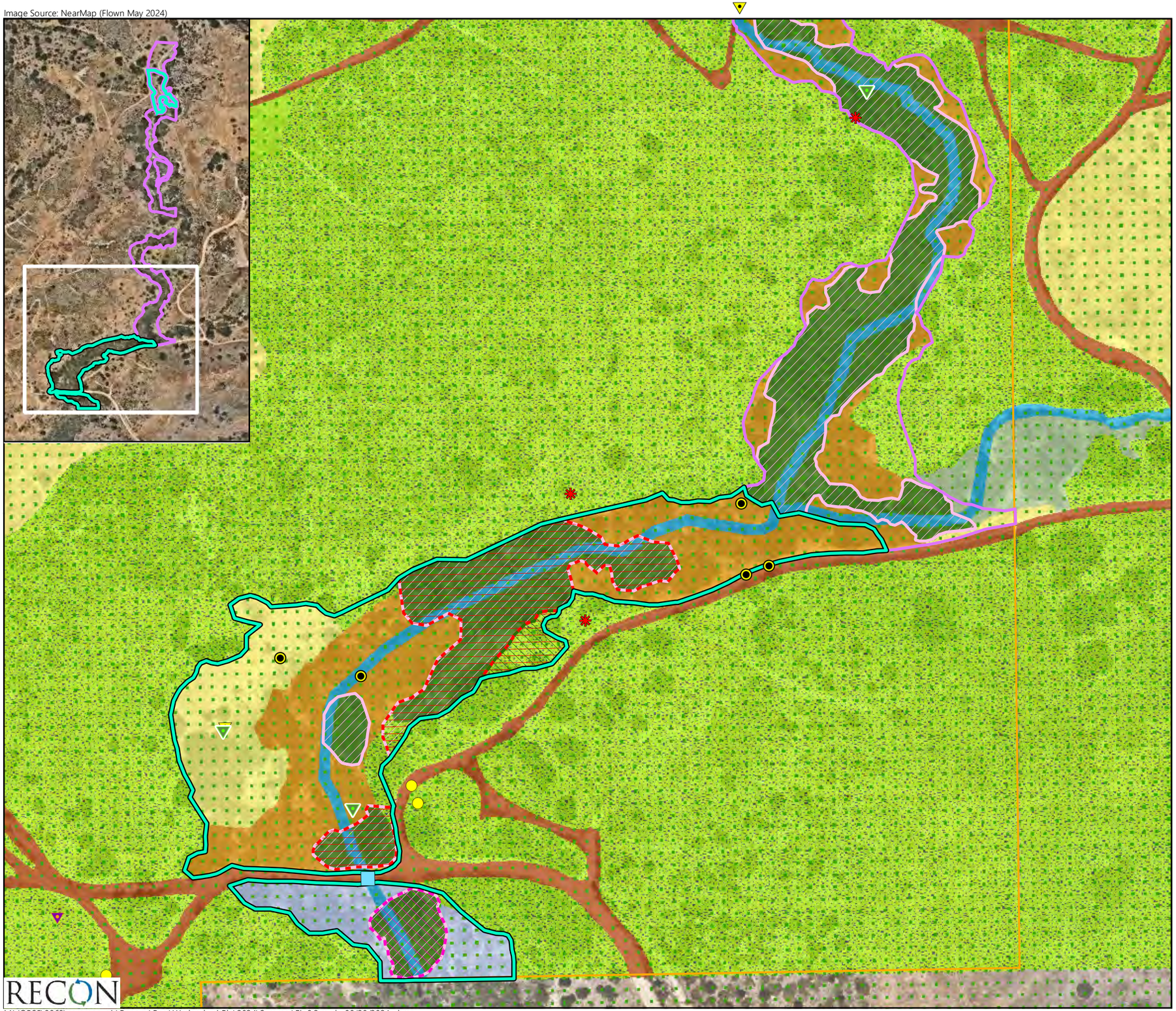
FIGURE 8.1
Wetland Plan Area
Existing Biological Resources

Image Source: NearMap (Flown May 2024)



- Culvert
- Land to be Conserved and Managed by the City
- City of SD MHPA

Southwest Village Wetland Plan Area (2.179 ac)

- Wetland Plan Area (2.179 ac)

Nakano Wetland Plan Area (3.920 acres)

- Creation (Establishment) Area for Southwest Village to be Implemented Concurrent with Nakano Project (0.458 ac)
- Remaining Nakano Wetland Plan Area (3.462 acres)

Vegetation Communities

- Diegan Coastal Sage Scrub
- Maritime Succulent Scrub
- Disturbed Maritime Succulent Scrub
- Mule Fat Scrub
- Tamarisk Scrub
- Non-native Grassland
- Southern Willow Scrub
- Natural Flood Channel
- Disturbed

Sensitive Animals

Birds

- Coastal California Gnatcatcher (*Polioptila californica californica*)
- Least Bell's Vireo (*Vireo bellii pusillus*)
- Yellow Warbler (*Setophaga petechia*)

Sensitive Plants

- San Diego County Viguiera (*Bahiopsis laciniata*)

Invasive Plants

- Castor Bean and Fennel
- Pepper Tree and Tamarisk
- Tamarisk and Castor Bean
- Tamarisk
- Castor Bean
- Tree Tobacco

0 Feet 100

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FIGURE 8.2
Wetland Plan Area
Existing Biological Resources

Additionally, a groundwater investigation was conducted in the Nakano Wetland Plan area by Geocon in June 2024 by drilling for groundwater across the upland non-native grassland habitat and incised channel (Attachment 3). The purpose of the groundwater investigation was to identify depth to groundwater within the upland areas and the channel to understand the suitability and practicability of recontouring the floodplain to establish riparian vegetation in the lowered floodplain. Understanding the depth of groundwater during the dry season helps to determine the degree of upland grading to bring the surface of the restoration area close enough to groundwater to support wetland vegetation in all seasons. Figure 7.1 presents the drilling locations and depth to groundwater measurements at each drilling location. Four drilling locations were established, including two within the incised channel and two near the 2-year floodplain boundaries in the upland non-native grassland areas. Groundwater depths were between 7.5 feet and 15 feet (see Figure 7.1). Typical target groundwater depths for riparian systems in southern California are 15 feet during the dry season and 10 feet during the wet season, with groundwater to surface connection usually occurring during wet season rain events (California Riparian Habitat Joint Venture 2009; Rohde et al. 2021).

A groundwater investigation was not able to be conducted in the creation (establishment) area in the Southwest Village Wetland Plan area due to the proximity of sensitive bird species during the breeding season (see Figure 7.2). However, the results obtained from the groundwater investigation performed in the Nakano Wetland Plan area indicate that adequate groundwater is present in low-lying, non-native grassland habitats within Spring Canyon including areas that are near the main channel but outside the 2-year floodplain, such as the area proposed for creation (establishment) in the Southwest Village Wetland Plan Area. Topographic recontouring would bring the wetland surface closer to groundwater, increasing the frequency and length of groundwater to surface flow connection during rain events and reducing the distance to groundwater for established riparian species root systems. It would also broaden the 2-year flow limits further into portions of the wetland plan area currently mapped as non-native grassland.

2.1.3 Aquatic Resources

Aquatic resources within the wetland plan area include non-wetland waters and riparian areas; the process for identifying and characterizing the wetland plan area's aquatic resources is described in the Aquatic Resources Delineation Report for the Nakano Project Wetland Area in Spring Canyon (RECON 2024c). Non-wetland waters within the wetland plan area consist of unvegetated ephemeral drainage channels. The main drainage course flows southward through Spring Canyon, draining across the international border via a stormwater conveyance facility and into Mexico, where flows enter the Tijuana River and then continue into the Pacific Ocean. The channel is mostly devoid of vegetation and has a sandy or cobble bottom within incised banks that vary in depth. Riparian areas within the wetland plan area consist of mule fat scrub and tamarisk scrub on terraces above the ordinary high-water mark and adjacent to the non-wetland water channels. These vegetation communities extend outside of the ordinary high-water mark delineated for the non-wetland waters. The riparian areas support hydrophytic vegetation but lack wetland hydrology and hydric soil indicators required to meet the USACE definition of a wetland.

2.1.4 Biological Conditions

The wetland plan area's existing biological resources are shown on Figures 8.1 and 8.2. Photographs 1 through 3 provide representative overviews of the existing native vegetation and non-native weed infestations. The wetland plan area consists of stands of mule fat scrub, southern willow scrub, tamarisk scrub and non-native grassland and small areas of disturbed maritime succulent scrub, with a natural channel meandering from the upstream end to the downstream end. The existing riparian habitat within the wetland plan area ranges from approximately 70 to 150 feet in width, with adjacent uplands and conserved lands owned by the City 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 wetland plan 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.

Southern willow scrub is a dense, broad-leafed, winter-deciduous riparian thicket dominated by several willow species (*Salix* spp.), with scattered emergent western cottonwood (*Populus fremontii* ssp. *fremontii*) and western sycamore (*Platanus racemosa*). This community was formerly extensive along the major rivers of coastal southern California but is now much reduced (Oberbauer et al. 2008). Within the wetland plan area, this community contains mature willow trees including black willow and arroyo willow (*Salix lasiolepis*) as well as non-native species.

The tamarisk scrub within the wetland plan area consists of one hundred percent cover of invasive species dominated by tamarisk with other invasive species such as pepper tree and castor bean mixed in among the tamarisk.

The non-native grassland within the wetland plan area consists primarily of non-native grasses, garland daisy (*Glebionis coronaria*), castor bean, bull thistle (*Cirsium vulgare*), tree tobacco (*Nicotianna glauca*), and fennel (*Foeniculum vulgare*).

Cover of invasive species within the wetland plan area and upstream tributaries was determined through analysis of aerial photographs combined with ground surveys. Upstream tributaries within public property were surveyed on foot and instances of invasive species mapped as points using global positioning system (GPS) technology (see Figure 4).

PHOTOGRAPH 1
Stand of Tamarisk (*Tamarix ramosissima*) in the Mitigation Area,
Facing Southwest, September 2023

PHOTOGRAPH 2
Stands of Tamarisk (*Tamarix ramosissima*) in the Mitigation Area,
Facing Northwest, September 2023

PHOTOGRAPH 3

Stand of Castor Bean (*Ricinus communis*) and Non-Native Grassland in the Mitigation Area, Facing South, September 2023

The wetland plan area is occupied by several sensitive and special status species. During surveys conducted by RECON in 2018, least Bell's vireo was observed within the wetland plan area and a yellow warbler was observed upstream of the wetland area within Spring Canyon. Yellow-breasted chat and coastal California gnatcatcher (*Polioptila californica californica*) have also been observed throughout the wetland plan area. Although not observed in the vicinity of the wetland plan area (Spring Canyon), there is a potential for thread-leaved brodiaea (*Brodiaea filifolia*) and Crotch's bumble bee (*Bombus crotchii*) to be present. San Diego County viguiera (*Bahiopsis laciniata*) is mapped in an upland area to the east of the wetland plan area. San Diego bur-sage (*Ambrosia chenopodifolia*) is mapped in the uplands to the west and east of the wetland plan area.

2.2 Rationale for Expecting Success

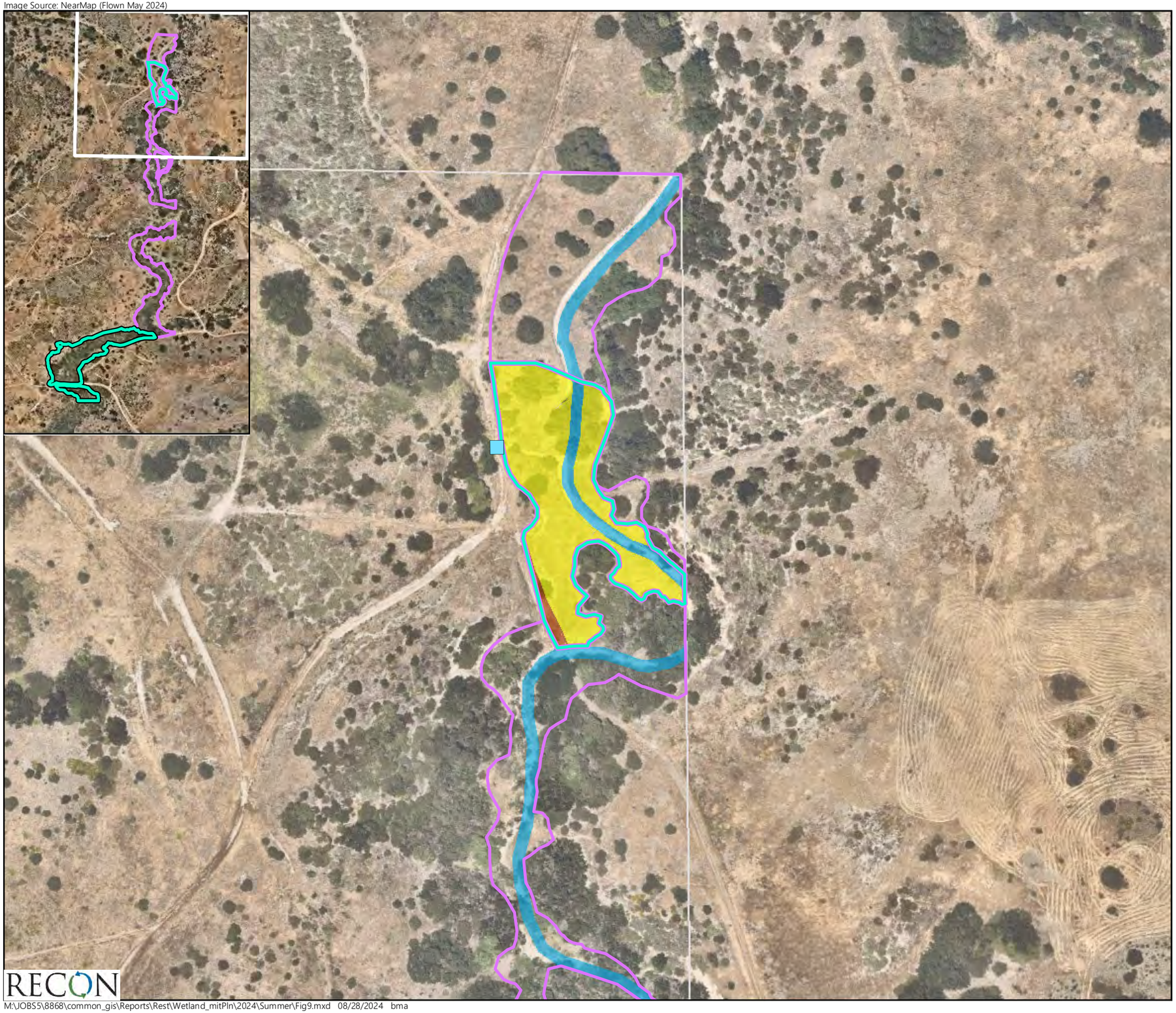
2.2.1 Mitigation Goals

The mitigation would consist of at least 0.36 acre of wetland creation (establishment) and 0.37 acre of wetland enhancement (rehabilitation) in Spring Canyon to satisfy City wetland mitigation requirements under the MSCP, and an additional 0.43 acre of wetland creation (establishment) to satisfy RWQCB and CDFW requirements (see Tables 1 through 3). As noted above, at least 0.46 acre of wetland creation (establishment) for the project would be implemented concurrent with the Nakano wetland plan. An additional 0.36 acre of creation (establishment) required by RWQCB is proposed within the Southwest Village wetland plan area. The proposed 2.18-acre wetland plan area is depicted on Figures 9.1 and 9.2. This area would include the following: A 0.36-acre creation (establishment) area, which, combined with the 0.46-acre wetland creation (establishment) area for Southwest Village in the Nakano Wetland Plan area, totals 0.83 acre of creation (establishment) and exceeds the 0.79 acre of required wetland creation (establishment) acreage in Spring Canyon and meets both City and RWQCB/CDFW mitigation requirements.

- Enhancement (rehabilitation) areas totaling 0.62 acre, which exceeds the 0.37 acre of required wetland enhancement (rehabilitation) acreage.

This plan also includes additional project design features aimed at reducing the impact of edge effects on the wetland plan area and increasing the overall amount of creation(establishment) beyond the minimum required mitigation. Edge effects would be reduced through additional invasive species control proposed in portions of the wetland plan area totaling 1.20 acres (see Figure 9.2), by sequencing wetland mitigation in Spring Canyon from upstream to downstream, which includes implementing the Nakano Wetland Plan area before the Southwest Village Wetland Plan area, and by pursuing the removal of perennial invasive non-native plant species within publicly owned land in tributaries upstream of the wetland plan 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. The proposed project phasing would support the City's goal of upstream-to-downstream sequencing and hydrologic and ecological connectivity of all restoration efforts within Spring Canyon.

Image Source: NearMap (Flown May 2024)



Culvert

Mitigation Parcel

Southwest Village Wetland Plan Area (2.179 ac)

Wetland Plan Area (2.179 ac)

Nakano Wetland Plan Area (3.920 acres)

Creation (Establishment) Area for Southwest Village to be Implemented Concurrent with Nakano Project (0.458 ac)

Remaining Nakano Wetland Plan Area (3.462 acres)

Vegetation Communities

Non-native Grassland

Natural Flood Channel

Disturbed Habitat

0 Feet 100

RECON

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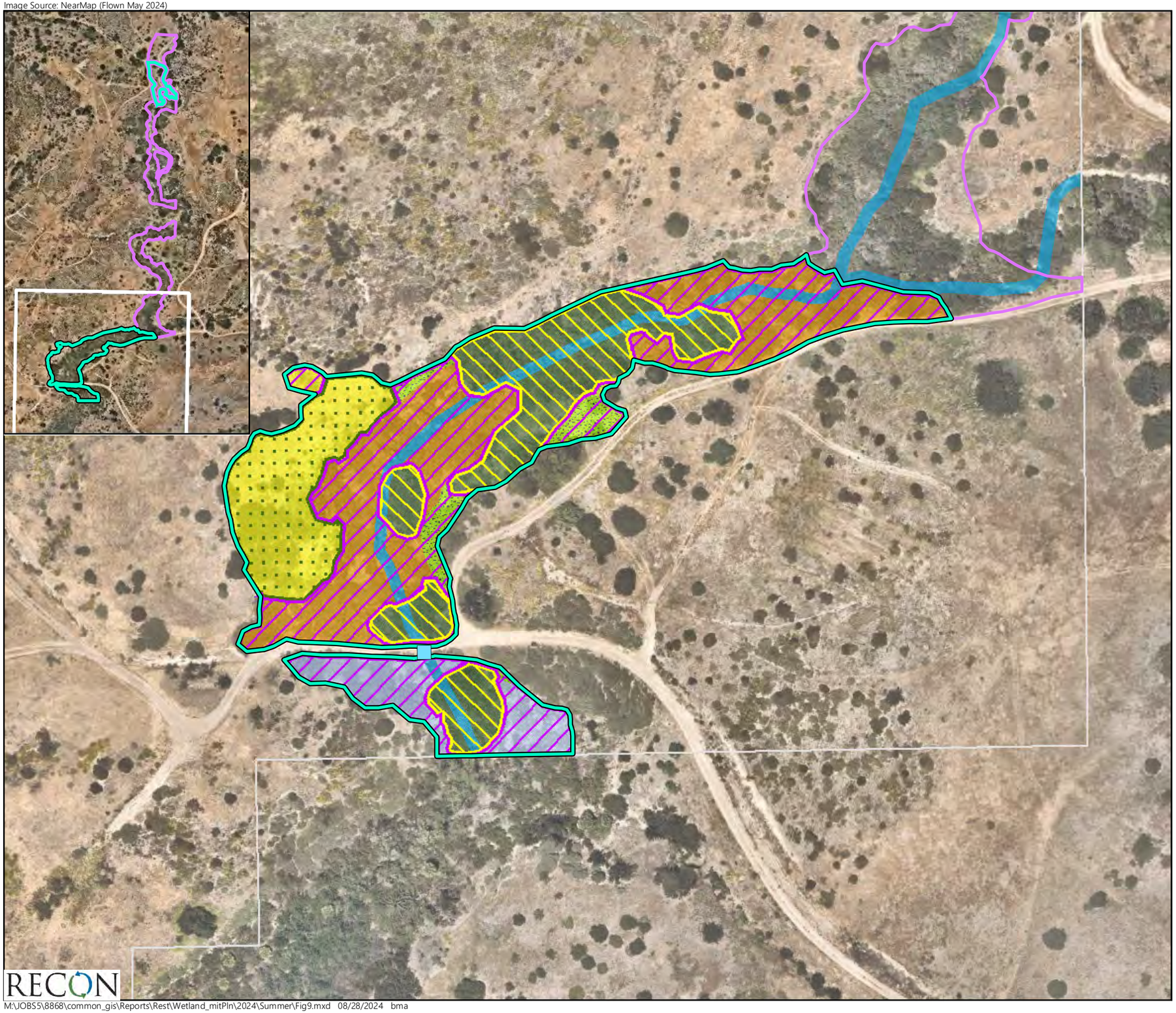
FIGURE 9.1
Wetland Plan Area - Existing Conditions

Image Source: NearMap (Flown May 2024)



Culvert

Mitigation Parcel

Southwest Village Wetland Plan Area (2.179 ac)

Wetland Plan Area (2.179 ac)

Weed Control / Project Design Feature (1.201 acres)

Wetland Enhancement (Rehabilitation) (0.615 acre)

Wetland Creation (Establishment)
for Impacts to Non-wetland Waters/Streambed (0.363)

Nakano Wetland Plan Area (3.920 acres)

Creation (Establishment) Area for
Southwest Village to be Implemented
Concurrent with Nakano Project (0.458 ac)

Remaining Nakano Wetland Plan Area (3.462 acres)

Vegetation Communities

Disturbed Maritime Succulent Scrub

Non-native Grassland

Tamarisk Scrub

Mule Fat Scrub

Southern Willow Scrub

Natural Flood Channel

0 Feet 100

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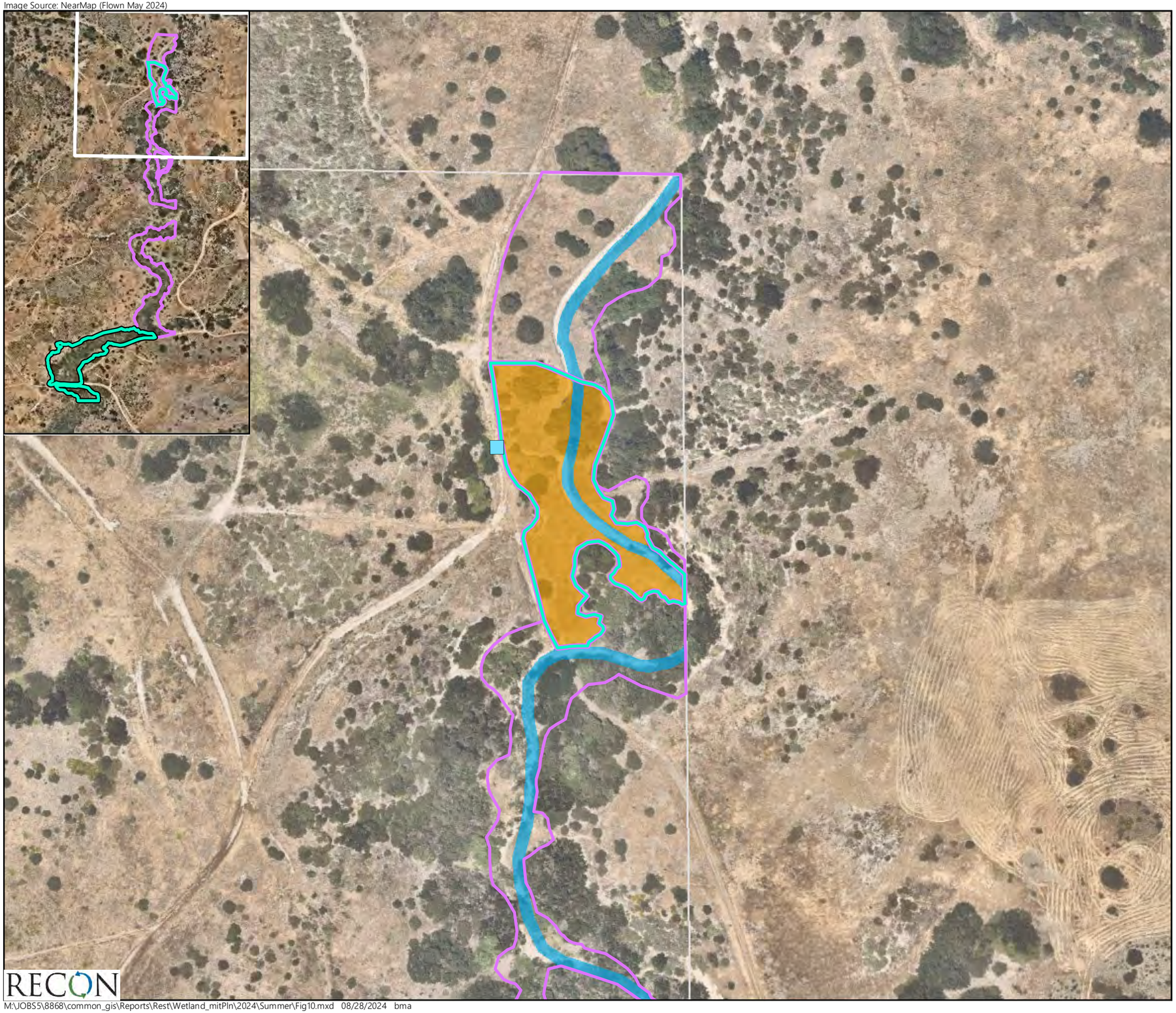
FIGURE 9.2
Wetland Plan Area - Existing Conditions

Following wetland plan implementation and five years of maintenance and monitoring, the wetland plan area would consist of diverse native wetland vegetation structure indicative of mule fat scrub and southern willow scrub, supporting several willow species, mule fat, and blue elderberry (*Sambucua nigra* ssp. *caerulea*) with a native understory consisting of western ragweed (*Ambrosia psilostachya*), mugwort (*Artemisia douglasiana*), California rose (*Rosa californica*), and wild grape (*Vitis girdiana*) (Figures 10.1 and 10.2). It is anticipated that the diversity of native plants introduced through creation (establishment) 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, yellow-breasted chat, and yellow warbler.

2.2.2 Wetland Plan Area Suitability

The proposed wetland plan area is in an area of Spring Canyon where non-native grassland and monoculture stands of tamarisk scrub and castor bean provide opportunities for wetland creation (establishment) and wetland enhancement (rehabilitation). Based on aerial photographs from 1953 to 2024, the wetland plan area has a history of ranching (grazing) and off-highway vehicle use that has resulted in the encroachment of non-native grassland, scouring, and erosion, particularly within the area of proposed wetland creation (establishment) on the west side of the wetland plan area and in Southwest Village creation (establishment) area within the Nakano wetland plan area. Attachment 4 presents a series of historic aerial images of the wetland plan area and the Southwest Village creation area in the Nakano wetland plan area beginning with an image taken in 1953, which is the earliest available aerial, and includes images from subsequent decades until the present. Based on these aerials, Spring Canyon has undergone repeated impacts from cattle grazing, vehicle access, road improvements, and other uses over decades. For example, more roads and trails are visible within Spring Canyon, including roads and trails bisecting the wetland plan area, on the historic aerials than on the 2024 aerial (except for the 1953 aerial), and several of the roads and trails presently visible in the wetland plan area appear wider and more developed on the historic aerial. Those historic impacts have caused changes in native vegetation cover, an increase in invasive species cover and erosion, and altered wetland hydrology and soils.

Image Source: NearMap (Flown May 2024)



Culvert

Mitigation Parcel

Southwest Village Wetland Plan Area (2.179 ac)

Wetland Plan Area (2.179 ac)

Nakano Wetland Plan Area (3.920 acres)

Creation (Establishment) Area for Southwest Village to be Implemented Concurrent with Nakano Project (0.458 ac)

Remaining Nakano Wetland Plan Area (3.462 acres)

Vegetation Target

Natural Flood Channel

Mule Fat Scrub

0 Feet 100

RECON

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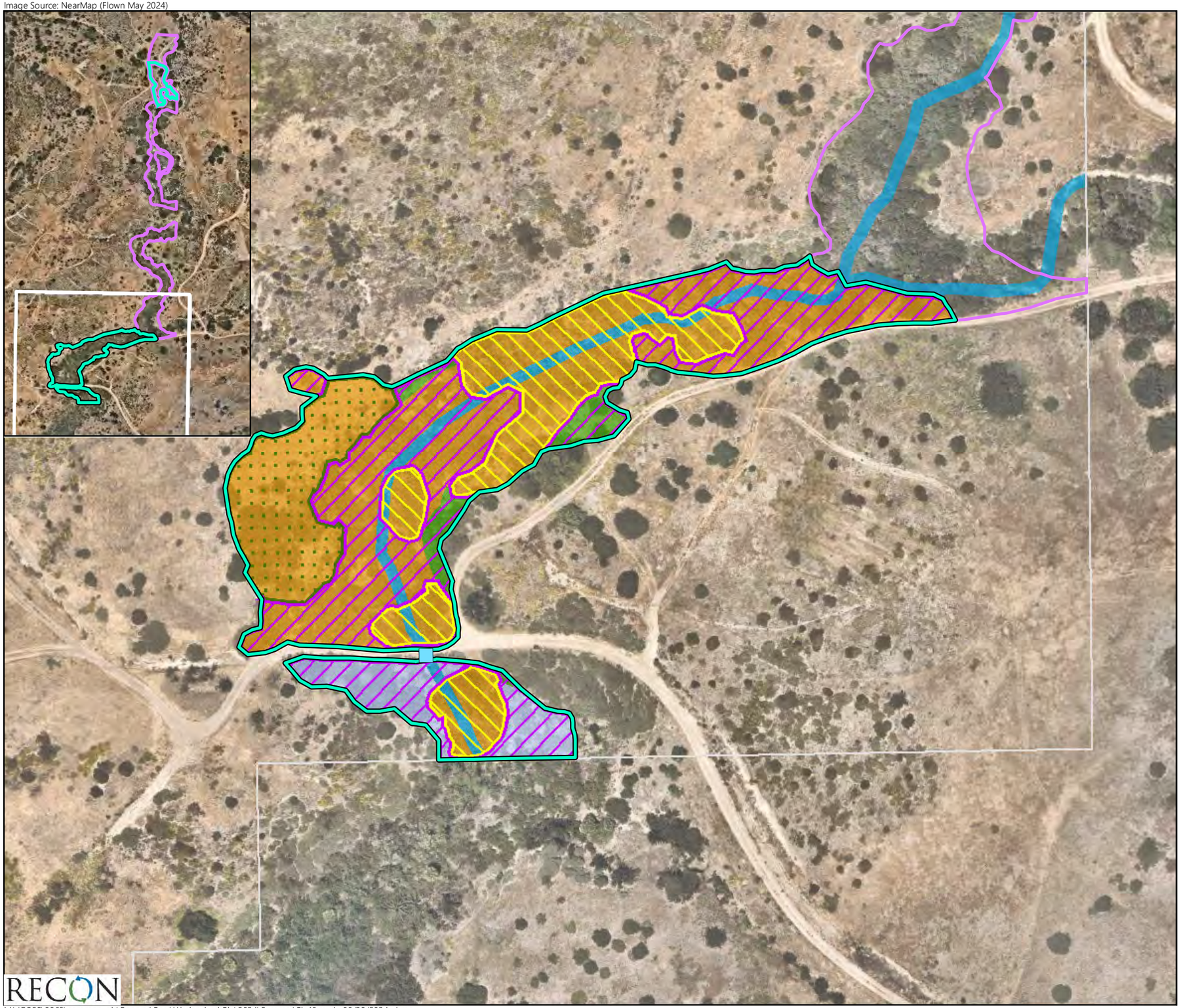
FIGURE 10.1
Wetland Plan Area - Target Vegetation

Image Source: NearMap (Flown May 2024)



Culvert

Mitigation Parcel

Southwest Village Wetland Plan Area (2.179 ac)

Wetland Plan Area (2.179 ac)

Weed Control / Project Design Feature (1.201 acres)

Wetland Enhancement (Rehabilitation) (0.615 acre)

Wetland Creation (Establishment)
for Impacts to Non-wetland Waters/Streambed (0.363)

Nakano Wetland Plan Area (3.920 acres)

Creation (Establishment) Area for
Southwest Village to be Implemented
Concurrent with Nakano Project (0.458 ac)

Remaining Nakano Wetland Plan Area (3.462 acres)

Vegetation Target

Natural Flood Channel

Mule Fat Scrub

Southern Willow Scrub

Wetland Buffer

0 Feet 100

RECON

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FIGURE 10.2
Wetland Plan Area - Target Vegetation

In the proposed creation (establishment) areas that currently support non-native grassland (including non-native grassland areas in the Southwest Village wetland plan area and the Nakano wetland plan area; see Figure 8 and Section 2.1.4), the site appears to have historically supported upland habitats, such as maritime succulent scrub, coastal sage scrub, and disturbed habitat and non-native grassland during and after periods of heavy grazing by livestock and vehicle use. In later decades, such as in the 1982, 1996, and 2003 aerials, much of the vegetation visible in the earlier aerials has been grassland vegetation, most likely due to grazing. Mature riparian vegetation would not be converted to grassland habitat through grazing in this relatively short period, whereas the conversion of upland scrub habitat to grassland due to grazing occurs much more rapidly (Smith Vaughn et al. 2020). This conclusion is based on a comparison of vegetation visible on historic and present-day aerials to the vegetation observed during site visits in 2023 and 2024. From 1953 onward to present time, within the Southwest Village creation (establishment) area in the Nakano wetland plan area, several trees can be identified persisting in the same location; these trees were confirmed during 2023 and 2024 field visits as Peruvian pepper trees (*Schinus molle*) and lemonade berry (*Rhus integrifolia*), both of which are upland indicators (see the pink and yellow dots on Attachment 2). Within the creation (establishment) area in the Southwest Village wetland plan area, the aerial signature of the vegetation visible on the 1953 aerial is like that of the vegetation on the upland slopes surrounding the creation (establishment) area; the vegetation appears to consist of sparse upland shrubs surrounded by herbaceous vegetation. Aerial images of the same area in subsequent decades show substantial loss of vegetation in the creation (establishment) due to road/trail development or off-highway vehicle use.

Within the upland non-native grassland areas, preliminary floodplain mapping by RICK and a groundwater investigation by Geocon in the Nakano wetland plan area indicate that topographic recontouring could successfully create (establish) wetland hydrology by lowering the surface elevation in relation to the groundwater level and the channel (see Figures 7 and 8 and Attachment 2). The degraded upland areas would be converted to native wetland habitat through channel and/or floodplain recontouring/lowering, removal of non-native vegetation, 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 installation of native wetland species and would be contiguous with existing areas of mule fat scrub and southern willow scrub. Within the stands of tamarisk scrub, the wetland habitat has become degraded by a high cover of non-native invasive species but otherwise supports wetland hydrology. By removing these highly invasive species and planting native riparian habitat, the wetlands functions would be re-established and enhanced. Because of its existing hydrology within the channel and its potential for the creation (establishment) of wetland hydrology through lowering of the floodplain, the wetland plan area is appropriate for high-quality wetland habitat creation (establishment) and enhancement (rehabilitation) suitable for occupancy by sensitive wildlife such as the last Bell's vireo, yellow warbler and yellow-breasted chat.

The proposed activities would improve the wetland functions and values within the wetland plan area and qualify as wetland creation (establishment) and enhancement (rehabilitation) per the City's Biology Guidelines and the USACE Standard Operating Procedures for Compensatory Mitigation (see Section 1.2; City of San Diego 2018 and USACE 2016).

The proposed wetland plan area is suitable for wetland creation (establishment) and enhancement (rehabilitation) because of the following factors:

- The wetland plan area has been identified by the City as a target site for habitat restoration, set forth in the City MSCP Subarea Plan for Southern Otay Mesa, which prioritizes the restoration of disturbed areas in Spring Canyon.
- Based on a comparison of historic aerial images compared with recent aerial photos and data from current site visits, the entire area of proposed wetland creation (establishment) appears to have historically supported upland habitats and is, therefore, suitable for wetland creation (establishment), as opposed to wetland restoration (re-establishment) or enhancement (rehabilitation).
- Groundwater is within depths suitable for the recontouring of upland grasslands to lower the floodplain to bring it closer to the extant groundwater and thus create (establish) jurisdictional wetlands with native riparian habitat. Refer to groundwater data collected upstream (see Figure 7.1 and Attachment 2).
- Wetland hydrology is present in the enhancement (rehabilitation) areas and could be improved via invasive species removal and planting (see Figures 7.2 and 8.2 and Attachment 2).
- It is located within the City's MHPA Preserve and is referenced in the City's 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).
- Native wetland habitats are present adjacent to the wetland plan 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 wetland plan area is surrounded by open space consisting mainly of maritime succulent scrub, a native upland habitat.
- Least Bell's vireo, yellow-breasted chat and yellow warbler have been observed within the riparian habitat. Creation (establishment) and enhancement (rehabilitation) would expand suitable habitat for these species.
- It is part of a regional network of habitat corridors and conserved open space (wetland buffers). Per the City 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, Spring Canyon supports 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. Native wetland habitats are present adjacent to the wetland plan 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 wetland plan area is surrounded by contiguous 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 for the restoration specialist and installation/maintenance contractor via dirt roads and city streets connecting to Britannia Boulevard (see Figure 8).

- The wetland plan area lacks utility or other easements (see Figure 4).

2.2.3 Wetland Plan Area Viability

The viability of the proposed mitigation was assessed during the preparation of this plan per the City's Land Development Code–Biology Guidelines (City of San Diego 2018). 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. Furthermore, the site's viability is characterized by the potential to enhance native habitat and sensitive species values and water quality in perpetuity through long-term management.

While development is anticipated approximately 0.3-mile northwest of the wetland plan area, no future development is planned in the open space surrounding the wetland plan area, which is part of the City's MHPA (see Figure 4). The development areas associated with the Specific Plan would be separated from the wetland plan area by approximately 0.3-mile including rugged topography that buffers the wetland plan area from potential human trespass.

In addition, any future development associated with the pending Specific Plan would be required to comply with the Land Use Adjacency Guidelines in the City MSCP Subarea Plan (City of San Diego 1997). These guidelines apply to projects that are adjacent to the City'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 wetland plan area is located within the MHPA, these guidelines would provide protection for the wetland plan area from indirect impacts. The location of the wetland plan area within the MHPA would reduce fragmentation of this sensitive vegetation community and increase viability and longevity of the habitat quality.

The 0.46-acre wetland creation (establishment) area to be implemented consistent with the Nakano Wetland Plan would satisfy the project's restoration requirement to meet the City-required 1:1 restoration obligation through wetland creation. This area would be implemented concurrently with the Nakano mitigation. The concurrent grading and creation (establishment) along with implementation of the entire area identified in the Nakano Plan Area would ensure continuity in topography and would maintain an upstream-to-downstream phasing of restoration implementation.

Finally, the design of the wetland plan area includes considerations to minimize the spread of non-native species into the wetland plan area from upstream reaches and surrounding habitats. The mitigation effort would address adjacent and upstream populations of invasives 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 0.36-acre of low-quality degraded wetlands (RECON 2024a), the proposed mitigation would occur within a larger track of wetland

habitat, provide greater wetland functions and values, and optimize long-term viability of wildlife such as least Bell's vireo, yellow-breasted chat, and yellow warbler through higher quality wetlands with connectivity between larger natural open spaces with both wetland and upland habitat.

3.0 Roles and Responsibilities

3.1 Project Proponent and Financial Responsibility

The project proponent (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 wetland 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 work described in this plan.

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13520 Evening Creek Drive North, Suite 300
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Allen.Kashani@TriPointeHomes.com

3.2 Responsible Agencies

The City Development Services Department (DSD) would be responsible for issuing any necessary permits associated with the entitlements. The following entities would be responsible for reviewing and approving this plan.

Contacts:
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Development Services Department
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Multiple Species Conservation Program
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3.3 Restoration Specialist

Overall supervision of the installation and maintenance of this 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 wetland project. Specifically, the restoration specialist would educate all participants about mitigation 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 mitigation 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 mitigation effort.

During the installation, the contractor would be responsible for initial topographic recontouring, erosion control, weed treatment and removal, and plant installation, as well as maintenance of the wetland plan area during the 120-day plant establishment period (PEP) and five-year maintenance period utilizing the methods detailed herein.

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 wetland plan area five years. During this period, the contractor would service the entire mitigation site as well as invasive weed occurrences within the upstream tributaries according to the maintenance schedule (Section 5.0, below). Service would include, but not be limited to, weed control, trash removal, watering, remedial cutting and seed installation, 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 work and how it would be implemented. Implementation would be conducted under the direction of the qualified restoration specialist concurrent with project development. All activities would commence the first summer-fall season prior to, or concurrently with, construction. The proposed design is shown on Figure 9.2.

Implementation activities include recontouring within the creation (establishment) areas, weed treatment and weed dethatching, native container plant and cutting installation, and barrier installation. Recontouring, weed treatment and dethatching would occur before or concurrently with the start of the project construction. Implementation 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 wetland habitat would use restoration methods to support establishment of a structurally diverse habitat. The creation (establishment) and enhancement (rehabilitation) areas would total 1.45 acres and are located within the larger 2.18-acre wetland plan area (see Figure 9). Mitigation activities within the creation (establishment) areas would include topographic recontouring and native riparian species planting, while mitigation activities within the enhancement (rehabilitation) areas would involve the removal of annual and perennial non-native species and the installation of native species indictive 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 currently support 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 wetland plan area. In addition, tributaries on publicly owned parcels that are upstream of the wetland plan area 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 wetland plan area (see Figure 4). Weed species that are found in upstream tributaries pose a threat to the long-term viability of the wetland plan area by their potential to set and deposit seed that may encroach into the wetland plan area. The creation (establishment), enhancement (rehabilitation) and all project design feature areas would be maintained throughout the five-year maintenance and monitoring period to native wetland habitat, as described in Section 5.0.

4.2 Mitigation Measures

During implementation, the following mitigation measures would be implemented to avoid and minimize impacts to adjacent habitat, to ensure that the existing streambed hydrology is maintained, and to avoid impacts to sensitive bird species. General avoidance and minimization measures would be implemented as follows:

Wetland Plan 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 wetland plan 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 (USBP). If fencing was installed it should be of a type that permits the continued wildlife use of the restoration site. Signage for the wetland plan 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.

Prior to Wetland Plan Implementation

In order to mitigate for potential impacts to sensitive plant and wildlife species as a result of restoration activities, the following measures would be implemented:

1. Thread-leaved Brodiaea:

    a. Conduct a focused rare plant survey in the spring prior to the start of construction to determine the presence of thread-leaved brodiaea not previously detected. If no thread-leaved brodiaea are detected, no additional measures would be required.

    b. If detected, a qualified biologist would flag or fence any thread-leaved brodiaea that occur within the temporary impact areas prior to initiation of construction activities. Thread-leaved brodiaea shall be avoided to the maximum extent feasible within the temporary impact and restoration areas.

    c. Any individuals that cannot be avoided within temporary impact or restoration areas shall be salvaged for transplant and incorporated into the Vernal Pool/Quino Checkerspot Mitigation Plan area (RECON 2024d).

2. Least Bell's Vireo and Coastal California Gnatcatcher

    a. To avoid indirect impacts to least Bell's vireo nesting within Spring Canyon and coastal California gnatcatcher nesting within the adjacent maritime succulent scrub and Diegan coastal sage 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 these species, March 15-September 15 and March 1 to August 15, respectively.

    b. If removal of habitat in the wetland plan 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 wetland plan activities (including removal of vegetation).

    c. The applicant shall submit the results of the pre-implementation survey to the City, CDFW, USFWS, and RWQCB for review and approval prior to initiating any wetland plan activities. If no nesting birds are detected, no additional monitoring beyond general biological monitoring would be required.

    d. If nesting birds are detected, a letter report in conformance with the City's Biology Guidelines (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.

    e. The report shall be submitted to the City, CDFW, USFWS, and RWQCB for review and approval and implemented to the City's satisfaction. The City's Mitigation Monitoring

Coordinator 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.

3. Other Nesting Avian Species

    a. To avoid any direct impacts to avian species identified as a listed, candidate, sensitive, or special status species in the MSCP, removal of habitat that supports active nests in the wetland plan area should occur outside the breeding season for these species (February 1 to September 15).

    b. If removal of habitat in the wetland plan 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 wetland plan activities (including removal of vegetation).

    c. The applicant shall submit the results of the pre-implementation survey to the City, CDFW, USFWS, and RWQCB for review and approval prior to initiating any wetland plan activities. If no nesting birds are detected, no additional monitoring beyond general biological monitoring would be required.

    d. If nesting birds are detected, a letter report in conformance with the City's Biology Guidelines (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.

    e. The report shall be submitted to the City, CDFW, USFWS, and RWQCB for review and approval and implemented to the City's satisfaction. The City's Mitigation Monitoring Coordinator 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.

4. Crotch's Bumble Bee

    a. Additional coordination and an Incidental Take Permit are anticipated to be conducted with CDFW. The results of this additional coordination may adjust the required mitigation. If Crotch's bumble bee is no longer a candidate or listed species at the time of implementation, this measure would not apply.

    b. To avoid impacts to Crotch's bumble bee, removal of habitat in the proposed area of disturbance must occur outside of the Colony Active Period between April 1 through August 31. If removal of habitat in the proposed area of disturbance must occur during the Colony Active Period, a Qualified Biologist shall conduct a pre-construction survey to determine the presence or absence of Crotch's bumble bee within the proposed area of disturbance.

c. The Qualified Biologist must be approved by CDFW and hold a Memorandum of Understanding to catch and release Crotch's bumble bees in accordance with the CDFW guidance (i.e., Survey Considerations for California Endangered Species Act [CESA] Candidate Bumble Bee Species, dated June 6, 2023). Survey methods that involve lethal take of species are not acceptable.

d. The pre-construction survey shall be conducted during the colony active period between April 1 through August 31 by the Qualified Biologist prior to the issuance of Grading Permit, Demolition Plans/Permits and Building Plans/Permits and within one year prior to the initiation of project activities (including removal of vegetation). The pre-construction survey shall consist of photographic surveys following CDFW guidance (i.e., Survey Considerations for California Endangered Species Act [CESA] Candidate Bumble Bee Species, dated June 6, 2023). The surveys shall consist of three separate visits spaced two to four weeks apart. Survey results would be considered valid until the start of the next colony active period.

e. The Qualified Biologist/owner permittee shall submit the results (including positive or negative survey results) of the pre-construction survey to City DSD (Mitigation Monitoring and Coordination) City Planning Department (MSCP) staff and CDFW for review and written approval prior to the issuance of Grading Permit, Demolition Plans/Permits and Building Plans/Permits.

f. If pre-construction surveys identify Crotch's bumble bee individuals on-site, the Qualified Biologist shall notify CDFW and the measures identified in the ITP would be implemented.

g. Survey data shall be submitted by the Qualified Biologist to the CNDDB in accordance with the Memorandum of Understanding with CDFW, or Scientific Collecting Permit requirements, as applicable.

5. Quino Checkerspot Butterfly

a. Prior to restoration implementation, locations of Quino checkerspot butterfly host and nectar plants would be mapped.

b. During wetland plan activities, Quino checkerspot butterfly nectar plants shall be avoided.

c. Herbicide application would not occur within the 10-foot buffers of the Quino checkerspot butterfly host plant patches, nectar plant patches, and Quino restoration areas. Buffers would be used to prohibit restoration activities from occurring or personnel from entering areas where Quino checkerspot butterfly larvae have potential to traverse between host plant patches, and to ensure only target species are treated with herbicide. The field crew would not enter occupied Quino checkerspot butterfly areas or areas where host plants are present.

d. Only locations with dense non-native plant cover and no Quino checkerspot butterfly host or nectar plants would be sprayed with a glyphosate-based herbicide. A field crew

trained in habitat restoration would spray weeds in areas where Quino checkerspot butterfly and its host plants have not been documented.

e. Herbicide would not be applied when wind speed and direction may cause herbicide to drift to areas with host plants, nectar plants or Quino restoration areas. Marker dye would be added to the herbicide mixture so the restoration field crew can see any drift.

f. The California Invasive Plant Council BMPs for wildland stewardship, including covering host plant patches and nectar plant patches with tarps during herbicide applications.

During Wetland Plan Implementation

1. The qualified restoration specialist that has been approved by the City, CDFW, U.S Fish and Wildlife Service (USFWS), and RWQCB would be on-site as needed during implementation activities to ensure compliance with all mitigation measures identified in the California Environmental Quality Act environmental document. The restoration specialist would perform the following duties:

   a. Oversee installation of and inspect temporary site protection and permanent fencing (if needed), construction fencing and/or silt fencing, 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, and the penalties associated with violating the federal Endangered Species Act.

   d. Submit a final as-built report within 60 days following completion of implementation (following the PEP). 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 wetland plan 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.

4.3 Implementation Activities

Implementation activities include lowering the floodplain through grading with equipment, invasive weed treatment, non-native weed biomass removal, barrier/signage installation, and native plant installation. The implementation schedule is shown in Table 4. Implementation would commence prior to or concurrently with the start of construction of the project.

Table 4
Implementation Activities Schedule

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

4.3.1 Initial Weed Removal

Mitigation would begin with the initial removal of perennial and annual weeds. Perennial weeds present within the wetland plan area primarily consist of tamarisk, castor bean, tree tobacco, and pepper trees. Perennial weeds present throughout the wetland plan 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 wetland plan 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. Non-native species considered Cal-IPC high should be removed to zero percent occupancy; all other non-native species should be removed to five percent occupancy.

4.3.2 Topographic Recontouring

Topographic recontouring would be implemented within the wetland creation (establishment) areas to restore topography that supports wetland hydrology and vegetation. Grading would lower the ground surface approximately 2 to 4 feet within the existing non-native grassland habitats, improving hydrologic connection to the adjacent wetland area. The shallow floodplain slope gradient and daylighting areas would be determined during engineering design and the development of plans and specifications. The intent of the recontouring would be to transition the restored floodplain to the surrounding upland areas.

Grading would be conducted under the direction of the wetland restoration specialist, as described in Section 3.3. Areas that are to remain unaffected by grading activities would be marked and fenced prior to implementation. Grading would be implemented using a small bulldozer or skidsteer, as deemed appropriate by the grading contractor. At the discretion of the restoration specialist and the grading contractor, the upper six inches of topsoil could be set aside at the beginning of the grading process for redistribution throughout the creation (establishment) area after grading is complete. After grading, the soil may be tested and amended as needed, including but not limited to the addition of mulch, compost, and gypsum. Appropriate erosion control (i.e., fiber rolls, gravel bags) would be installed in strategic locations within the site to prevent erosion.

After grading, high resolution aerial photography would be captured using a professional small unmanned aerial vehicle. Using industry standard photogrammetry software and procedures, a digital surface model would be generated using the data collected by the small unmanned aerial vehicle. The as-built grading plans and report figures would include wetland boundaries and 0.5-foot contours, both of which would be derived from the digital surface model and would be replotted at 1 inch equals 40 feet.

4.3.3 Barrier Installation

After initial weed removal and if warranted based on site conditions, the wetland plan area would be fenced with t-posts and rope at all unauthorized access points into the wetland plan 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 wetland plan 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 wetland plan area on metal t-posts or similar.

4.3.4 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. All container plants and seed should be locally sourced, as close to the project site as possible. The container plant and seed palettes are included in Table 5. 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). Plant layout shall be overseen by the Restoration Ecologist. 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 5). 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 5
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.

4.4 120-day Plant Establishment Period and As-built Reporting

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 6). Year 1 would begin after successful completion of the PEP and any required remedial planting installation has been completed. At the completion of implementation and PEP, the installation would be approved by the City, 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 wetland plan area design. The report may be a brief letter report with photos of the final site design and figures with locations of site elements.

Table 6
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
Erosion Control	As needed	As needed	As needed	As needed	As needed	As needed

NOTE: Maintenance requirements in the off-site weed control areas would include weed control (herbicide treatment) and trash removal only over the 5-year maintenance period.
[1]Minimum frequency.

5.0 Maintenance Plan

Regular maintenance of the wetland plan 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 replanting/reseeding 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 wetland plan 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 or other adjacent landowners with recommendations for remedial measures.

5.6 Erosion Control

Erosion control materials (Best Management Practices) installed within the wetland plan area during topographic recontouring (see Section 4.3.2) may need to be maintained and/or replaced during the five-year maintenance period. Erosion control materials such as fiber rolls and gravel bags would be monitored and repaired or replaced as needed before rain events. Additionally, the wetland plan area would be monitored throughout the five-year maintenance period for new erosion issues such as the development of new rills on slopes. Additional erosion control materials would be installed to resolve any new instances of erosion appearing within the wetland plan area. Erosion is expected to diminish as the project progresses and native vegetation cover increases throughout the wetland plan area.

5.7 Adaptive Management Approach

While the implementation and maintenance measures proposed by this plan are intended to improve the quality of the wetland plan 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 wetland plan area using an adaptive management approach. Adaptive management is defined, for the purposes of this wetland plan, 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 wetland plan 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.

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 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 total and relative percent native cover, species richness, and weed abundance. A native riparian reference site within Spring Canyon is identified in Section 6.2.1 to allow for a qualitative comparison of restoration success that accounts for stochastic events that may affect the broader area such as drought conditions and other variables unrelated to the restoration activities.

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 wetland plan area would be conducted prior to the start of wetland plan activities to demonstrate the functional lift of the wetland plan 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 wetland plan area. CRAM scores for the wetland plan area should increase, both by index (or total) scores and by attribute scores, but mostly by physical and biotic attribute scores (Table 7).

A CRAM assessment of the riverine system shall be conducted on the wetland plan area prior to implementation of this plan to provide the specific baseline target CRAM metric goals (see Section 7.4, CRAM Monitoring).

Table 7 CRAM Metric Goals for Five Years Post-establishment of Wetland Plan 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 8 and would be as follows:

- Container plant survival shall be 80 percent of the initial plantings for the first five years. At the first and second anniversary of plant installation, 80 percent of dead plants would be replaced with new container plants.
- Year 5 criteria must be demonstrated following two years of no artificial watering.
- At the end of the five-year monitoring program, the total combined absolute cover of planted and recruited native species shall be at least 80 percent. Absolute cover is the percentage of the ground covered by the vertical projection of all plants within the creation (establishment) and enhancement (rehabilitation) areas (California Native Plant Society [CNPS] 2024). Plant overlap is excluded (i.e., the total combined absolute cover does not exceed 100 percent, even if the total absolute cover of individual strata (i.e., the tree/shrub stratum and the herbaceous species stratum) exceeds 100 percent when they are combined. The absolute cover of herbaceous plants includes any standing plant parts (attached to a living plant, and not lying on the ground), whether alive or dead; this definition excludes litter and other separated plant material. The cover may include mosses, lichens, and recognizable cryptogamic crusts.
- Throughout the duration of the project, the relative cover of native tree and shrub species shall be within a range of 60 to 80 percent and the relative cover of native herbaceous species shall be at least 30 percent. This wetland plan defines relative cover as the cover of a vegetation stratum (i.e., either the tree/shrub stratum or the herbaceous species stratum) in

relation to the total native vegetation cover within the creation (establishment) and enhancement (rehabilitation) areas. The purpose of the relative cover success criteria is to demonstrate that the site supports multiple overlapping vegetation layers (i.e., an overstory of shrubs and trees with an herbaceous understory). Therefore, when combined, the percent relative tree/shrub cover and the percent relative herbaceous cover may exceed 100 percent. The percent relative cover success criterion is higher for native tree/shrub cover than for herbaceous species, indicating that a greater proportion of native vegetation cover would be provided by trees and shrubs, though the wetland plan area would still support a well-established understory of native herbaceous species. The success criteria for percent relative cover of native tree/shrub species are provided as a range to reflect the diversity of possible habitat compositions within a healthy wetland site. While interim success criteria for relative cover are provided in Years 1 through 4, natural variability in the development of vegetation strata during that period is expected; therefore, the performance standards are targets toward the ultimate Year 5 standard. Riparian habitats are non-equilibrium systems where frequent disturbance from fluvial and hydrological processes create an extremely dynamic herbaceous plant community (Gornish 2017). A five-year target of 30 percent relative herbaceous cover accounts for these riparian dynamics. Percent relative native tree/shrub and herbaceous species cover would be calculated during each annual quantitative monitoring visit and provided in the annual reports to track the site's progress towards the Year 5 success criteria.

- At the end of the five-year monitoring program, the creation (establishment) and enhancement (rehabilitation) areas would support at least eight native species (species richness). The annual species richness success criteria were determined based on the number of species in the Target Plant Species List (see Table 5) and the likelihood to retain this species diversity over time.

- The cover of all non-native species within the wetland plan area shall not exceed an absolute value of 1 to 5 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 8
Performance Standards for the Wetland Creation (Establishment) and Wetland Enhancement (Rehabilitation) Areas

Year	Container Plant Survival[1]	Percent Total Combined Absolute Native Cover[2]	Percent Relative Cover–Native Tree/ Shrub Species[3]	Percent Relative Cover–Native Herbaceous Species[3]	Species Richness[4]	Percent Cover–Non-native Species[5]
1	80	40	40-60	10	N/A	10
2	80	50	45-65	15	5	5
3	80	60	50-70	20	6	5
4	80	70	55-75	25	7	1-5
5	80	80	60-80	30	8	1-5

[1]At the first and second anniversary of plant installation, all dead plants would be replaced unless their function has been replaced by natural recruitment.

[2]Absolute cover is the percentage of the ground covered by the vertical projection of all plants within the creation (establishment) and enhancement (rehabilitation) areas (CNPS 2024). Plant overlap is excluded (i.e., the percent total combined absolute cover does not exceed 100 percent, even if the percent total absolute cover of individual strata (i.e., the tree/shrub stratum and the herbaceous species stratum) exceeds 100 percent. The absolute cover of herbaceous plants includes any standing plant parts (attached to a living plant, and not lying on the ground), whether alive or dead; this definition excludes litter and other separated plant material. The cover may include mosses, lichens, and recognizable cryptogamic crusts.

[3]This plan defines relative cover as the cover of a vegetation stratum (i.e., either the tree/shrub stratum or the herbaceous species stratum) in relation to the total native vegetation cover within the creation (establishment) and enhancement (rehabilitation) areas. The purpose of the relative cover success criteria is to demonstrate that the site supports multiple overlapping vegetation layers (i.e., an overstory of shrubs and trees with an herbaceous understory). Therefore, when combined, the percent relative tree/shrub cover and the percent relative herbaceous cover may exceed 100 percent. The Year 5 percent relative cover success criterion is higher for native tree/shrub cover than for herbaceous species, indicating that a greater proportion of native vegetation cover would be provided by trees and shrubs, though the mitigation site would still support a well-established understory of native herbaceous species. The success criteria for percent relative cover of native tree/shrub species is provided as a range to reflect the diversity of possible habitat compositions within a healthy wetland site.

[4]The species richness success criteria are presented in absolute values and are based on the number of species in the Target Plant Species List (see Table 5 of this plan).

[5]No Cal-IPC High or perennial species would be present during any monitoring years (Cal-IPC 2023).

6.2.1 Location of Reference Site

Per City of San Diego Biology Guidelines (City of San Diego 2018) and as requested by CDFW, a proposed reference site has been identified within Spring Canyon that mimics the intended habitat composition, topography, and hydrology of the wetland plan area after the implementation and maintenance have been successfully completed. The purpose of the reference site is to allow for a qualitative evaluation of mitigation site performance that may be affected by stochastic events that may affect the broader area, such as drought conditions and other variables unrelated to the restoration activities.

The proposed reference site is upstream of the wetland plan area (Figure 11). The reference site measures approximately 2.55 acres and is on City-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, mule fat, blue elderberry, lemonade berry , and needlegrass species (*Stipa* sp.). Non-native species cover was low and included fennel and non-native grasses.

The use of a reference site is included in this plan to provide a reference to document potential regional annual and seasonal changes that may occur unrelated to the restoration activities and will be approved by the City of San Diego .

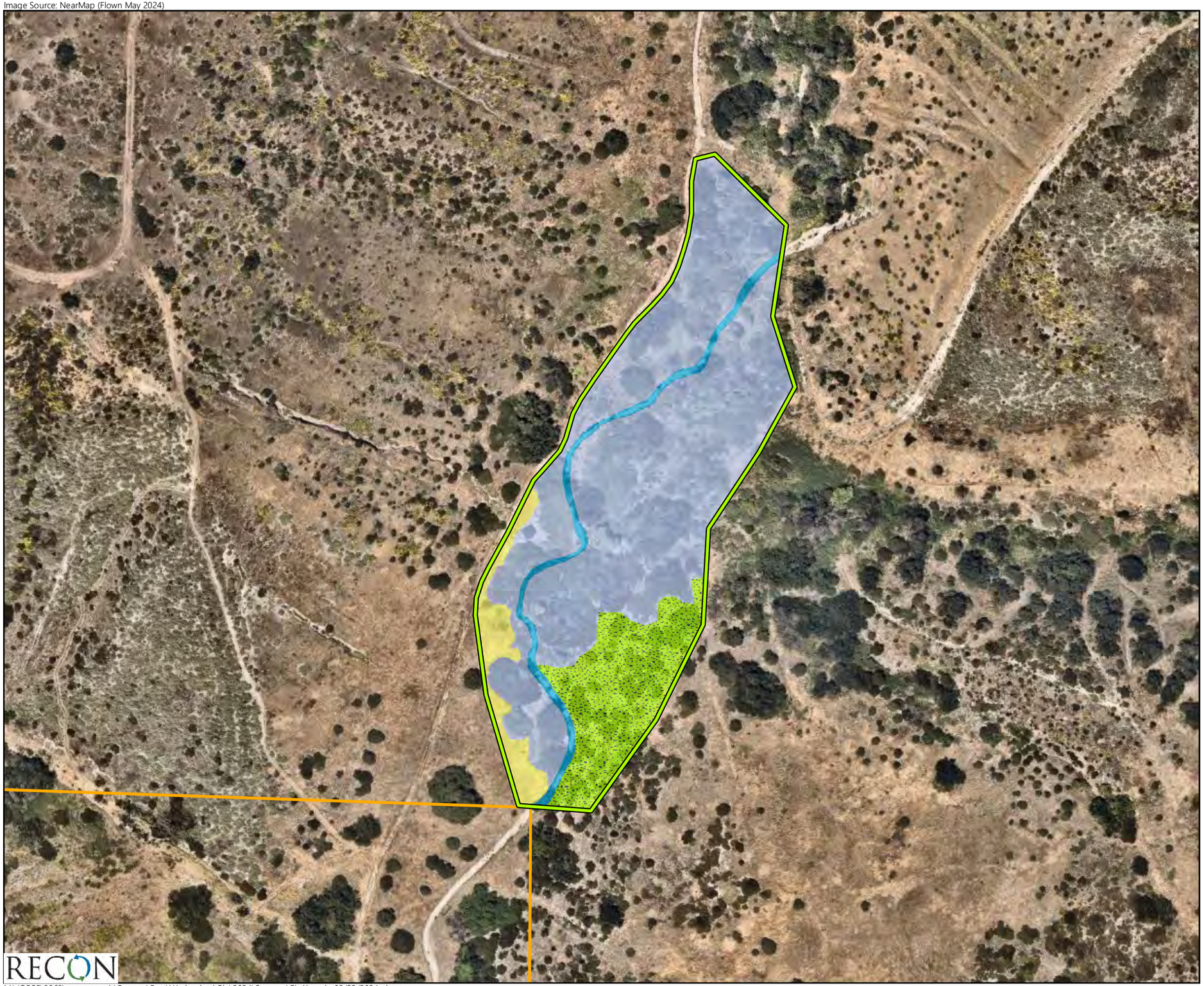
6.3 Photographic Documentation

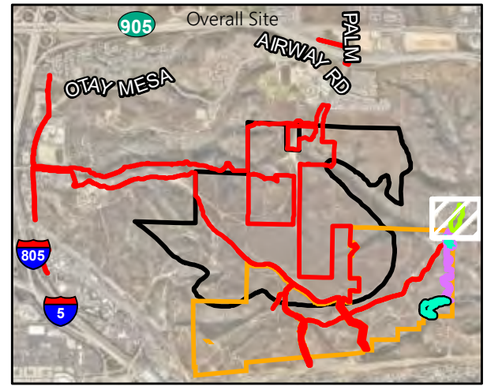
Permanent photograph location points would be located in strategic areas of the wetland plan area. Representative photographs would be taken at each photograph location point to visually document the progress of vegetation cover development over the monitoring period. Photographs shall be taken from the same location, vantage point and angle each year to compare each year at the end of the five-year monitoring period. Photograph location points shall be marked and mapped using GPS to enable the relocation of the points.

6.4 Jurisdictional Delineation

In order to demonstrate that the project has met the required compensatory mitigation, a jurisdictional delineation of the wetland plan area would be performed based on the applicable jurisdiction's criteria. The RWQCB delineation would be performed using the methodology set forth in the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual and the 2008 Regional Supplement to the U.S. Army Corps of Engineers Wetland Delineation Manual: Arid West Region by the end of Year 5. Using the jurisdictional delineation, the project would demonstrate that 0.40 acre of wetland has been established and the three wetland indicators (wetland vegetation, soils, and hydrology) are present. The jurisdictional delineation results would be submitted with the respective annual project progress report.

Image Source: NearMap (Flown May 2024)





Reference Site

Land to be Conserved and Managed by the City

Vegetation Communities

Disturbed Maritime Succulent Scrub

Non-native Grassland

Southern Willow Scrub

Natural Flood Channel

0 Feet 100

RECON

M:\JOBS5\8868\common_gis\Reports\Rest\Wetland_mitPln\2024\Summer\Fig11.mxd 08/22/2024 bma

FIGURE 11
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 9.

Table 9
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	Spring	None	Spring

[1]Quantitative monitoring to begin in Year 1.

7.1 Qualitative Monitoring

Qualitative monitoring of the wetland plan 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 9). 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. Transect monitoring methods would follow the protocol published by the 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. Using this revised approach, approximately three transects per acre would be randomly positioned throughout the creation (establishment) and enhancement (rehabilitation) areas, with at least one of the transects placed across the channel (i.e.,

from edge of floodplain to edge of floodplain), if feasible, to capture all habitat types within one transect; the transects would follow the stratified random sampling method and a map of the transect locations would be reviewed by the City 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 will also be counted to determine container plant survival. In addition, a photograph from the same vantage point and angle would be taken at the beginning and end of the transect; the transect would be marked and the marker included in the in the photograph. The photographs will be compared to each other each year to document the trend of the restoration site.

7.3 Wildlife Usage

A list of wildlife species observed using the wetland plan 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.

7.4 CRAM Monitoring

As noted above, the newly established wetland plan area would have CRAM assessment monitoring conducted a total of three times throughout 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 three post-implementation assessments shall be conducted in Year 1, Year 3, 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 City DSD Mitigation and Monitoring Coordinator, CDFW, and RWQCB by January 15 of each year. The annual report would assess the wetland plan 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. A final monitoring report would be prepared and submitted to the City Mitigation and Monitoring Coordinator, USFWS, RWQCB, and CDFW for use in the notification of completion and final acceptance of the mitigation effort.

8.0 Financial Assurances

The project proponent/applicant 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 project proponent/applicant 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.

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 project proponent's maintenance and monitoring obligations will continue, until the City, USFWS, CDFW, and RWQCB deem the mitigation program as successful or contingency measures must be implemented (see Section 5.6, Adaptive Management Approach).

Following receipt of the final annual report, the City, USFWS, CDFW, and RWQCB shall conduct a site visit to the mitigation site in order to approve 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 City, RWQCB, USFWS and CDFW has been received.

10.0 Site Protection Instrument

The wetland plan area is planned to be conveyed to the City in fee title. The wetland plan area shall be protected in perpetuity through establishment of a Conservation Easement, restrictive covenant, or other mechanism acceptable by the City and Wildlife Agencies, and an endowment to fund long-term management would be established prior to or concurrent with implementation of the long-term management. After conveyance, assurance of long-term conservation and management of the wetland plan area would be provided by the City's MSCP Subarea Plan. Management and monitoring would be provided consistent with the City MSCP Subarea Plan, Section 1.5.2 General Management Directives.

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ATTACHMENTS

ATTACHMENT 1

Wetland Plan for the Nakano Project, San Diego, California

Wetland Plan
for the Nakano Project
San Diego, California

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RECON Number 3396-1
August 14, 2024

Katy Chappaz, Restoration Ecologist

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4: Downstream Portion of Plan Area with Monoculture Stand of Tamarisk (*Tamarix ramosissima*) Circled in Red. Panoramic Photograph Facing Southwest to Northwest, July 2024. 22

ATTACHMENT

1: Technical Memorandum for Spring Canyon Hydraulic Analysis and Preliminary Floodplain Mapping
2: Spring Canyon 1971 and Present
3: Summary of Drilling and Groundwater Measurements Nakano and Southwest Village Mitigation Areas, San Diego, California

Acronyms and Abbreviations

BSO	Biologically Superior Option
Cal-IPC	California Invasive Plant Council
CDFW	California Department of Fish and Wildlife
CNPS	California Native Plant Society
CRAM	California Rapid Assessment Method
DSD	Development Services Department
LTMP	Long Term Management Plan
MHPA	Multi-Habitat Planning Area
MSCP	Multiple Species Conservation Program
NAS	National Academy of Sciences
PEP	Plant Establishment Period
plan	Wetland 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 Wetland 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] 2024a). 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, 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 at a 2:1 ratio within Tri Pointe Homes property along Spring Canyon, approximately three miles southeast of the project site in the Otay Mesa area[1]. Creation (establishment)[2] would be implemented within 0.4 acre of non-native grassland that would be converted to native riparian habitat. An additional 0.4 acre of enhancement (rehabilitation) would be implemented within non-native dominated tamarisk scrub. This area would provide 0.4 acre of enhancement (rehabilitation) credit due to the area having 100 percent non-native cover. The creation (establishment) and enhancement (rehabilitation) would be consistent with the priorities set forth in the City of San Diego MSCP Subarea Plan for southern Otay Mesa, which prioritizes the restoration of disturbed areas in Spring Canyon, a regional corridor identified in the MSCP. Although the mitigation is proposed within the City of San Diego, it would also be consistent with the City of Chula Vista MSCP Subarea Plan as the proposed mitigation area 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.

[1] The RWQCB will require an additional mitigation ratio for out-of-watershed mitigation; hence, the total mitigation ratio for RWQCB would be 3:1. However, the City of San Diego and City of Chula Vista mitigation requirement is a 2:1 ratio.

[2] U.S. Army Corps of Engineers (USACE) and RWQCB terminology is provided in parentheses for RWQCB use during project permitting. City of San Diego definitions for wetland creation and wetland enhancement correspond to USACE definitions for wetland establishment and wetland rehabilitation, respectively.

The wetland mitigation component of the project would create (establish) and enhance (rehabilitate) degraded areas of Spring Canyon currently supporting large and dense stands of invasive species and non-native grasses to high quality mule fat scrub habitat with diverse wetland vegetation. The 0.4-acre creation (establishment) area is located within non-native grassland habitat bisected by a narrow, incised channel. The incised channel is disconnected from the surrounding upland habitat, which is dominated by non-native grassland. The incised channel would be recontoured to hydrologically reconnect the channel surface flows to the surrounding floodplain. The identified 0.4-acre enhancement (rehabilitation) area is currently dominated by tamarisk (*Tamarix ramosissima*), castor bean (*Ricinus communis*), and pepper trees (*Schinus* spp.) along the channel invert. In the enhancement (rehabilitation) area, one monoculture stand of tamarisk scrub would be removed. In both the creation (establishment) and enhancement (rehabilitation) areas, non-native species would be replaced with native riparian species suitable to support least Bell's vireo (*Vireo bellii pusillus*), yellow warbler (*Setophaga petachia*), and yellow-breasted chat (*Icteria virens*), which are known to occur in Spring Canyon upstream and downstream of the mitigation areas.

The project also proposes the following project design features intended to support the long-term viability of the mitigation effort: (1) enhancement (rehabilitation) of an additional 0.4 acre (at minimum) of non-native riparian to native riparian habitat to provide a biologically superior condition as required by the City of San Diego Biologically Superior Option (BSO) wetland deviation criteria and to meet the RWQCB's out-of-watershed mitigation requirements (for a minimum total of 1.2 acres); (2) weed control of an additional 2.2 acres of riparian scrub and riparian buffer; and (3) invasive species removal in upstream locations off-site, on publicly owned lands, and in small sections of Spring Canyon where the main channel makes a sharp, U-shaped bend or "oxbow" and a portion of the bend lies outside the Tri Pointe Homes property/wetland plan area on City of San Diego property.

This plan includes a presentation of the project location, wetland plan locations, mitigation requirements, proposed work, 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.

1.1 Project Location and Plan Area Location

The project is located east of Interstate 805, northwest of Dennery Road, and south of the Otay River, in the Otay Watershed (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 2024a). Regardless of whether annexation proceeds, this plan addresses mitigation that would satisfy the requirements of either agency.

Project Location

RECON

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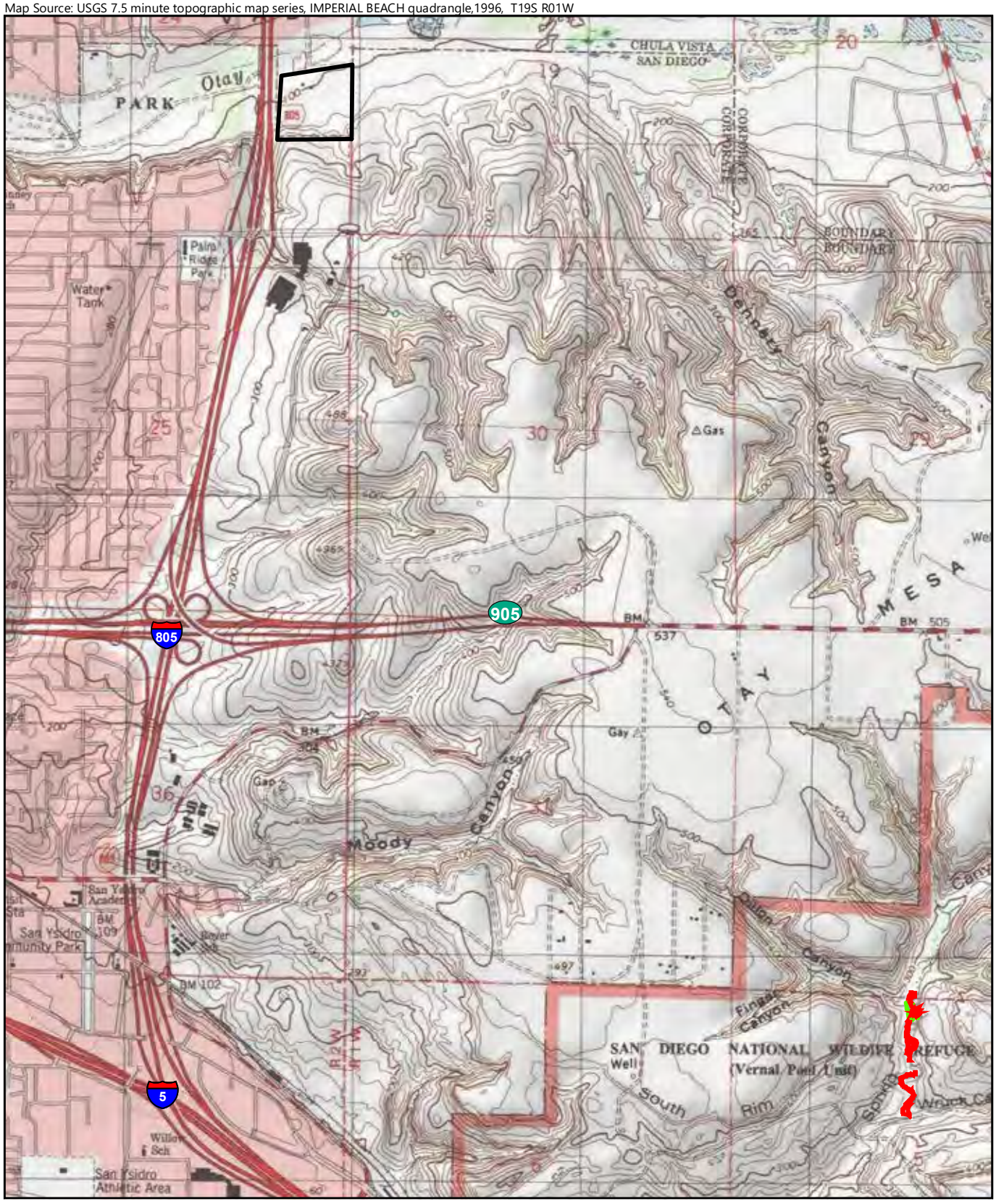
FIGURE 1
Project Location

The wetland plan area[1] is located off-site, in the city of San Diego, south of State Route 905 and east of Interstate 805 in the Tijuana Watershed (see Figure 1). The wetland plan 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 wetland plan area includes the project's wetland mitigation and project design features and 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 wetland plan 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). The wetland plan area would be reached via dirt roads accessible from Calle De Linea, near Britannia Boulevard. No utility easements are present within the wetland plan area, and potential future development in adjacent areas was taken into consideration when identifying the mitigation area. While the project impacts are occurring in the Otay Watershed, mitigation is being provided in the Tijuana Watershed because there are no mitigation opportunities available in the Otay Watershed. An additional 1:1 ratio of mitigation is proposed in this plan to compensate for the out-of-watershed mitigation.

The wetland plan area addressed in this plan includes (1) 0.4 acre of creation (establishment) and 0.4 acre of enhancement (rehabilitation) required by the City of Chula Vista, the City of San Diego, and RWQCB (creation/establishment is proposed in Spring Canyon to avoid net loss of wetlands), and an additional 0.4-acre of enhancement (rehabilitation) provided to meet the City of San Diego biologically superior mitigation and required by RWQCB for out of watershed mitigation; (2) as-needed invasive species removal within additional acreage contiguous with the mitigation proposed as a project design feature; and (3) a 0.46-acre creation (establishment) area proposed as a potential/partial wetland mitigation for the Southwest Village project. The additional 0.46-acre creation (establishment) for Southwest Village would undergo a separate permit application process and would not be approved by the Wildlife Agencies or RWQCB as part of the permit process for the project. The project would also pursue invasive species removal in small sections of Spring Canyon where the main channel makes a sharp, U-shaped bend or "oxbow" and a portion of the bend lies outside the Tri Pointe Homes property/wetland plan area on City of San Diego property and in upstream tributaries to the wetland plan area to support the long-term viability of the mitigation 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, U.S. Customs and Border Protection, and the California Department of Transportation), to the maximum extent feasible. The wetland plan area and all project design feature areas would be maintained throughout the 5-year maintenance and monitoring period to native wetland habitat, as described in Section 5.0. Figure 4 presents the locations of invasive weeds within all public lands upstream of the wetland plan area as observed during project planning site visits in 2023 and 2024.

[1] This term is used for the entire restoration area that consists of the compensatory mitigation areas for the Nakano project and the Nakano project design features, including a portion of the compensatory mitigation for the Southwest Village project as detailed below.

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



Nakano Project Boundary

Wetland Plan Area

Wetland Area for Nakano

Partial/Potential Mitigation Area for Southwest Village

Wetland Creation (Establishment)

0 Feet 2,000

FIGURE 2
Project and Wetland Plan Area
Location on USGS Map

RECON

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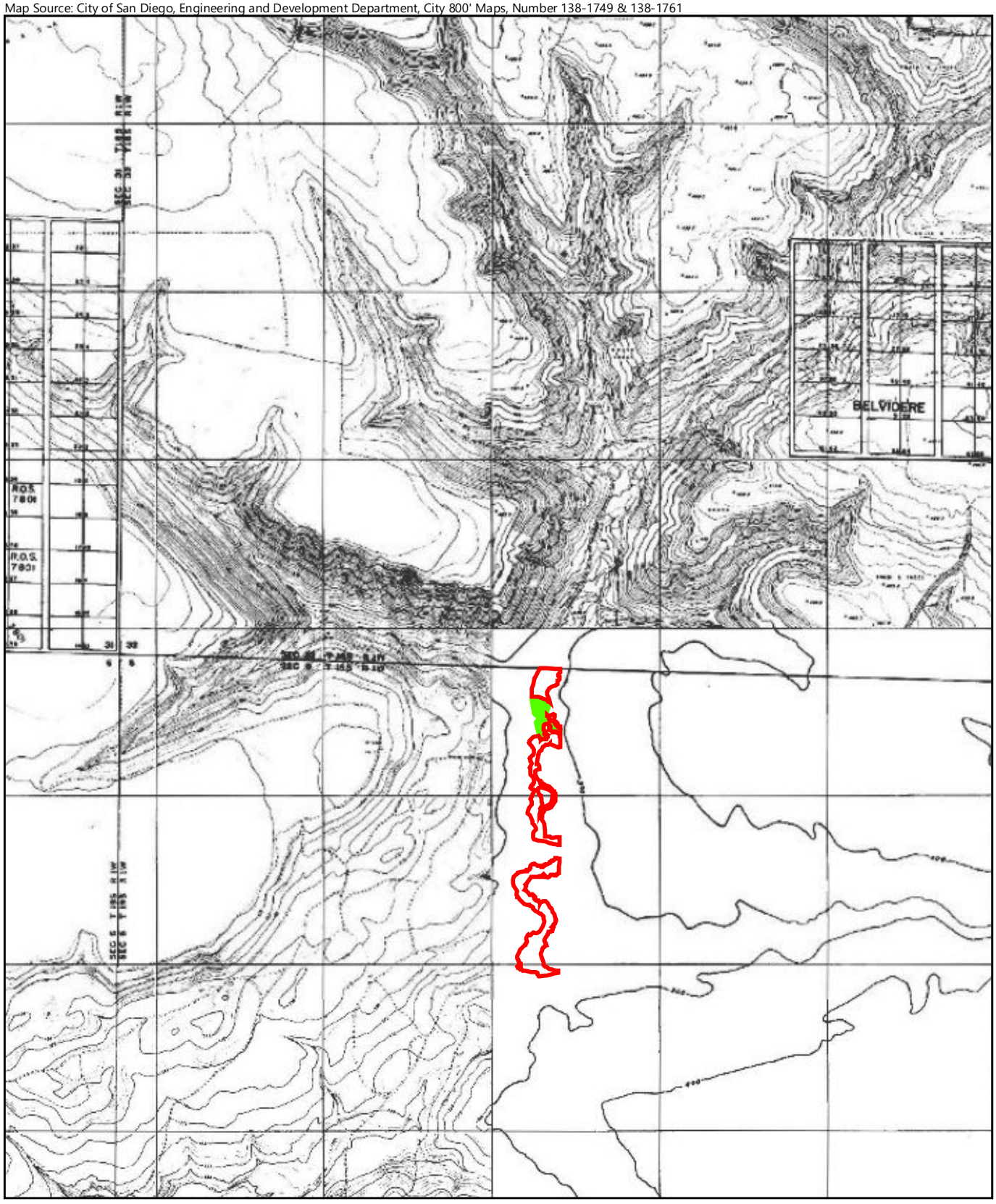
Map Source: City of San Diego, Engineering and Development Department, City 800' Maps, Number 138-1749 & 138-1761



Wetland Plan Area

Wetland Area for Nakano

Partial/Potential Mitigation Area for Southwest Village

Wetland Creation (Establishment)

0 Feet 800

RECON

FIGURE 3

Wetland Plan Area Location on City 800' Map

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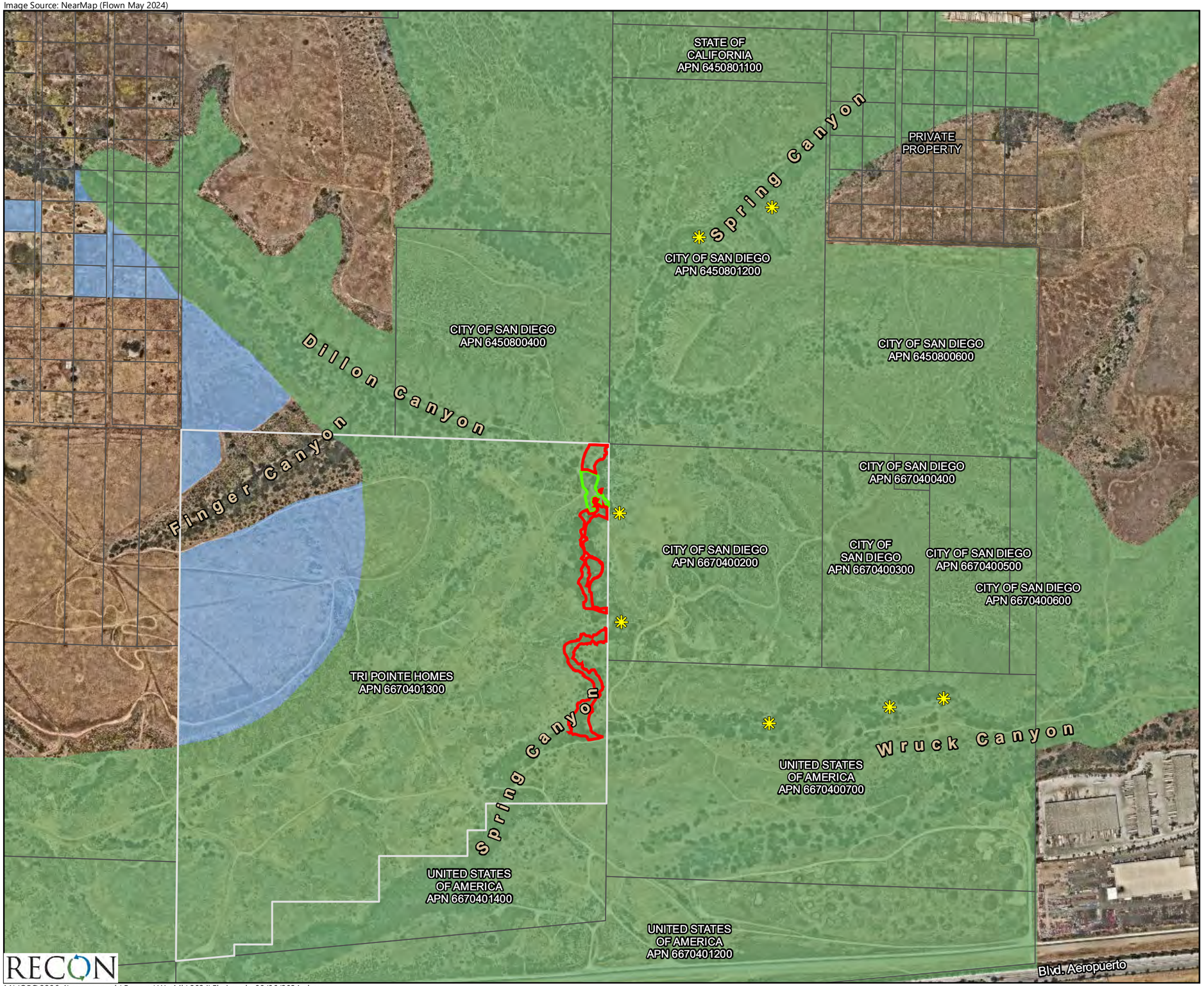
Image Source: NearMap (Flown May 2024)



- Upstream Invasive Weed Location
- Mitigation Parcel
- City of SD MHPA
- VPHCP MHPA

Wetland Plan Area

- Wetland Area for Nakano

Partial/Potential Mitigation Area for Southwest Village

- Wetland Creation (Establishment)

0 Feet 600

RECON

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FIGURE 4
Wetland Plan Area on Aerial Photograph

As noted above, Figure 4 identifies an additional 0.46-acre wetland creation (establishment) area. Due to its location in the upstream portion of the wetland plan area and embedded within the Nakano creation (establishment) site, this area would be implemented concurrently with the Nakano project's mitigation and would serve as partial mitigation for the Southwest Village project (to be permitted separately). The additional 0.46-acre creation (establishment) area is considered a project design feature for the Nakano project but is not part of its required compensatory mitigation.

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.

Table 1
Wetland Impacts by Jurisdiction

Vegetation Community	Impacts in Acres	Impacts by Jurisdiction		
		City of San Diego and City of Chula Vista Wetlands (Acres)	RWQCB Waters of the State Wetland (Acres)	CDFW Waters of the State Riparian (Acres)
Mule fat scrub	0.03	0.03	0.03	0.03
Southern willow scrub	0.15	0.15	0.15	0.15
Emergent wetland	0.18	0.18	0.18	0.18
Disturbed wetland	0.04	0.04	0.04	0.04
TOTAL	**0.40**	**0.40**	**0.40**	**0.40**

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 restoration. The RWQCB requires a minimum of 1:1 ratio of creation (establishment) to mitigate for any net loss of wetlands; per the Executive Order W-59-93, commonly referred to as California's "no net loss" policy for wetlands, this mitigation requirement ensures that the Water Boards' regulation of dredge or fill activities will be conducted in a manner "to ensure no overall net loss and long-term net gain in the quantity, quality, and permanence of wetlands acreage and values…" The remaining balance may occur as wetland restoration in the form of re-establishment or enhancement (rehabilitation).

An additional 0.4 acre of enhancement (rehabilitation) is being provided as a project design feature to demonstrate that the project is biologically superior per the City of San Diego BSO wetland deviation criteria. This additional 0.4 acre of enhancement (rehabilitation) would also satisfy RWQCB State Procedures, including State Supplemental Dredge or Fill Guidelines, Subpart J, which requires a watershed-based approach for mitigation (the same would be required pursuant to the USACE Compensatory Mitigation Standard Operating Procedures [USACE 2016] should the USACE take jurisdiction). Therefore, an additional 1:1 ratio of restoration (re-establishment) or enhancement (rehabilitation) is anticipated to be required because the mitigation is occurring in the Tijuana Watershed, which is adjacent the Otay Watershed, resulting in a total minimum mitigation ratio of 3:1.

Table 2 presents the total mitigation required for each wetland type based on the impact acreage and the 3:1 mitigation ratio.

Table 2
Required 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[1,2]	City of San Diego and City of Chula Vista Minimum Required Mitigation (Acres)	Additional RWQCB Mitigation Ratio for Out of Watershed Mitigation [2]	Total Mitigation Ratio	Required Mitigation[3]
Mule fat scrub	0.03	2:1	0.06	1:1	3:1	
Southern willow scrub	0.15	2:1	0.30	1:1	3:1	
Emergent wetland	0.18	2:1	0.36	1:1	3:1	
Disturbed wetland	0.04	2:1	0.08	1:1	3:1	
Total	**0.40**	—	—0.80	—	—	**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 (establishment) or wetland restoration (re-establishment); the remaining balance may occur as wetland enhancement (rehabilitation).
[2]Consistent with State Procedures, including State Supplemental Dredge or Fill Guidelines, Subpart J, and USACE Compensatory Mitigation Standard Operating Procedures (USACE 2016).
[3]Mitigation would be accomplished through 0.4 acre minimum of wetland creation (establishment) to mitigate for net loss of wetlands, and 0.4 acre minimum of wetland enhancement (rehabilitation) to satisfy City of San Diego and City of Chula Vista mitigation requirements, and an additional 0.4 acre minimum of wetland enhancement (rehabilitation) for biologically superior conditions per the City of San Diego BSO criteria and to satisfy RWQCB mitigation requirements, totaling at least 1.2 acres.

The project's mitigation requirements would be achieved within Spring Canyon through at least 0.4 acre of wetland creation (establishment) and 0.4 acre of wetland enhancement (rehabilitation) to satisfy City of Chula Vista, City of San Diego, and RWQCB mitigation requirements, and an additional 0.4-acre of wetland enhancement (rehabilitation) to provide biologically superior conditions per the City of San Diego BSO criteria and to satisfy RWQCB requirements for out-of-watershed mitigation. Wetland creation (establishment) (at least 0.4 acre) would include conversion of upland (non-native grassland) habitat to wetland (native riparian) habitat via topographic recontouring. Wetland enhancement (rehabilitation), including 0.4 acre to satisfy City of Chula Vista and City of San Diego mitigation requirements and an additional 0.4 acre pursuant to the City of San Diego BSO criteria and RWQCB requirements, would include the conversion of non-native riparian habitat into native riparian habitat through invasive species removal and planting with native riparian species suitable for least Bell's vireo. Table 3 summarizes the proposed mitigation, which exceeds the mitigation requirements presented in Table 2, and the project design features that are proposed to be implemented concurrently with the mitigation.

Table 3 Proposed Work (Wetland Mitigation and Project Design Features)	
Mitigation/Project Design Components	Proposed Mitigation and Project Design Features
Mitigation	
Wetland Creation/Establishment (to avoid net loss)	0.45[1]
Wetland Enhancement/Rehabilitation	0.80[2]
Subtotal	**1.25[3]**
Project Design Features	
Weed Control	2.21
Wetland Creation/Establishment	0.46[4]
Total Area of Work	**3.92**

NOTE: Totals may not add due to rounding.
[1]Exceeds the required total creation (establishment) of 0.4 acre (see Table 2).
[2]Meets the required enhancement (re-establishment) of 0.8 acre (see Table 2).
[3]Exceeds the required total mitigation of 1.20 acre (see Table 2).
[4]This project component is partial/potential mitigation for the Southwest Village project (RECON 2024b).

1.2.1 Site Selection (Watershed Approach)

The selection of Spring Canyon as a suitable wetland plan area for the Nakano Project is due to the lack of available mitigation sites in the watershed in which the project occurs (Otay River watershed). The Otay River watershed is encompassed by two large mitigation banks that would cover all available wetlands restoration potential; one mitigation bank in the upper Otay River watershed is proposed by the City of Chula Vista and the other in the lower Otay River watershed is planned by the City of San Diego. On the other hand, the City of San Diego supports the selection of Spring Canyon in the Tijuana River watershed based on the City's MSCP Subarea Plan's Specific Management Directives for southern Otay Mesa as a priority area for restoration (City of San Diego 1997).

According to the State Supplemental Dredge or Fill Guidelines, Subpart J, a watershed approach must be applied to evaluate the concept of "no net loss" (SWRCB 2021). The loss of waters of the State must be offset by creating wetlands to achieve "no net loss" of wetlands overall. The watershed approach considers the needs of a watershed when making mitigation decisions to achieve a balance between wetland impacts and protecting ecological functions over time.

In 2001, the National Academy of Sciences (NAS) conducted a study that included several recommendations related to adopting a watershed approach to compensatory mitigation (National Academy of Sciences 2001). For example, the NAS study states that mitigation preference should not be automatic but should be based on the wetland needs and the potential for the compensatory wetland to persist over time. The considerations may include current trends in habitat loss or conversion, the presence and needs of sensitive species, and site conditions that favor or hinder the success of compensatory mitigation projects (among others). While the watershed approach is designed to enhance the aquatic resource mitigation, NAS acknowledged the risks of the watershed approach because it might prioritize individual wetlands that might not be ecologically functional over functional wetlands in a different watershed. Successful attainment of a watershed approach requires thorough consideration of landscape trends to properly site compensatory wetlands where they will maintain sustainable "no net loss" of wetland functions and services. Given that the project and Spring Canyon wetland plan area are in close proximity to each other, despite being located in

adjacent watersheds, and considering the unavailability of mitigation sites in the Otay River watershed, adding one mitigation ratio to compensate for out-of-watershed mitigation would provide a net gain to wetlands functions and services in south San Diego County.

1.2.2 Mitigation and Restoration Definitions

The proposed mitigation would create (establish) and enhance (rehabilitate) the wetland functions and values within the wetland plan area in line with City of San Diego and USACE/RWQCB definitions, which are provided as follows:

- Per the City of San Diego's Biology Guidelines Section III. B. 1. (a), wetland creation is an activity that results in the formation of new wetlands in an upland area. An example is excavation of uplands adjacent to existing wetlands to lower the surface elevation in a manner to allow for surface waters, and the establishment of native wetland vegetation that would be sustained by the new surface flows, and wetland enhancement is an activity that improves the self-sustaining habitat functions of an existing wetland (City of San Diego 2018).
    - Per the USACE Compensatory Mitigation Standard Operating Procedures, which are applied by RWQCB during the permitting process, wetland creation (establishment) is the manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area and functions.
    - For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation:
        - 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.

City of San Diego definitions for wetland creation and wetland enhancement correspond to USACE/RWQCB definitions for wetland establishment and wetland rehabilitation, respectively. USACE/RWQCB terminology is provided in parentheses after each use of the City terms "creation" and "enhancement."

The proposed creation (establishment) and enhancement (rehabilitation) would result in hydrological and morphological changes to the creek through the conversion of non-native grasslands by lowering the floodplain, and by removing dense stands of perennial invasive plant species, namely tamarisk, located within the floodplain that currently reduce water flow through the area. Topographic recontouring of non-native grassland uplands within the creation (establishment) area using mechanized equipment would further reconnect the incised channel to its floodplain. This

would facilitate the re-establishment and recruitment of native wetland species by bringing the surface closer to groundwater levels and increasing the frequency and length of groundwater to surface flow connection during rain events. 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 stands of tamarisk from the enhancement (rehabilitation) areas, hydraulic resistance values would be reduced for improved hydrologic function. The removal of the halophytic tamarisk and the resulting improved flushing capacity would also reduce soil salinity for improved recruitment of native wetland vegetation and establishment of native wetland plantings. Large invasive species such as tamarisk would be cut at the stump and treated with herbicide, but the stump and roots would not be removed to avoid disturbing the creek system. No manual or mechanical equipment would be used to modify the creek system within the enhancement (rehabilitation) areas.

2.0 Existing Conditions

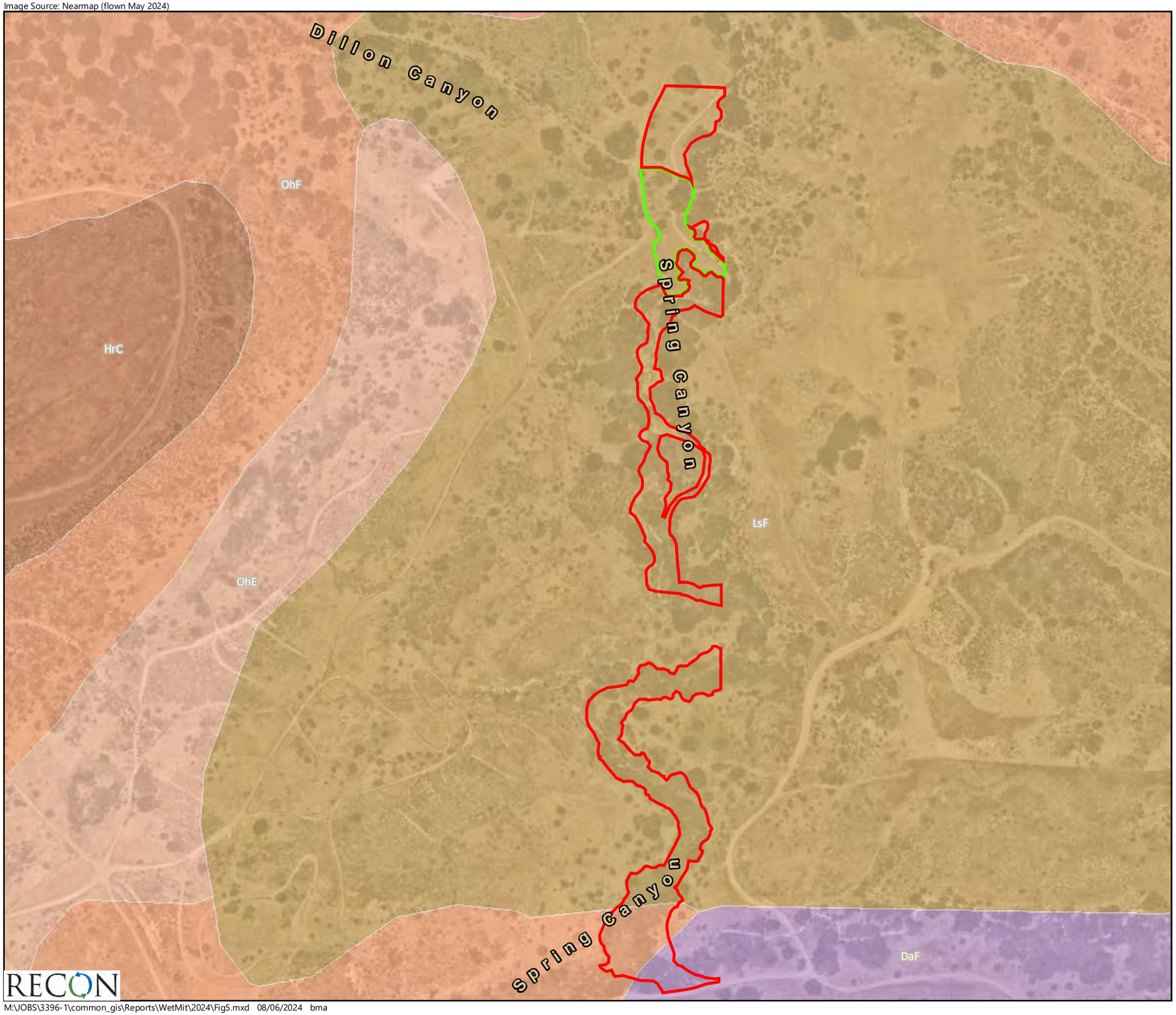
2.1 Wetland Plan Area Description

The wetland plan area is located within Spring Canyon, in the City of San Diego MHPA Preserve, on land owned by Tri Pointe Homes (see Figure 4). The wetland plan area is characterized by monoculture of tamarisk and castor bean stands and other non-native species mixed with native riparian habitat. Non-native grassland surrounds an incised channel that is characterized by scour and other disturbances (including off-road vehicle tracks and erosion). Least Bell's vireo, yellow warbler, and yellow-breasted chat have been observed within the wetland plan area. An additional wetland creation (establishment) potential/partial wetland mitigation area would be implemented concurrently with the mitigation and would be applied to the future Southwest Village project through the permitting process for the Southwest Village Project. 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 wetland plan 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 wetland plan 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 wetland plan 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 wetland plan area and consists of well-drained, moderately deep to deep clays derived from soft, calcareous sandstone, and shale with rapid runoff.

Image Source: Nearmap (flown May 2024)



Wetland Plan Area

Wetland Area for Nakano

Partial/Potential Mitigation Area for Southwest Village

Wetland Creation (Establishment)

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

RECON

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FIGURE 5
Wetland Plan Area on Soils Map

2.1.2 Hydrology

The wetland plan 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 wetland plan area and directly upstream of the wetland plan area (Figure 6). These waters would also be considered CDFW riparian. The watershed immediately surrounding the canyon is largely undeveloped and provides upland buffers that protect water quality.

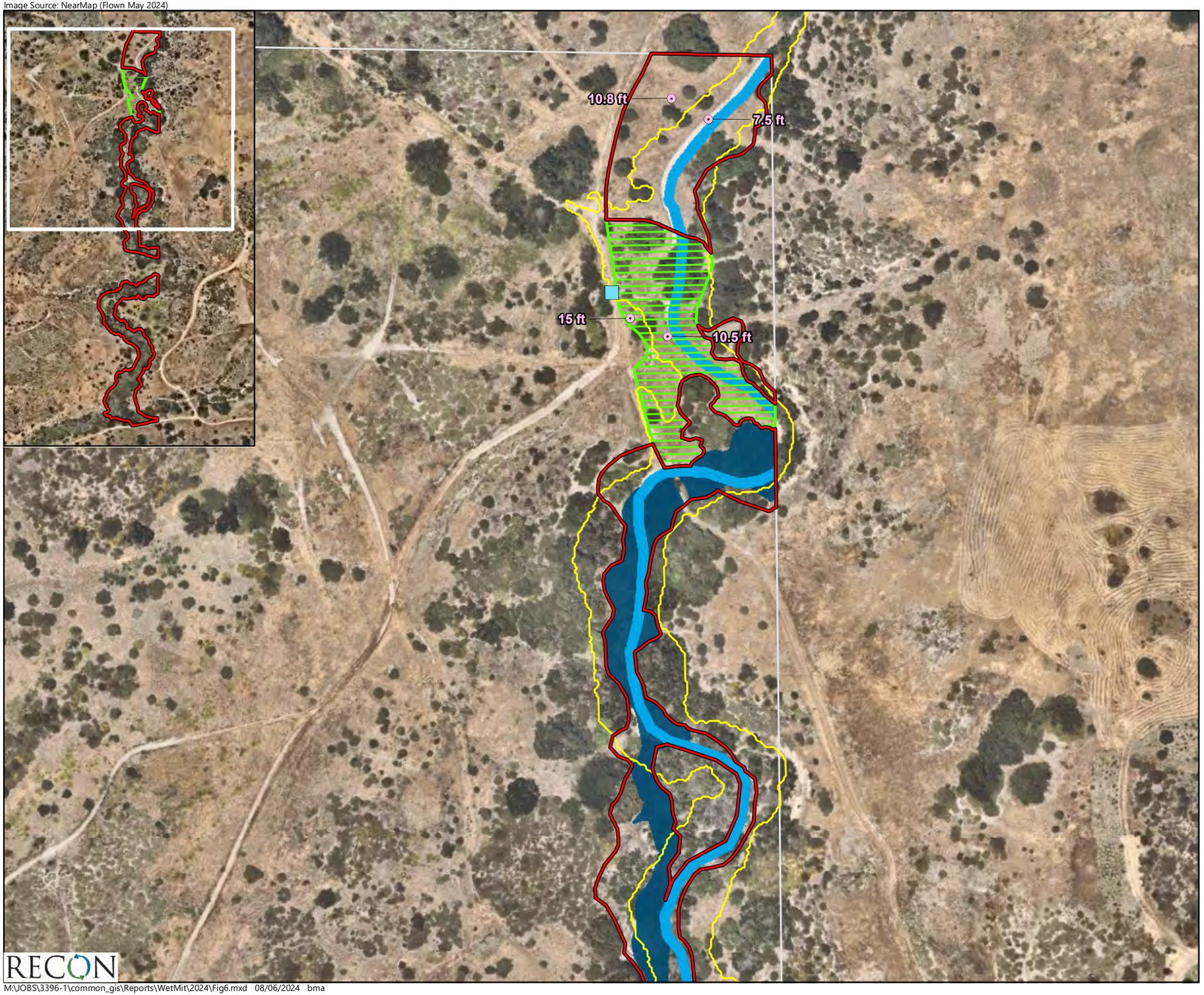
A hydraulic analysis was performed by Rick Engineering identifying the limits of inundation for the 2-, 5-, and 10-year flood events (see Figure 6; Attachment 1). The hydraulic analysis indicates that most of the wetland mitigation area is located within the 2-year flow limits, indicating adequate hydrologic functions to establish native riparian habitats.

Additionally, a groundwater investigation was conducted in the upstream portions of the wetland plan area by Geocon in June 2024 by drilling for groundwater across the upland non-native grassland habitat and incised channel. The purpose of the groundwater investigation was to identify the depth to groundwater within the upland areas and the channel to understand the suitability and practicability of recontouring the floodplain to establish riparian vegetation in the lowered floodplain. Understanding the depth of groundwater during the dry season helps to determine the degree of upland grading to bring the surface of the restoration area close enough to groundwater to support wetland vegetation in all seasons. Figure 6 presents the drilling locations and depth to groundwater measurements at each drilling location. Four drilling locations were established, including two within the incised channel and two near the 2-year floodplain boundaries in the upland non-native grassland areas. Groundwater depths were between 7.5 feet and 15 feet (see Figure 6). Typical target groundwater depths for riparian systems in southern California are 15 feet during the dry season and 10 feet during the wet season, with groundwater to surface connection usually occurring during wet season rain events (California Riparian Habitat Joint Venture 2009; Rohde et al 2021). Topographic recontouring would bring the wetland surface closer to groundwater, increasing the frequency and length of groundwater to surface flow connection during rain events and reducing the distance to groundwater for established riparian species root systems. It would also broaden the 2-year flow limits further into portions of the wetland plan area currently mapped as non-native grassland.

2.1.3 Aquatic Resources

Aquatic resources within the wetland plan area include non-wetland waters and riparian areas; the process for identifying and characterizing the wetland plan area's aquatic resources is described in the Aquatic Resources Delineation Report for the Nakano Project Wetland Area in Spring Canyon (RECON 2024c). Non-wetland waters within the wetland plan area consist of unvegetated ephemeral drainage channels. The main drainage course flows southward through Spring Canyon, draining across the international border via a stormwater conveyance facility and into Mexico, where flows enter the Tijuana River and then continue into the Pacific Ocean. The channel is mostly devoid of vegetation and has a sandy or cobble bottom within incised banks that vary in depth.

Image Source: NearMap (Flown May 2024)



Mitigation Parcel

Culvert

Natural Flood Channel

2-year Floodplain

June 2024 Groundwater Drilling Location (Depth to Groundwater)

Wetland Plan Area

Wetland Area for Nakano

Partial/Potential Mitigation Area for Southwest Village

Wetland Creation (Establishment)

City of San Diego Wetlands

Wetland

0 Feet 100

RECON

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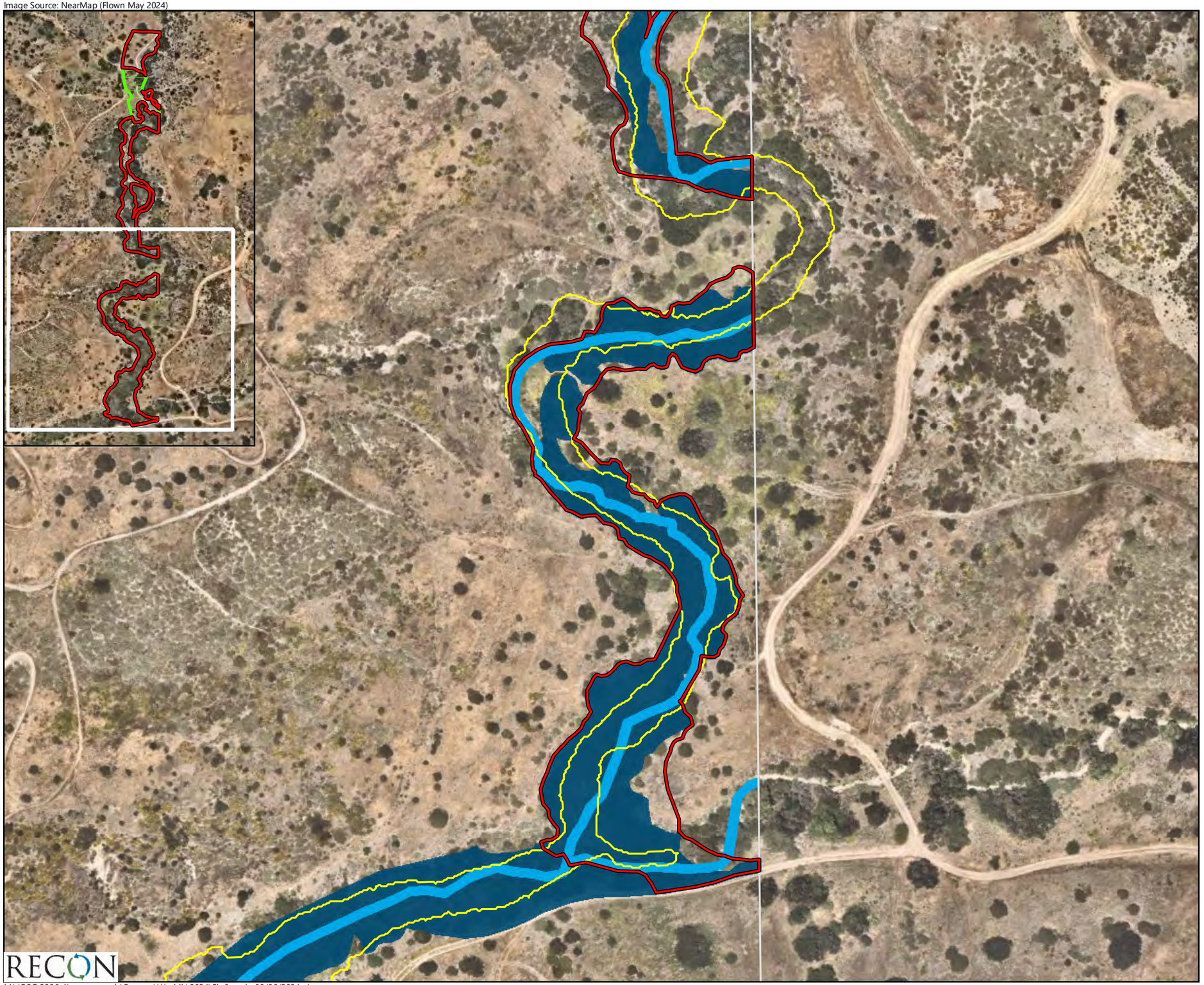
FIGURE 6.1
Wetland Plan Area Existing Hydrology

Image Source: NearMap (Flown May 2024)



Mitigation Parcel

Natural Flood Channel

2-year Floodplain

Wetland Plan Area

Wetland Area for Nakano

City of San Diego Wetlands

Wetland

0 Feet 120

RECON

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FIGURE 6.2
Wetland Plan Area Existing Hydrology

Riparian areas within the wetland plan area consist of mule fat scrub and tamarisk scrub on terraces above the ordinary high water mark and adjacent to the non-wetland water channels. These vegetation communities extend outside of the ordinary high water mark delineated for the non-wetland waters. The riparian areas support hydrophytic vegetation but lack wetland hydrology and hydric soil indicators required to meet the USACE definition of a wetland.

2.1.4 Biological Conditions

The wetland plan area's existing biological resources are shown on Figure 7. The wetland plan 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 wetland plan 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 wetland plan 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.

The non-native grassland and disturbed habitat within the mitigation area consist primarily of stands of tamarisk scrub and non-native grassland mixed with pepper trees, tree tobacco (*Nicotiana glauca*), garland daisy (*Glebionis coronaria*), castor bean, bull thistle (*Cirsium vulgare*), and fennel (*Foeniculum vulgare*). A large, dense stand of tamarisk scrub occurs towards the downstream end of the wetland plan area. The upstream end of the wetland plan area contains a stand of non-native grassland with pepper trees, castor bean and a few native shrubs mixed in. A stand of disturbed maritime succulent scrub juts into the non-native grassland area at its southern end.

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. Ground surveys were used to further refine the non-native species polygons. Photographs 1 through 4 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).

Image Source: NearMap (Flown May 2024)

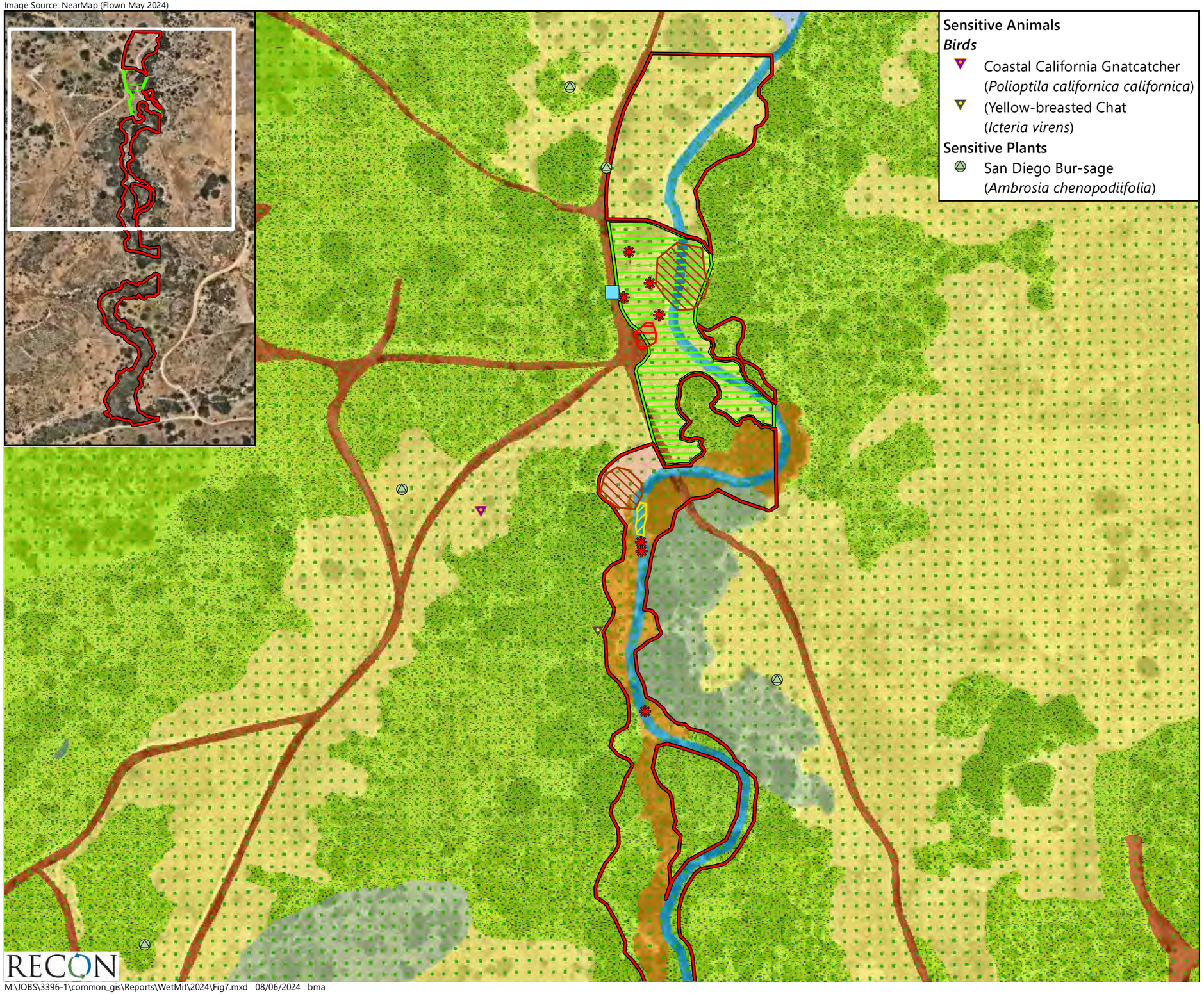

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FIGURE 7.1
Wetland Plan Area
Existing Biological Resources

Image Source: NearMap (Flown May 2024)

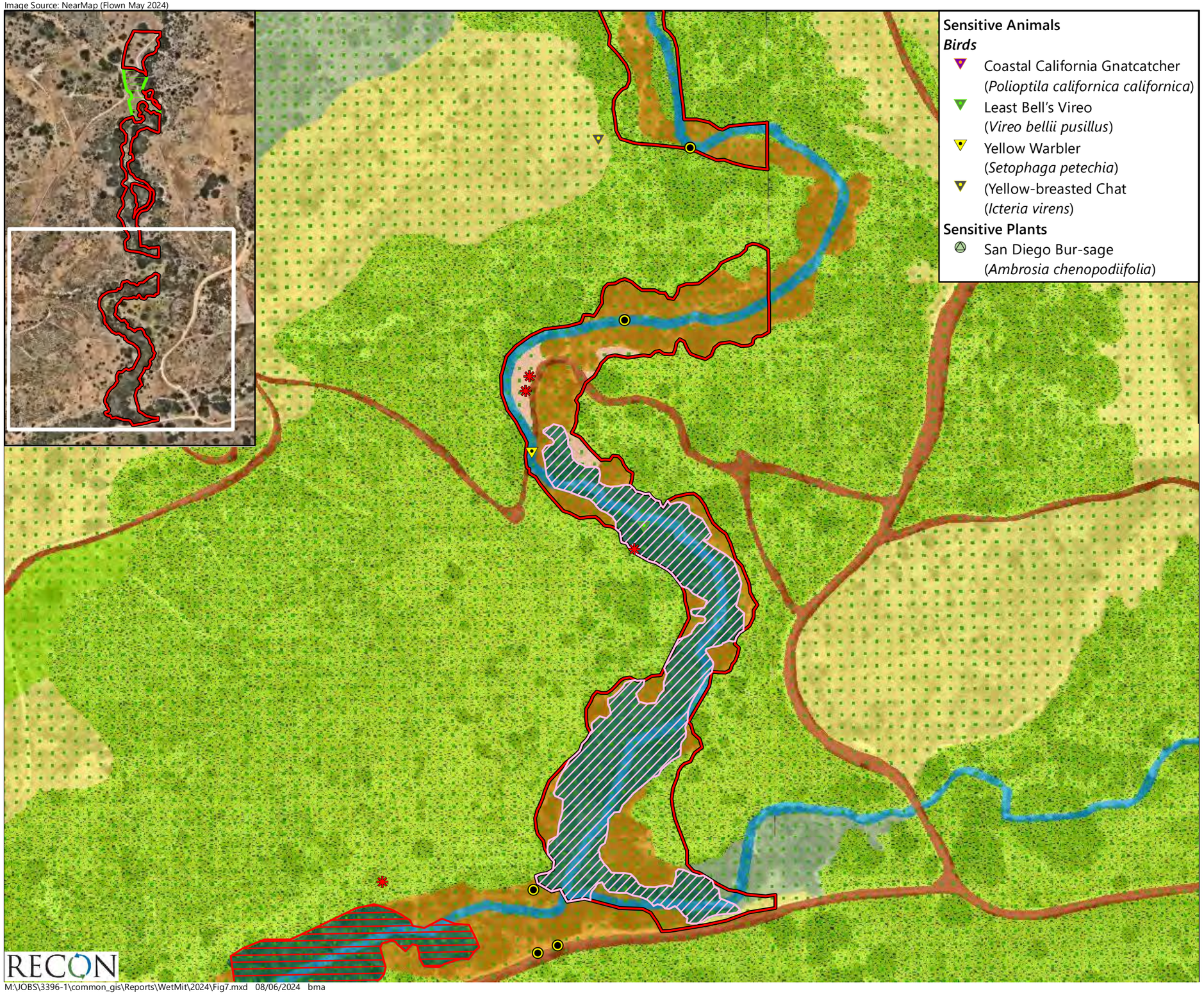

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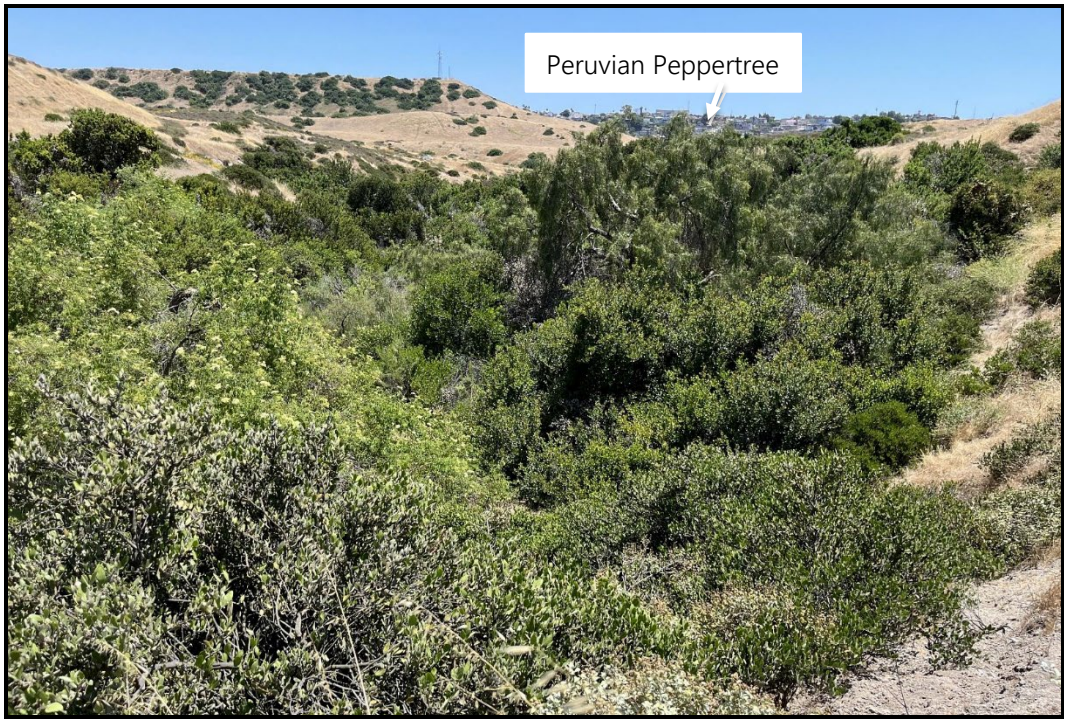
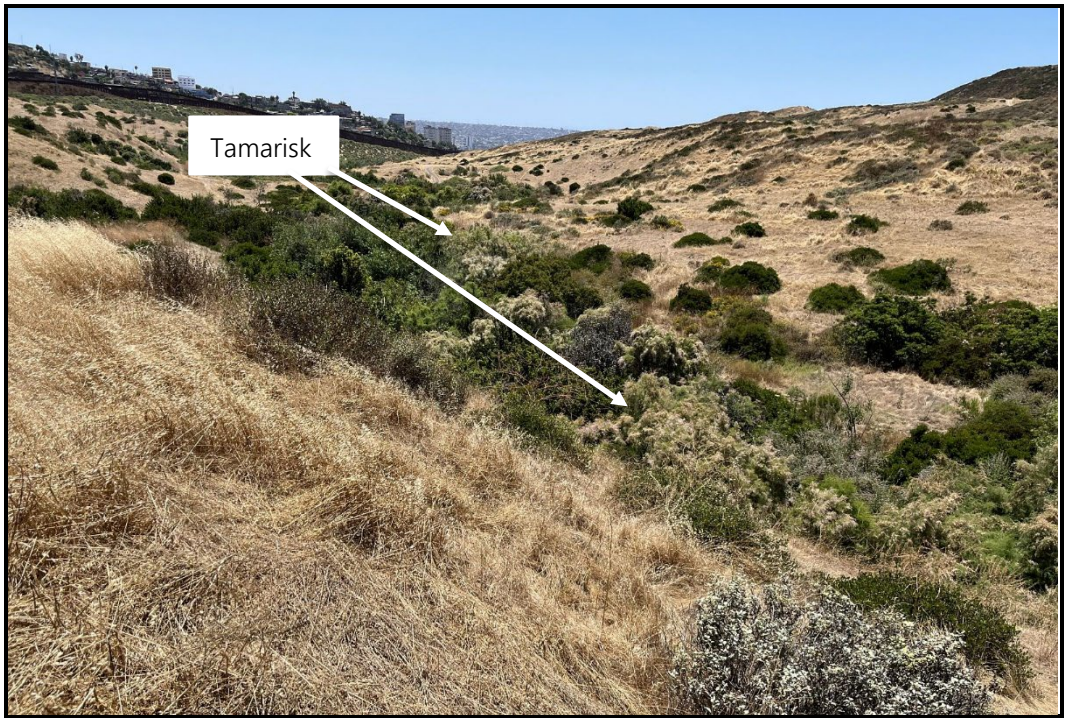
FIGURE 7.2
Wetland Plan Area
Existing Biological Resources

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

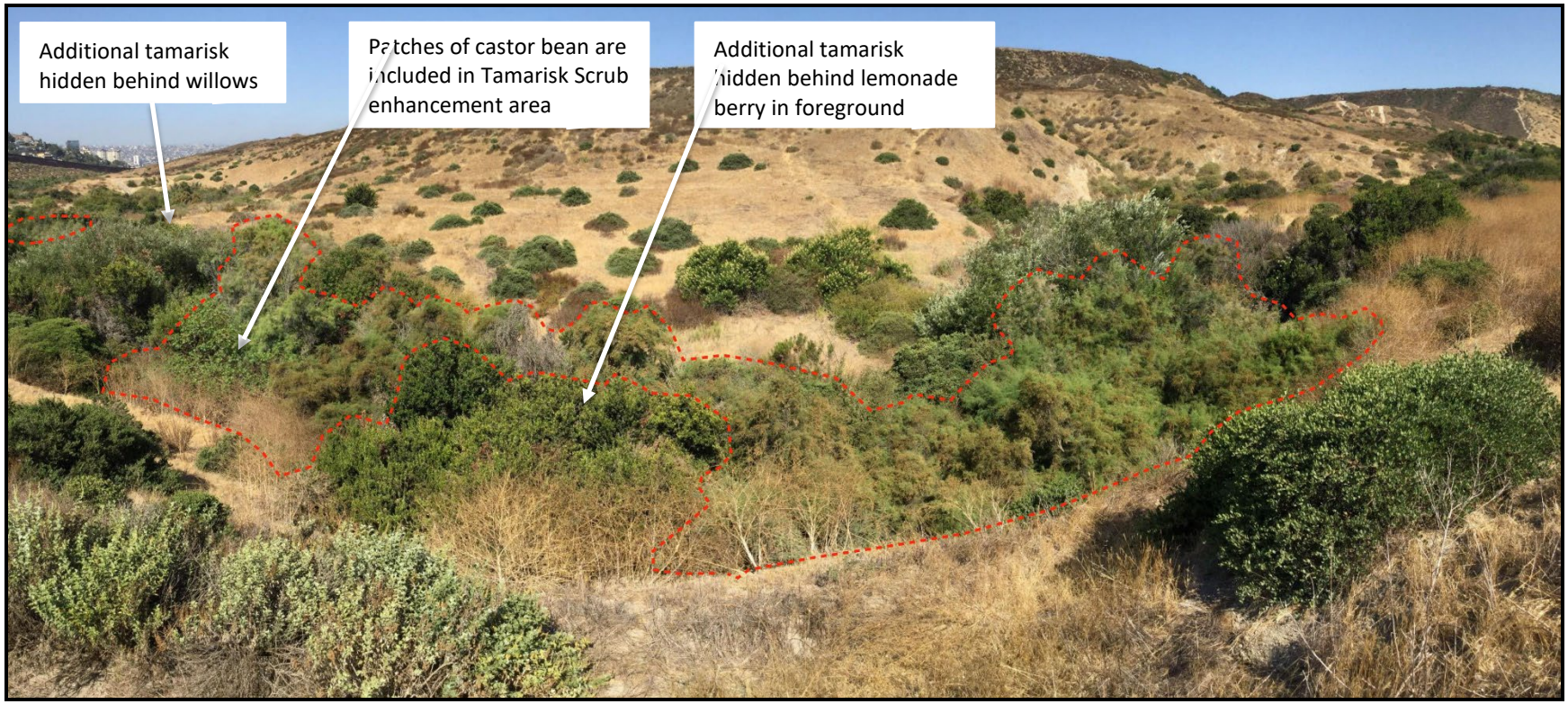


PHOTOGRAPH 2
Central Portion of Wetland Plan Area with Peruvian Peppertree (*Schinus molle*), Facing South, June 2023



PHOTOGRAPH 3

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



PHOTOGRAPH 4

Downstream Portion of Plan Area with Monoculture Stand of Tamarisk (*Tamarix ramosissima*) Circled in Red. Panoramic Photograph Facing Southwest to Northwest, July 2024.

The wetland plan area and the adjacent upland habitat is occupied by several sensitive and special status species. During surveys conducted by RECON in 2018, least Bell's vireo, yellow warbler, and yellow-breasted chat were observed within or immediately adjacent to the mitigation area in vegetation mapped as mule fat scrub or tamarisk scrub (see Figure 7). Coastal California gnatcatcher (*Polioptila californica californica*) were observed in adjacent upland habitats during the 2018 surveys. San Diego bur-sage (*Ambrosia chenopodifolia*) is mapped in the uplands to the west and east of the mitigation area.

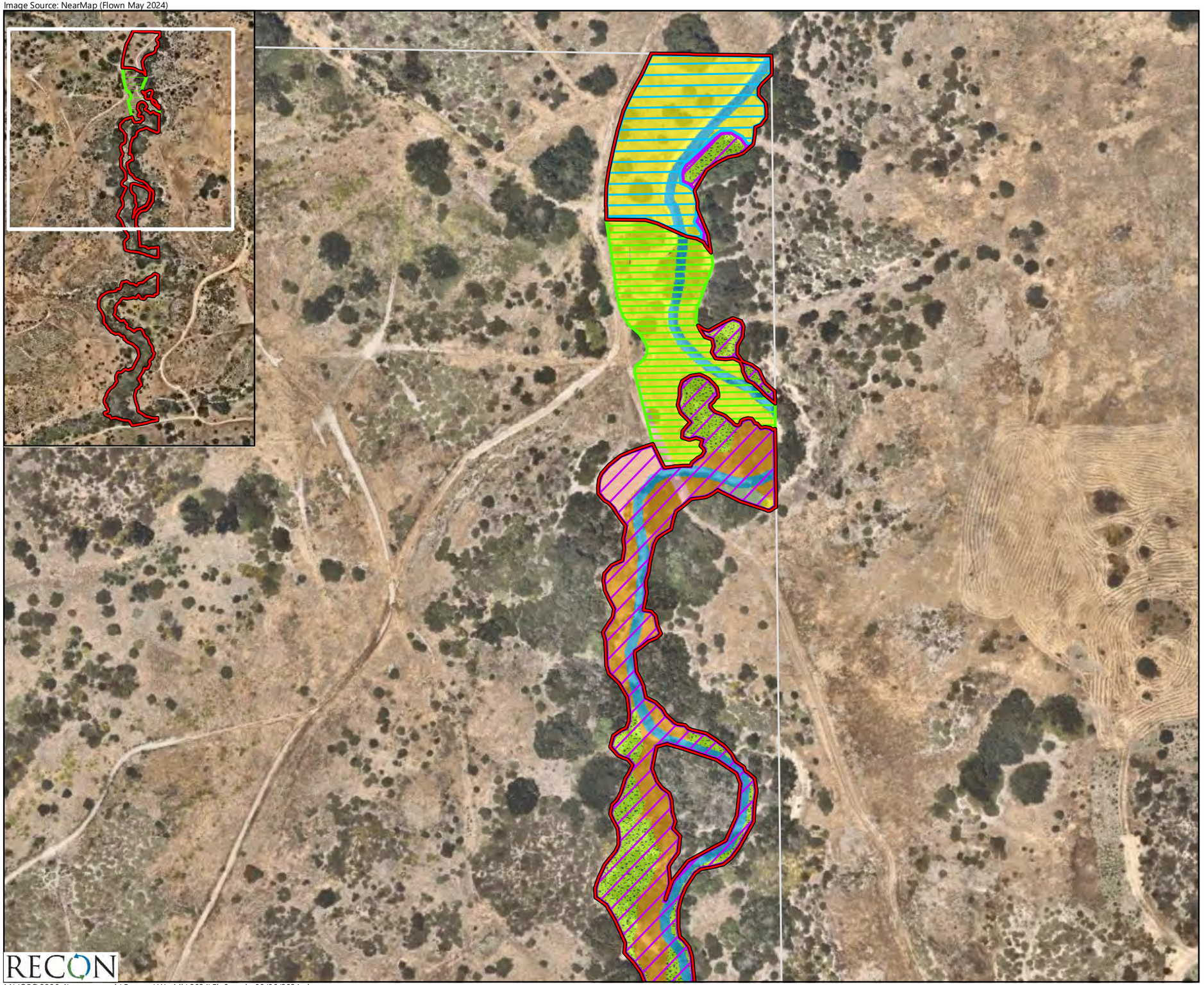
2.2 Rationale for Expecting Success

2.2.1 Mitigation Goals

The goal of this mitigation effort is to create (establish) and enhance (rehabilitate) a minimum of 1.2 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 Tables 1 through 3). This includes 0.4 acre of creation (establishment) and 0.4 acre of enhancement (rehabilitation) 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 (rehabilitation) to satisfy RWQCB mitigation requirements and to achieve biologically superior mitigation per the City of San Diego, for a total of 1.2 acres. Figure 8 depicts the wetland plan area in relation to existing site conditions and Figure 9 depicts the wetland plan area and the target vegetation communities. The wetland creation (establishment) is distinguished from the wetland enhancement (rehabilitation) because it would occur in portions of the mitigation characterized as uplands, whereas the enhancement (rehabilitation) 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).

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 plan area totaling 2.2 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 and in small "oxbow" sections of Spring Canyon where a portion of the main channel lies outside the Tri Pointe Homes property/wetland plan area on City of San Diego property (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. Invasive species removal areas on public land/City of San Diego property are not included in the wetland plan area acreage.

Image Source: NearMap (Flown May 2024)



Mitigation Parcel

Wetland Plan Area (3.92 acres)

Wetland Area for Nakano (3.46 acres)

Weed Control / Project Design Feature (2.208 acres)

Wetland Creation (Establishment) (0.453 acre)

Partial/Potential Mitigation Area for Southwest Village

Wetland Creation (Establishment) (0.457 acre)

Vegetation Communities

Diegan Coastal Sage Scrub

Disturbed Maritime Succulent Scrub

Non-native Grassland

Mule Fat Scrub

Natural Flood Channel

Disturbed Habitat

0 Feet 100

RECON

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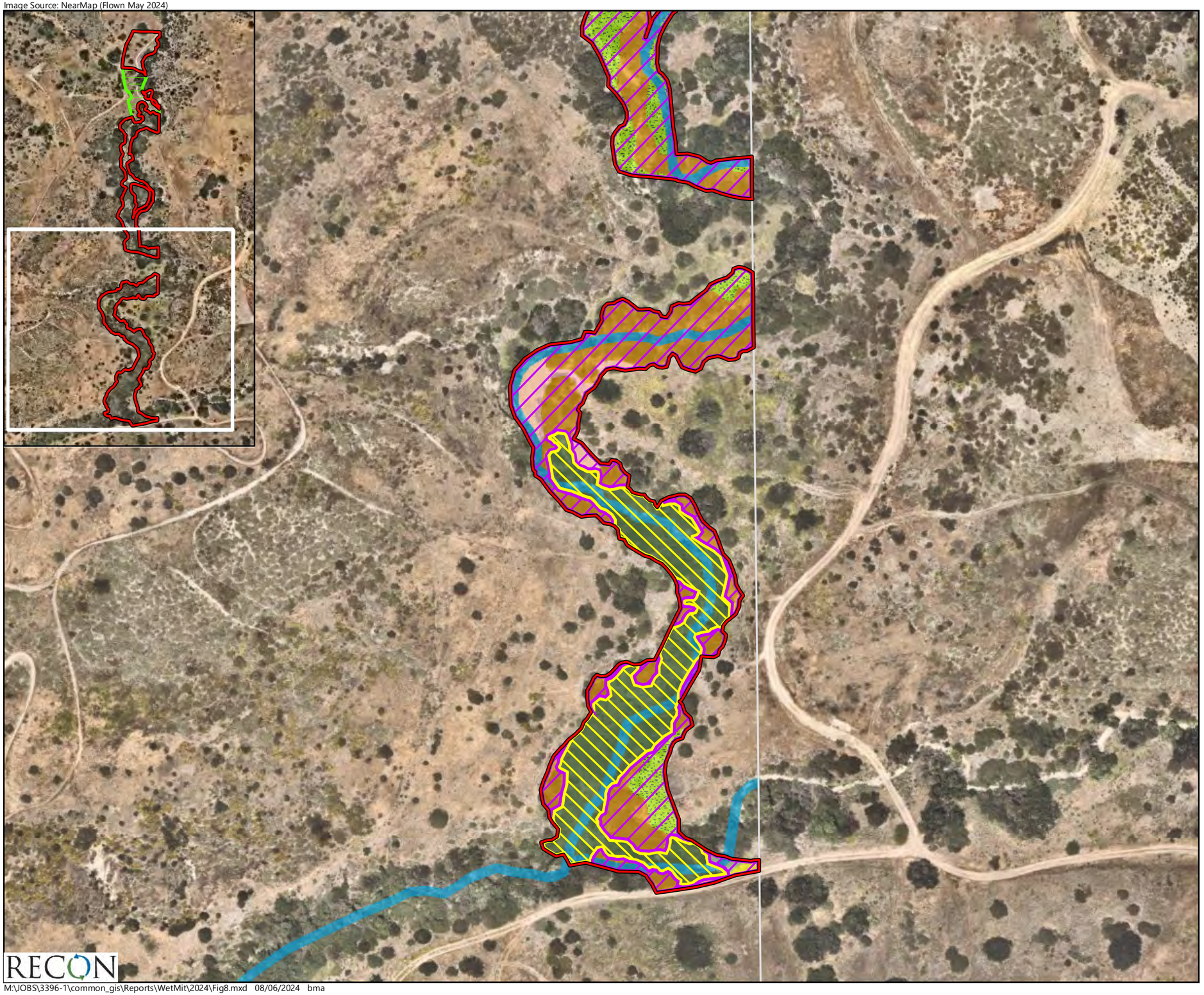
FIGURE 8.1
Wetland Plan Area - Existing Conditions

Image Source: NearMap (Flown May 2024)



Mitigation Parcel

Wetland Plan Area (3.92 acres)

Wetland Area for Nakano (3.46 acres)

Weed Control / Project Design Feature (2.208 acres)

Wetland Enhancement (Rehabilitation) (0.801 acre)

Vegetation Communities

Diegan Coastal Sage Scrub

Disturbed Maritime Succulent Scrub

Non-native Grassland

Tamarisk Scrub

Mule Fat Scrub

Natural Flood Channel

Disturbed Habitat

0 Feet 120

RECON

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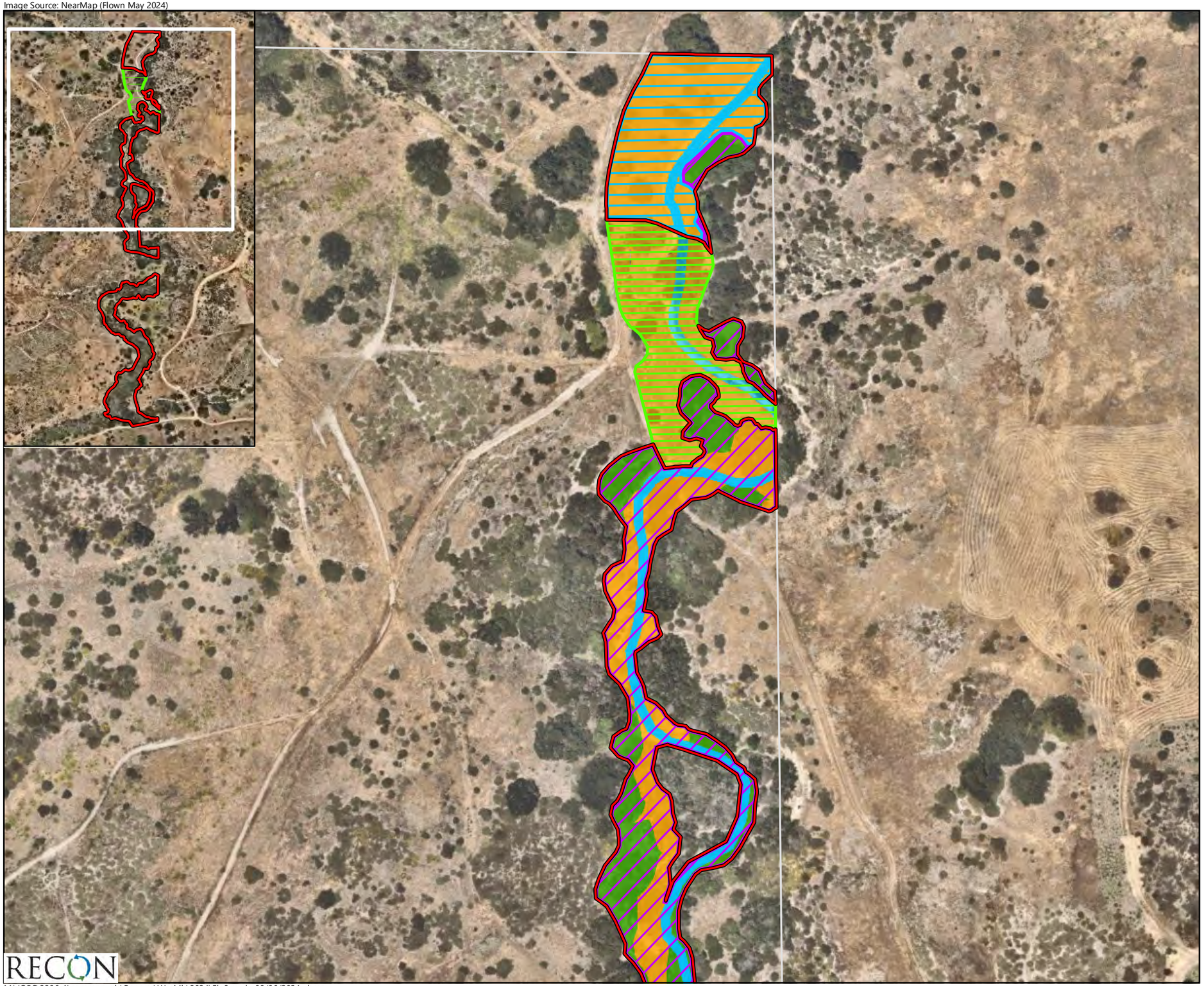
FIGURE 8.2
Wetland Plan Area - Existing Conditions

Image Source: NearMap (Flown May 2024)



Mitigation Parcel

Wetland Plan Area (3.92 acres)

Wetland Area for Nakano (3.46 acres)

Weed Control / Project Design Feature (2.208 acres)

Wetland Creation (Establishment) (0.453 acre)

Partial/Potential Mitigation Area for Southwest Village

Wetland Creation (Establishment) (0.457 acre)

Target Vegetation

Mule Fat Scrub

Natural Flood Channel

Wetland Buffer

0 Feet 100

RECON

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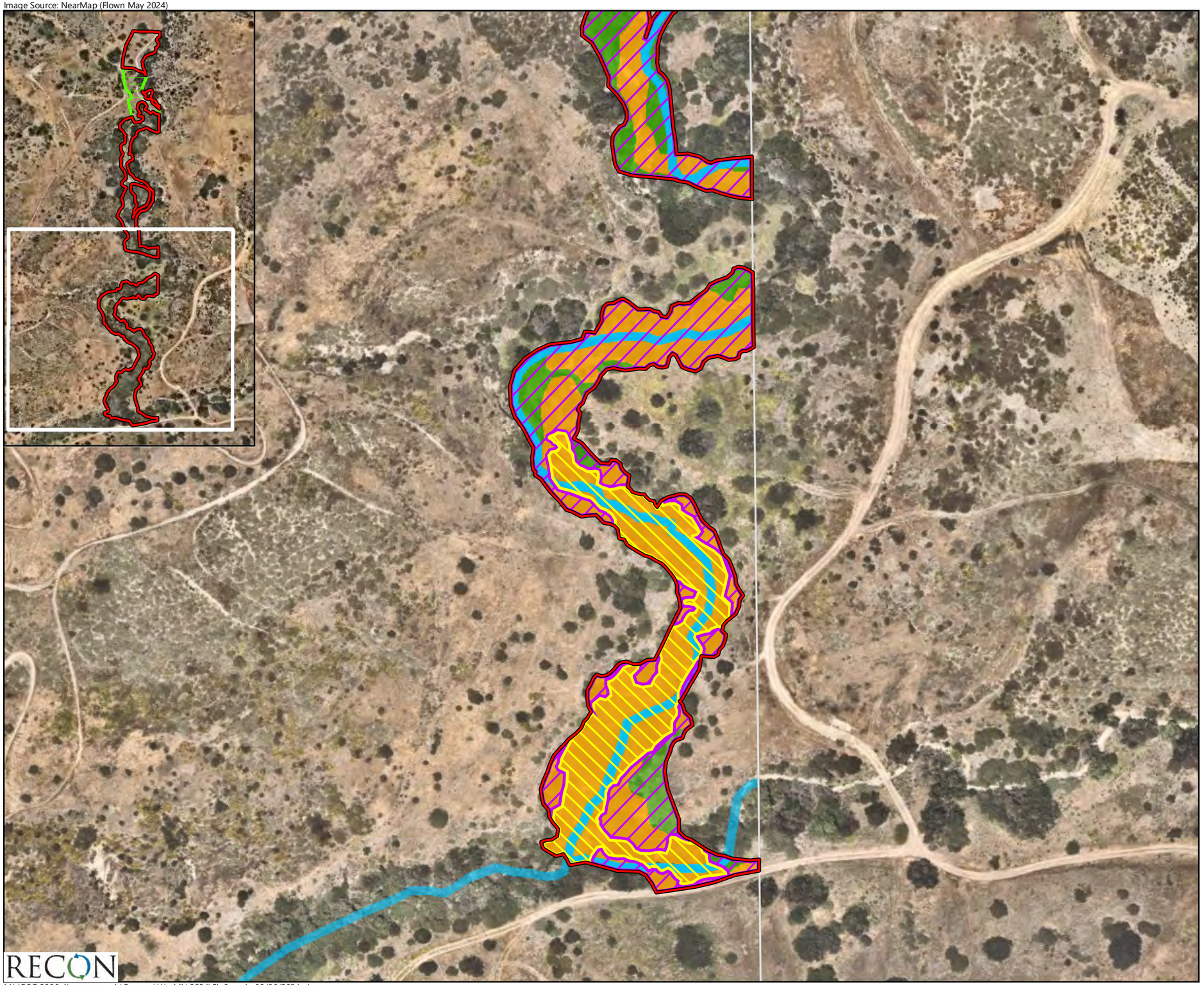
FIGURE 9.1
Wetland Plan Area - Target Vegetation

Image Source: NearMap (Flown May 2024)



Mitigation Parcel

Wetland Plan Area (3.92 acres)

Wetland Area for Nakano (3.46 acres)

Weed Control / Project Design Feature (2.208 acres)

Wetland Enhancement (Rehabilitation) (0.801 acre)

Target Vegetation

Mule Fat Scrub

Natural Flood Channel

Wetland Buffer

0 Feet 120

RECON

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FIGURE 9.2
Wetland Plan Area - Target Vegetation

Following mitigation implementation and five years of maintenance and monitoring, the wetland plan 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, yellow-breasted chat, and yellow warbler. Least Bell's vireo breeding habitat consists of willow-dominated riparian woodlands with a dense growth of tall trees and underbrush covering a large tract, and with foraging also occurring in mulefat scrub (Unitt 2004).

2.2.2 Wetland Plan Area Suitability

The proposed wetland plan area is located in an area of Spring Canyon where non-native grassland and stands of tamarisk scrub and castor bean provide opportunities for wetland restoration, specifically wetland creation (establishment) and wetland enhancement (rehabilitation). Based on aerial photographs from 1953 to 2024, the wetland plan area has a history of ranching (grazing) and off-highway vehicle use that has resulted in the encroachment of non-native grassland, scouring, and erosion, particularly within the area of proposed wetland creation (establishment) in the northern portion of the wetland plan area. Attachment 2 presents a series of historic aerial images of the wetland plan area beginning with an image taken in 1953, which is the earliest available aerial, and includes images from subsequent decades until the present. Based on these aerials, Spring Canyon has undergone repeated impacts from cattle grazing, vehicle access, road improvements, and other uses over decades. For example, more roads and trails are visible within Spring Canyon, including roads and trails bisecting the wetland plan area, on the historic aerials than on the 2024 aerial (except for the 1953 aerial), and several of the roads and trails presently visible in the wetland plan area appear wider and more developed on the historic aerial. Those historic impacts have caused changes in native vegetation cover, an increase in invasive species cover and erosion, and altered wetland hydrology and soils.

In the northern portion of the wetland plan area that currently supports non-native grassland (see Section 2.1.4), the site appears to have historically supported upland habitats. This conclusion is based on a comparison of vegetation visible on historic and present-day aerials to the vegetation observed during site visits in 2023 and 2024. From 1953 onward to present time, several trees can be identified persisting in the same location; these trees were confirmed during 2023 and 2024 field visits as Peruvian pepper trees (*Schinus molle*) and lemonade berry (*Rhus integrifolia*), both of which are upland indicators (see the pink and yellow dots in Attachment 2). In the period for which imagery is available, it appears that the entire proposed creation (establishment) area has primarily supported upland habitats, such as maritime succulent scrub, coastal sage scrub, and non-native grassland habitat during and after periods of heavy grazing by livestock. For example, on the 1953 and 1971 images, the vegetation in the proposed creation (establishment) area appears to consist of sparse upland shrubs surrounded by herbaceous vegetation; the aerial signature of this vegetation is similar to the vegetation occurring on nearby slopes. In later decades, such as in the 1982, 1996, and 2003 aerials, much of the vegetation visible in the earlier aerials has been grassland vegetation, most likely due to grazing. Mature riparian vegetation would not be converted to grassland habitat through

grazing in this relatively short period, whereas the conversion of upland scrub habitat to grassland due to grazing occurs much more rapidly (Vaughn et al 2020).

Within the upland non-native grassland areas, preliminary floodplain mapping by Rick Engineering (Attachment 1) and a groundwater investigation by Geocon (Attachment 3) indicate that topographic recontouring could successfully create (establish) wetland hydrology by lowering the surface elevation in relation to the groundwater level and by hydrologically reconnecting the surface flows of the incised channel that bisects the grassland areas to the floodplain (see Figures 6 and 7). The degraded upland areas would be converted to native wetland habitat through channel and/or floodplain recontouring/lowering; removal of non-native vegetation, 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 installation of native wetland species. The proposed habitat improvements would be contiguous with existing areas of mule fat scrub.

Within the stands of tamarisk scrub, the wetland habitat has become degraded by a high cover of non-native invasive species but otherwise supports wetland hydrology. By removing these highly invasive species and planting native riparian habitat, the wetland functions would be re-established and enhanced. More specifically, invasives presently prevent water flow through the area, increase soil salinity, and preclude native vegetation from growing. Their removal would allow for improved water flow, improved soil conditions and allow for long-term establishment of native wetland habitat. Because of its existing hydrology within the channel and its potential for the creation (establishment) of wetland hydrology through lowering of the floodplain, the wetland plan area is appropriate for high quality wetland habitat creation (establishment) and enhancement (rehabilitation) suitable for the occupancy by sensitive wildlife such as the last Bell's vireo and yellow-breasted chat. The proposed activities would improve the wetland functions and values within the wetland plan area and qualify as wetland creation (establishment) and enhancement (rehabilitation) 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). The proposed wetland plan area is suitable for wetland creation (establishment) and enhancement (rehabilitation) because of the following factors:

- The wetland plan area has been identified by the City of San Diego as a target site for habitat restoration, set forth in the City of San Diego MSCP Subarea Plan for Southern Otay Mesa, which prioritizes the restoration of disturbed areas in Spring Canyon.
- Based on a comparison of historic aerial images compared with recent aerial photos and data from current site visits, the entire area of proposed wetland creation (establishment) appears to have historically supported upland habitats and is, therefore, suitable for wetland creation (establishment), as opposed to wetland restoration (re-establishment) or enhancement (rehabilitation).
- Groundwater is within depths suitable for the recontouring of upland grasslands to lower the floodplain to bring it closer to the extant groundwater and thus create (establish) jurisdictional wetlands with native riparian habitat (see Figure 6).

- Wetland hydrology is present in the enhancement (rehabilitation) areas and could be enhanced via invasive species removal and installation of native riparian plants (see Figures 6 and 7 and Attachment 1).

- The wetland plan area 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).

- The wetland plan area has the potential to create (establish) and enhance (rehabilitate) riparian habitat suitable for least Bell's vireo, yellow warbler, and yellow-breasted chat, which have been documented within and downstream of the wetland plan 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.

- 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 wetland plan area 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). Spring Canyon supports 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. Native wetland habitats are present adjacent to the wetland plan 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 wetland plan 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 wetland plan area lacks utility or other easements (see Figure 4).

2.2.3 Wetland Plan 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 (City of 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. Furthermore, the site's viability is characterized by the potential to enhance native habitat and sensitive species values and water quality in perpetuity through long-term management.

While development is anticipated within the Southwest Village Specific Plan Area located approximately 0.3-mile northwest of the wetland plan area, no future development is planned in the

open space surrounding the wetland plan 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 wetland plan area by approximately 0.3 mile including rugged topography that keep the wetland plan 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 wetland plan area is located within the MHPA, these guidelines would provide protection for the wetland plan area from indirect impacts. The location of the wetland plan area within the MHPA would reduce fragmentation of this sensitive vegetation community and increase viability and longevity of the habitat quality.

The 0.46-acre wetland creation (establishment) is intended to be available for potential/partial mitigation for the future Southwest Village project and would be not included in the required compensatory mitigation for the Nakano project (see Figure 4). However, it would be implemented concurrently with the Nakano mitigation because it is integrated in the Nakano wetland plan area. The concurrent grading and creation (establishment) implementation would ensure continuity in topography between the Nakano and Southwest Village portions of the wetland plan area and would maintain an upstream-to-downstream phasing of the restoration implementation. The remaining wetland mitigation required for the Southwest Village project would occur downstream of the Nakano wetland plan area and is addressed in the Southwest Village Mitigation Plan (RECON 2024b).

Finally, the design of the wetland plan area includes considerations to minimize the spread of non-native species back into the wetland plan 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, including small "oxbow" sections of Spring Canyon where the main channel lies outside the Tri Pointe Homes property/wetland plan area on City of San Diego property.

Compared to the impacted wetland habitat, which consists of degraded wetlands in an isolated corridor (RECON 2024a), the proposed mitigation would provide greater wetland functions and values, improve hydrology and water quality, and optimize long-term viability of wildlife such as least Bell's vireo, yellow-breasted chat, and yellow warbler through higher quality wetlands with connectivity between larger natural open spaces with both wetland and upland habitat.

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 wetland 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 work described in this plan.

Tri Pointe Homes Contact: John Fahey, Vice President of Operations
Tri Pointe Homes
13520 Evening Creek Drive North
San Diego, CA 92128
John.Fahey@tripointehomes.com

3.2 Agencies

Under the No Annexation Scenario, the City of Chula Vista would be responsible for approving a final wetland 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 mitigation effort and approving the final wetland 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 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 wetland 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 topographic recontouring/grading, erosion control, weed treatment and removal, plant installation, as well as maintenance of the wetland plan area during the 120-day Plant Establishment Period (PEP) and five-year maintenance period utilizing the methods detailed herein.

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 wetland plan 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 and oxbow-shaped portions of Spring Canyon on adjacent City property 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 work and how it would be implemented. Implementation would be conducted under the direction of the qualified restoration specialist. All activities would commence the first summer-fall season prior to, or concurrently with, construction. The proposed design is shown on Figures 8 and 9.

Implementation activities include recontouring within the creation (establishment) areas, weed treatment and weed dethatching, native container plant and cutting installation, and barrier installation. Recontouring, weed treatment, and dethatching would occur before or concurrently with the start of the project construction. Implementation 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 wetland habitat would use restoration methods to support establishment of structurally diverse native wetland habitat. The creation (establishment) and enhancement (rehabilitation) areas would total 1.25 acres (slightly more than the required 1.2 acre minimum) and are located within the larger 3.92-acre wetland plan area, which would also include the 0.46-acre wetland creation (establishment) for Southwest Village and the project design weed control areas (see Figures 8 and 9). Mitigation activities within the creation (establishment) area and the additional wetland creation (establishment) for Southwest Village would include topographic recontouring and native riparian species planting, while mitigation activities within the enhancement (rehabilitation) areas would include 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. Tri Pointe Homes has notified U.S. Customs and Border Patrol of trails that will be closed and restored as part of the mitigation project. Site protection measures and access control are discussed in more detail in Section 4.3.3.

As a project design feature, invasive species management would also occur throughout the remaining portions of the wetland plan area. In addition, tributaries on publicly owned parcels that are upstream of the wetland plan area within Spring Canyon and Wruck Canyon including two contiguous off-site portions of the drainage on City property (the oxbow areas) would also be treated for non-native perennial weeds and annual weeds for the five-year maintenance period that pose a significant threat to the long-term viability of the wetland plan area (see Figure 4). Weed species that are found in upstream tributaries pose a threat to the long-term viability of the wetland plan area by their potential to set and deposit seed that may encroach into the wetland plan area. The creation (establishment), enhancement (rehabilitation) and all project design feature areas 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 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:

Wetland Plan 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 wetland plan 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 wetland plan 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 Wetland Plan Implementation

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

    a. Oversee installation of and inspect construction fencing and/or silt fencing and erosion control measures, 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 wetland plan 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, yellow-breasted chat, and yellow warbler 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 wetland plan 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 2023), 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 lowering the floodplain through grading with mechanized equipment, invasive weed treatment, non-native weed biomass removal, barrier/signage installation, and native plant installation. The implementation schedule is shown in Table 4. Implementation would commence prior to or concurrently with the start of construction of the project.

Table 4 Implementation Activities Schedule	
Task	Time of Year
1. Topographic Recontouring	Fall (outside bird breeding season[1])
2. Initial weed removal	Fall (outside bird breeding season[1])
3. Barrier/Signage	Fall, immediately following biomass removal
4. Plant installation	Winter
[1] Vegetation removal would occur outside of the bird breeding season for least Bell's vireo, yellow breasted chat, coastal California gnatcatcher, and yellow warbler. Implementation of BIO-SD-4 and BIO-SD-5 during restoration activities would ensure avoidance of these species (RECON 2024a).	

4.3.1 Initial Weed Removal

Mitigation would begin with the initial removal of perennial and annual weed biomass. Perennial weeds present within the wetland plan area primarily consist of tamarisk, castor bean, tree tobacco, and pepper trees. Perennial weeds present throughout the wetland plan area, offsite oxbow areas 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 wetland plan 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 Topographic Recontouring

Topographic recontouring would be implemented within the wetland creation (establishment) and additional wetland creation (establishment) potential/partial wetland mitigation areas to create topography that supports wetland hydrology and vegetation. Grading would lower the ground surface approximately 2 to 4 feet within the existing non-native grassland habitat and reconnect the existing incised channel to the surrounding floodplain while maintaining existing channel configuration. The shallow floodplain slope gradient and daylighting areas would be determined during engineering design and the development of plans and specifications, which would be submitted to the City, Wildlife Agencies and RWQCB for review and approval. The intent of the recontouring is to transition the created floodplain to the surrounding upland areas.

The grading would be conducted under the direction of the wetland restoration specialist, as described in Section 3.3. Areas that are to remain unaffected by grading activities would be marked and fenced prior to implementation. The grading would be implemented using a small bulldozer or skidsteer, as deemed appropriate by the grading contractor. At the discretion of the restoration specialist and the grading contractor, the upper six inches of topsoil could be set aside at the beginning of the grading process for redistribution throughout the creation (establishment) and additional wetland creation (establishment) potential/partial wetland mitigation area after grading is complete. After grading, the soil may be tested and amended as needed, including but not limited

to the addition of mulch, compost, and gypsum. Appropriate erosion control (i.e., fiber rolls, gravel bags) would be installed in strategic locations within the site to prevent erosion.

After grading, high resolution aerial photography would be captured using a professional small unmanned aerial vehicle. Using industry-standard photogrammetry software and procedures, a digital surface model would be generated using the data collected by the small unmanned aerial vehicle. The as-built grading plans and report figures would include wetland boundaries and 0.5-foot contours, both of which would be derived from the digital surface model, and would be replotted at 1 inch equals 40 feet. The as-built grading plans and report figures shall be provided in the report described in Section 4.4 below.

4.3.3 Barrier Installation

After initial weed removal and if warranted based on site conditions, the wetland plan area would be fenced with t-posts and rope at all unauthorized access points into the wetland plan 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 wetland plan 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 wetland plan area on metal t-posts or similar.

4.3.4 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. All container plants and seed should be locally sourced, as close to the project site as possible. The container plant and seed palettes are included in Table 5. 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). Plant layout shall be overseen by the Restoration Ecologist. 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 4). 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 5 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
1Wetland Indicator Status per USDA plant database (USDA 2020): FAC = facultative FACU = facultative upland FACW = facultative wetland 2All 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 wetland plan 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 6). 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 6 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
Erosion Control	As needed	As needed	As needed	As needed	As needed	As needed
[1]Minimum frequency Note: Maintenance requirements in the off-site weed control areas would include weed control (herbicide treatment) and trash removal only over the 5-year maintenance period.						

5.0 Maintenance Plan

Regular maintenance of the wetland plan 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, erosion control, 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 wetland plan 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 Erosion Control

Erosion control materials (Best Management Practices) installed within the wetland plan area during topographic recontouring (see Section 4.3.2) may need to be maintained and/or replaced during the 5-year maintenance period. Erosion control materials such as fiber rolls and gravel bags would be monitored and repaired or replaced as needed before rain events. Additionally, the wetland plan area would be monitored throughout the five-year maintenance period for new erosion issues such as the development of new rills on slopes. Additional erosion control materials would be installed to resolve any new instances of erosion appearing within the wetland plan area. Erosion is expected to diminish as the project progresses and native vegetation cover increases throughout the wetland plan area.

5.7 Adaptive Management Approach

While the restoration and maintenance measures proposed by this plan are intended to improve the quality of the wetland plan 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 wetland plan 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 wetland plan 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 and the Wildlife Agencies.

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 total and relative percent native cover, species richness, and weed abundance. A native riparian reference site is identified in Section 6.2.1 to allow for a qualitative comparison of restoration success that accounts for stochastic events that may affect the broader area such as drought conditions and other variables unrelated to the restoration activities.

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 wetland plan area would be conducted prior to the start of restoration activities to demonstrate the functional lift of the wetland plan 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 wetland plan area. CRAM scores for the wetland plan area should increase, both by index (or total) scores and by attribute scores, but mostly by physical and biotic attribute scores (Table 7).

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

Table 7 CRAM Metric Goals for Five Years Post Establishment of Wetland Plan 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 8 and would be as follows:

- Container plant survival shall be 80 percent of the initial plantings for the first 5 years. At the first and second anniversary of plant installation, 80 percent of dead plants will be replaced with new container plants.

- Year 5 criteria must be demonstrated following two years of no artificial watering.

- At the end of the five-year monitoring program, the total combined absolute cover of planted and recruited native species shall be at least 80 percent. Absolute cover is the percentage of the ground covered by the vertical projection of all plants within the creation (establishment) and enhancement (rehabilitation) areas (California Native Plant Society [CNPS] 2024). Plant overlap is excluded (i.e., the total combined absolute cover does not exceed 100 percent, even if the total absolute cover of individual strata (i.e., the tree/shrub stratum and the herbaceous species stratum) exceeds 100 percent when they are combined. The absolute cover of herbaceous plants includes any standing plant parts (attached to a living plant, and not lying on the ground), whether alive or dead; this definition excludes litter and other separated plant material. The cover may include mosses, lichens, and recognizable cryptogamic crusts.

- Throughout the duration of the project, the relative cover of native tree and shrub species shall be within a range of 60 to 80 percent and the relative cover of native herbaceous species shall be at least 30 percent. This Plan defines relative cover as the cover of a vegetation stratum (i.e., either the tree/shrub stratum or the herbaceous species stratum) in relation to

the total native vegetation cover within the creation (establishment) and enhancement (rehabilitation) areas. The purpose of the relative cover success criteria is to demonstrate that the site supports multiple overlapping vegetation layers (i.e., an overstory of shrubs and trees with an herbaceous understory). Therefore, when combined, the percent relative tree/shrub cover and the percent relative herbaceous cover may exceed 100 percent. The percent relative cover success criterion is higher for native tree/shrub cover than for herbaceous species, indicating that a greater proportion of native vegetation cover would be provided by trees and shrubs, though the mitigation site would still support a well-established understory of native herbaceous species. The success criteria for percent relative cover of native tree/shrub species are provided as a range to reflect the diversity of possible habitat compositions within a healthy wetland site. While interim success criteria for relative cover are provided in Years 1 through 4, natural variability in the development of vegetation strata during that period is expected; therefore, the performance standards are targets toward the ultimate Year 5 standard. Riparian habitats are non-equilibrium systems where frequent disturbance from fluvial and hydrological processes create an extremely dynamic herbaceous plant community (Gornish 2017). A 5-year target of 30 percent relative herbaceous cover accounts for these riparian dynamics. Percent relative native tree/shrub and herbaceous species cover will be calculated during each annual quantitative monitoring visit and provided in the annual reports to track the site's progress towards the Year 5 success criteria.

- At the end of the 5-year monitoring program, the creation (establishment) and enhancement (rehabilitation) areas will support at least eight native species (species richness). The annual species richness success criteria were determined based on the number of species in the Target Plant Species List (see Table 5) and the likelihood to retain this species diversity over time.

- The cover of all non-native species within the wetland plan area shall not exceed an absolute value of 1 to 5 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 8
Performance Standards for the Wetland Creation (Establishment) and Wetland Enhancement (Rehabilitation) Areas

Year	Container Plant Survival[1]	Percent Total Combined Absolute Native Cover[2]	Percent Relative Cover–Native Tree/ Shrub Species[3]	Percent Relative Cover–Native Herbaceous Species[3]	Species Richness[4]	Percent Cover–Non-native Species[5]
1	80	40	40-60	10	N/A	10
2	80	50	45-65	15	5	5
3	80	60	50-70	20	6	5
4	80	70	55-75	25	7	1-5
5	80	80	60-80	30	8	1-5

[1]At the first and second anniversary of plant installation, all dead plants will be replaced unless their function has been replaced by natural recruitment.

[2]Absolute cover is the percentage of the ground covered by the vertical projection of all plants within the creation (establishment) and enhancement (rehabilitation) areas (CNPS 2024). Plant overlap is excluded (i.e., the percent total combined absolute cover does not exceed 100 percent, even if the percent total absolute cover of individual strata (i.e., the tree/shrub stratum and the herbaceous species stratum) exceeds 100 percent. The absolute cover of herbaceous plants includes any standing plant parts (attached to a living plant, and not lying on the ground), whether alive or dead; this definition excludes litter and other separated plant material. The cover may include mosses, lichens, and recognizable cryptogamic crusts.

[3]This plan defines relative cover as the cover of a vegetation stratum (i.e., either the tree/shrub stratum or the herbaceous species stratum) in relation to the total native vegetation cover within the creation (establishment) and enhancement (rehabilitation) areas. The purpose of the relative cover success criteria is to demonstrate that the site supports multiple overlapping vegetation layers (i.e., an overstory of shrubs and trees with an herbaceous understory). Therefore, when combined, the percent relative tree/shrub cover and the percent relative herbaceous cover may exceed 100 percent. The Year 5 percent relative cover success criterion is higher for native tree/shrub cover than for herbaceous species, indicating that a greater proportion of native vegetation cover would be provided by trees and shrubs, though the mitigation site would still support a well-established understory of native herbaceous species. The success criteria for percent relative cover of native tree/shrub species is provided as a range to reflect the diversity of possible habitat compositions within a healthy wetland site.

[4]The species richness success criteria are presented in absolute values and are based on the number of species in the Target Plant Species List (see Table 5 of this plan).

[5]No Cal-IPC High or perennial species would be present during any monitoring years (Cal-IPC 2023).

6.2.1 Location of Reference Site

Per City of San Diego Biology Guidelines (City of San Diego 2018) and as requested by CDFW, 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 purpose of the reference site is to allow for a qualitative evaluation of mitigation site performance that may be affected by stochastic events that may affect the broader area, such as drought conditions and other variables unrelated to the restoration activities.

The proposed reference site is directly upstream of the wetland plan 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, and needlegrass species (*Stipa* sp.). Non-native species cover was low and included fennel and non-native grasses. The use of a reference site is included in this plan to provide a reference to document potential regional annual and seasonal changes that may occur unrelated to the restoration activities and will be approved by the City of San Diego.

6.3 Photographic Documentation

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

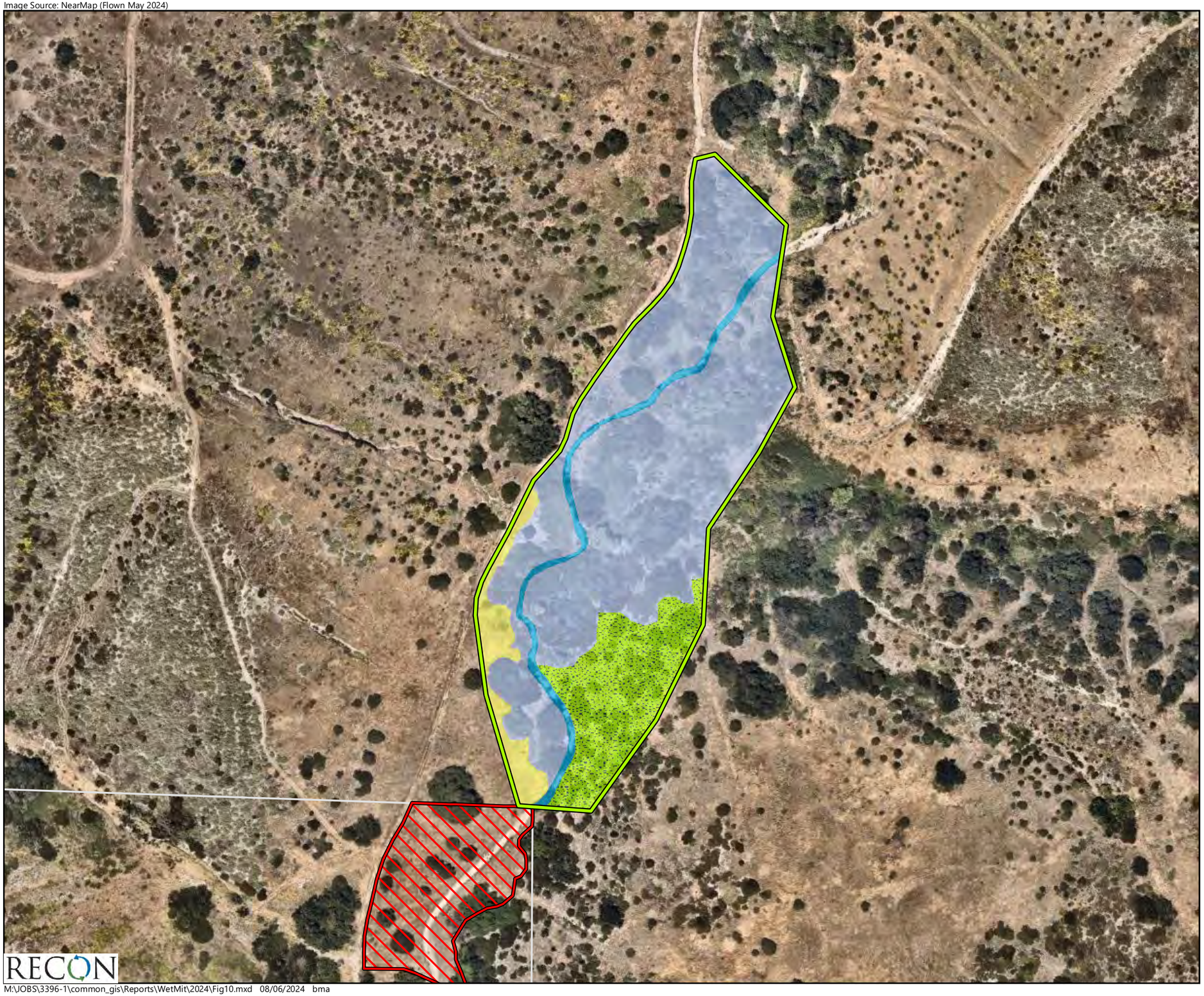
6.4 Jurisdictional Delineation

In order to demonstrate that the project has met the required compensatory mitigation, the Permittee shall perform a jurisdictional delineation of the wetland mitigation site based on the applicable jurisdiction's criteria. The RWQCB delineation would be performed using the methodology set forth in the 1987 *U.S. Army Corps of Engineers Wetland Delineation Manual* and the 2008 *Regional Supplement to the U.S. Army Corps of Engineers Wetland Delineation Manual: Arid West Region* by the end of year 5. Using the jurisdictional delineation, the Permittee would demonstrate that 0.40 acre of wetland has been established and the three wetland indicators (wetland vegetation, soils, and hydrology) are present. The jurisdictional delineation results would be submitted with the respective Annual Project Progress Report. A separate jurisdictional delineation would be submitted for the additional 0.46-acre creation (establishment) potential/partial mitigation area as part of the Southwest Village Project mitigation reporting.

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 9.

Image Source: NearMap (Flown May 2024)



Reference Site

Wetland Plan Area

Mitigation Parcel

Vegetation Communities

Natural Flood Channel

Southern Willow Scrub

Disturbed Maritime Succulent Scrub

Non-native Grassland

0 Feet 100

RECON

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FIGURE 10

Wetland Plan Reference Site

Table 9 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 wetland plan 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 9). 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 9). Transect monitoring methods would follow the protocol published by the 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 positioned throughout the wetland plan area, with at least one of the transects placed across the channel (i.e., from edge of floodplain to edge of floodplain), if feasible, to capture all habitat types within one transect; 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 wetland plan 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, yellow-breasted chat, and yellow warbler have been observed within the mitigation site, as discussed in Section 2.1.4. 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 wetland plan 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 wetland plan 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 mitigation 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, CDFW, and the City of San Diego and/or Chula Vista has been received.

10.0 Site Protection Instrument and Long-term Management Plan

The wetland plan area is planned to be conveyed to the City of San Diego in fee title. The wetland plan area shall be protected in perpetuity through the establishment of a Conservation Easement, restrictive covenant, or other mechanism acceptable by the City and Wildlife Agencies, and an endowment to fund long-term management. During restoration activities and prior to dedication of the land to the City, a temporary covenant of easement[1] would be required to ensure protection of the wetland plan area. After conveyance to the City, assurance of long-term conservation and management of the wetland plan 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.

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. 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 (PAR), or similar cost estimation method, would secure the ongoing funding for the perpetual long-term

[1] The City of San Diego requires a temporary covenant of easement for protection of environmentally sensitive lands within the MSCP MHPA.

management, maintenance, and monitoring of the wetland plan area. The PAR must be included in the LTMP and approved by the two cities and all regulatory agencies. The non-wasting endowment must be established prior to, or concurrently with impacts. The LTMP would be submitted to the City of San Diego and regulatory agencies (USFWS, RWQCB, and CDFW) for approval prior to issuance of grading permit.

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ATTACHMENTS

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.

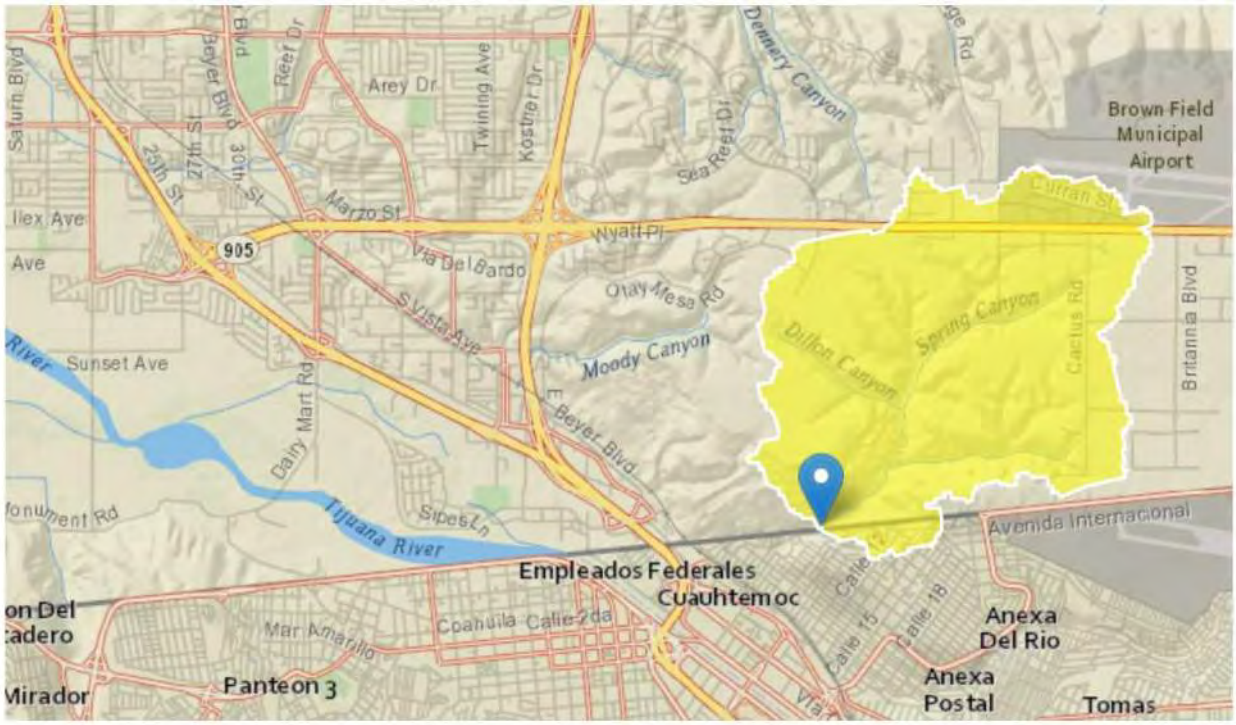

Figure 1: USGS StreamStats Spring Canyon Basin Delineation

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.

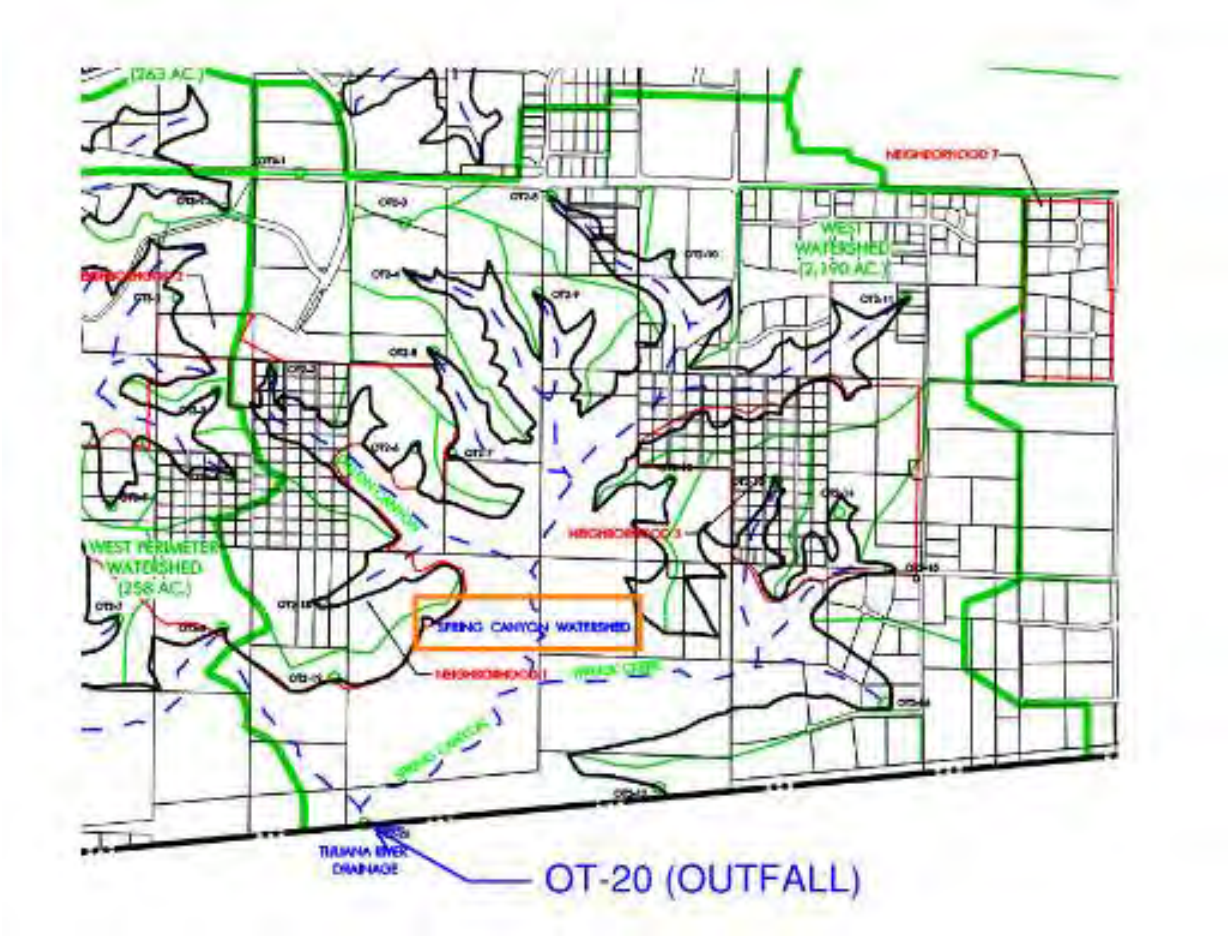

Figure 2: Drainage Map Excerpt of West Watershed (Kimley-Horn, 2007)

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.

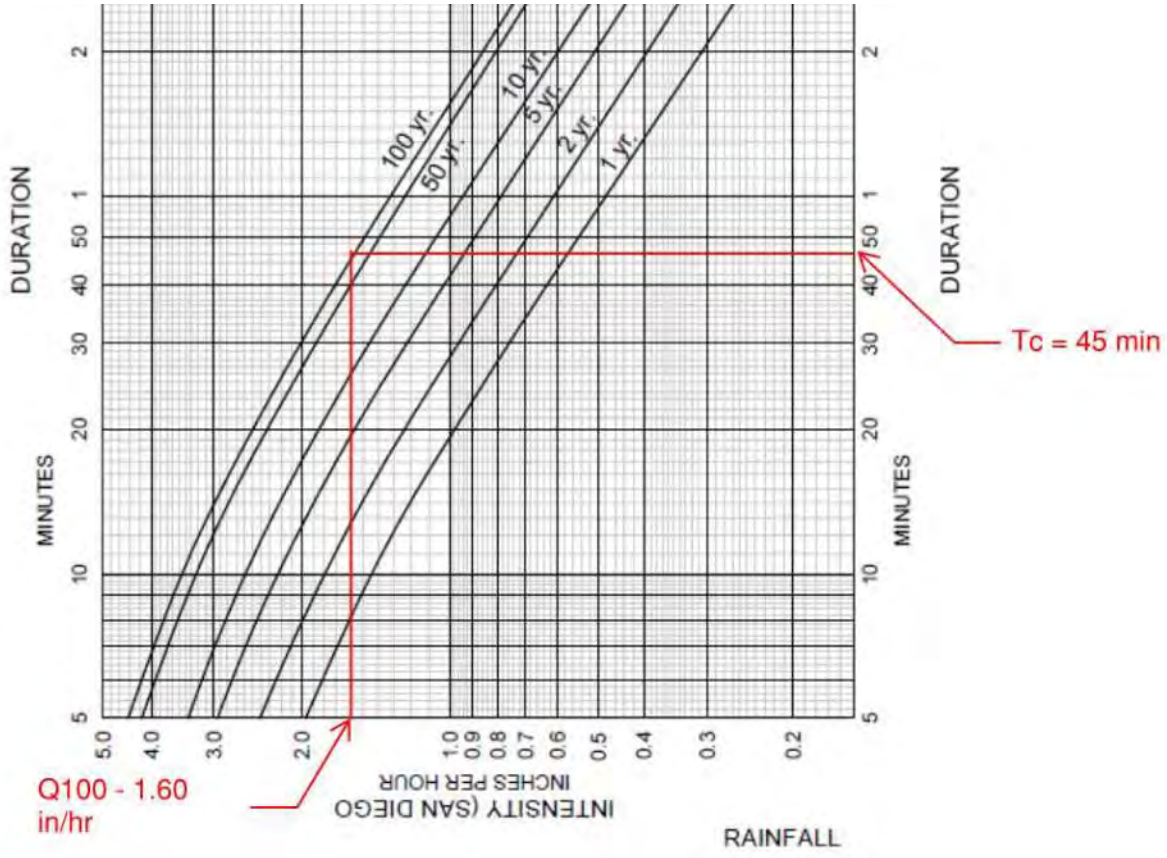

Figure 4: Tc Calculation from City of San Diego Intensity-Duration-Frequency Chart

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.

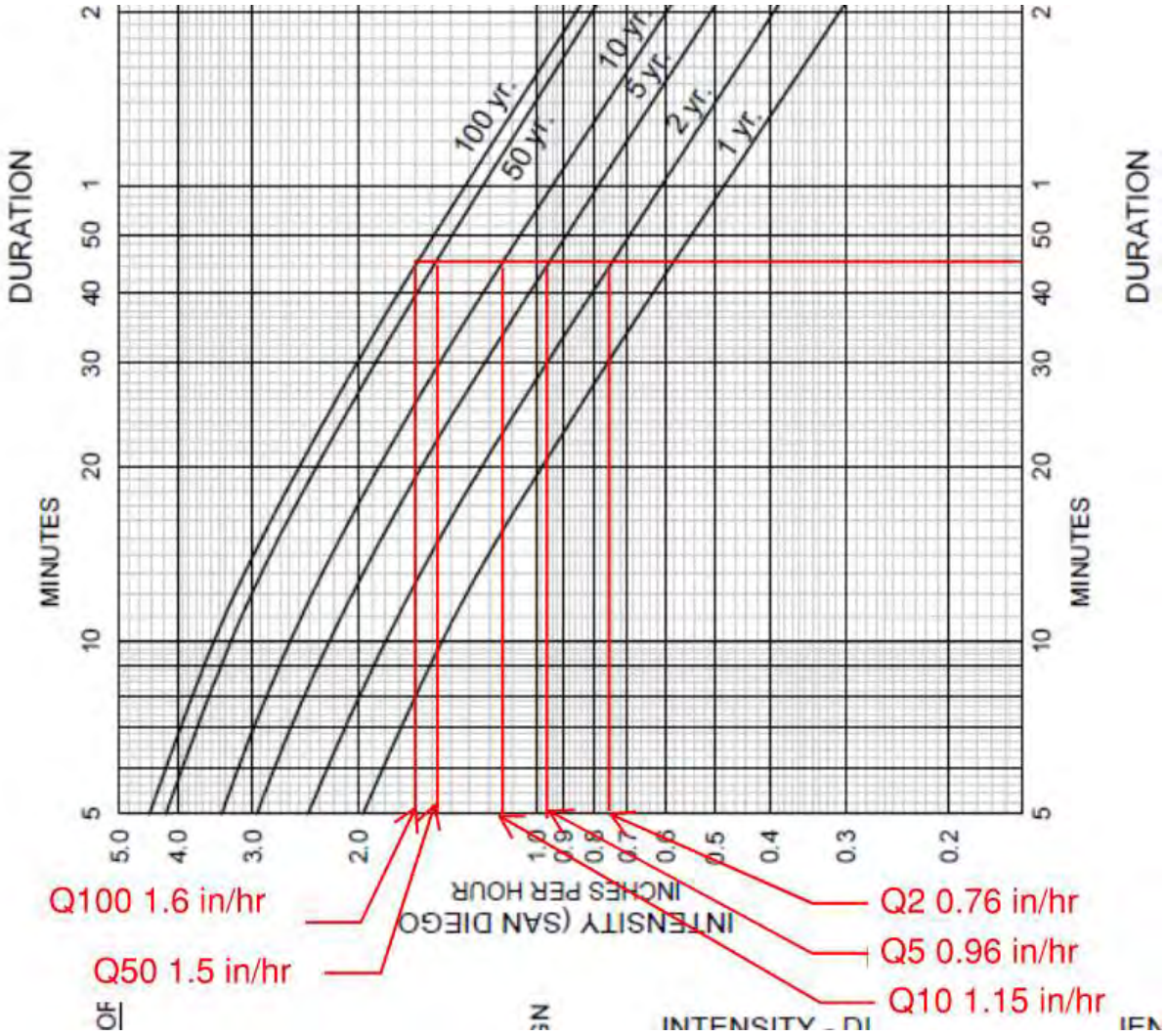

Figure 5: Overall Spring Canyon Watershed Intensity, City of San Diego IDF Chart

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.

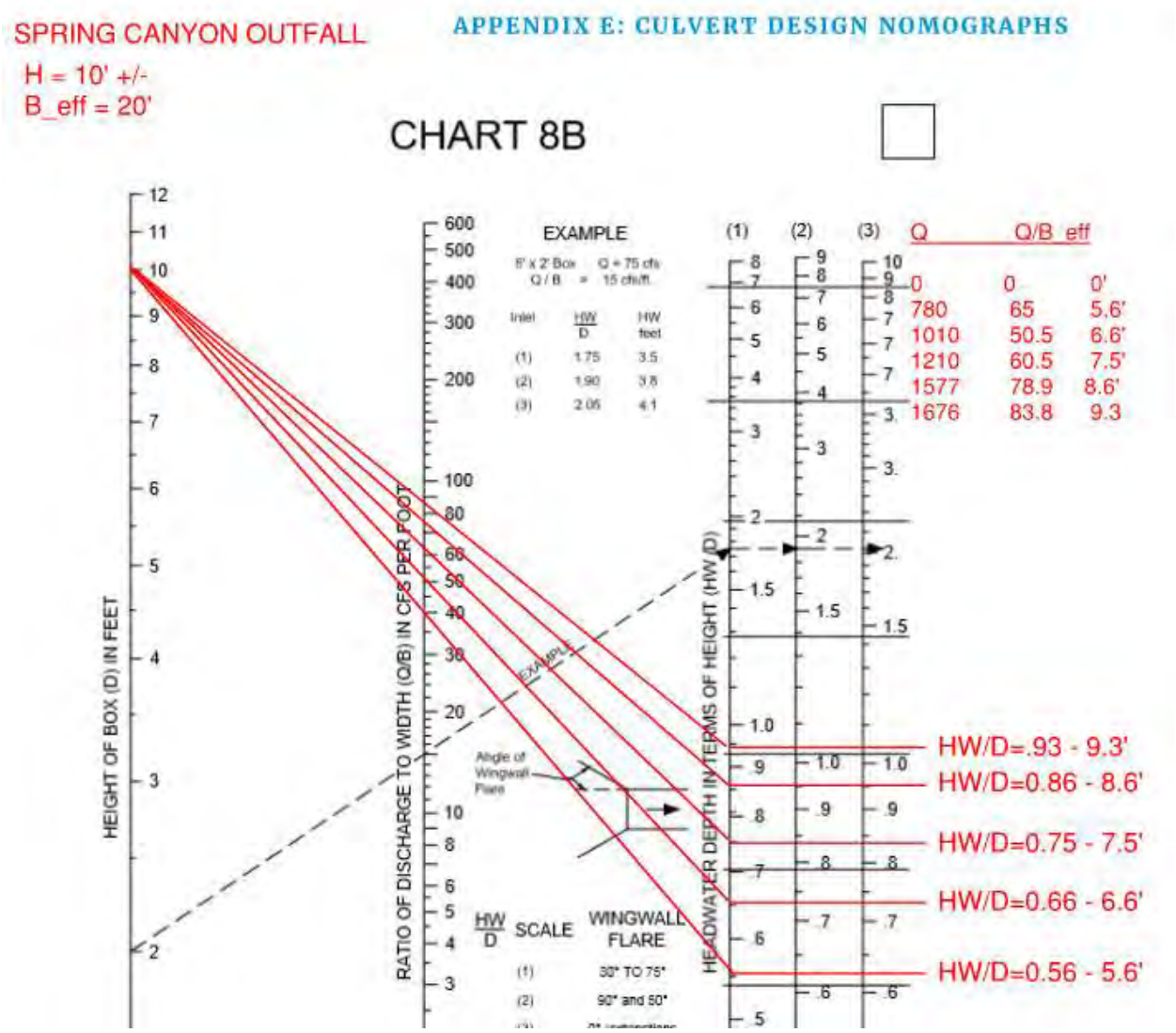

Figure 6: Inlet-Control Nomograph for Downstream Boundary Condition

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.

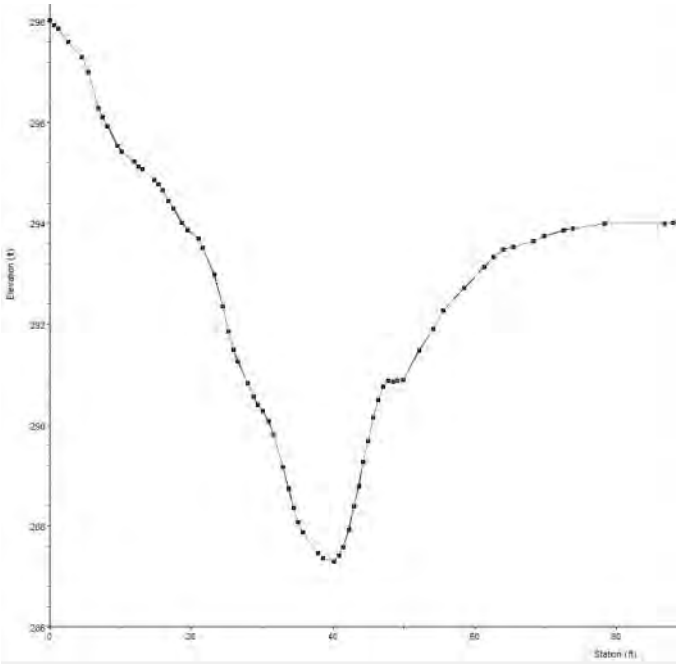

Figure 7: Upstream Cross-Section (7240) Showing Well-Defined Valley

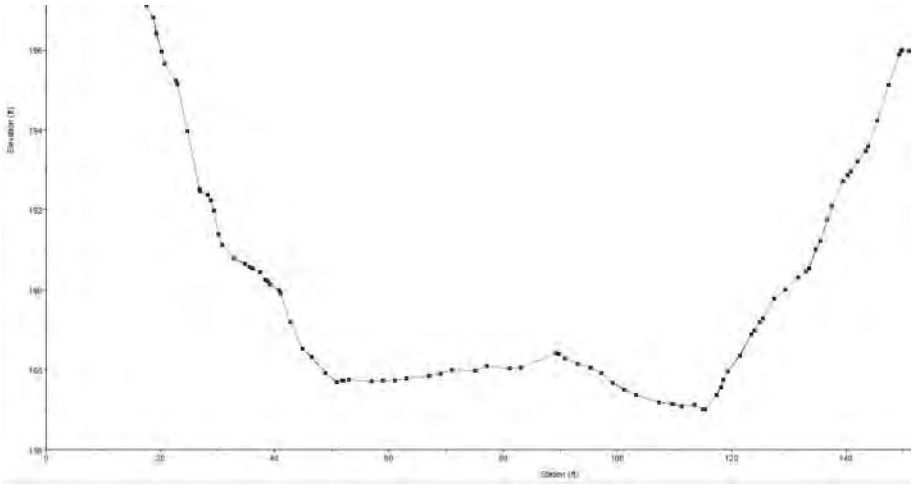

Figure 8: Downstream Cross-Section (1045) Showing Less Well-Defined Valley

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.

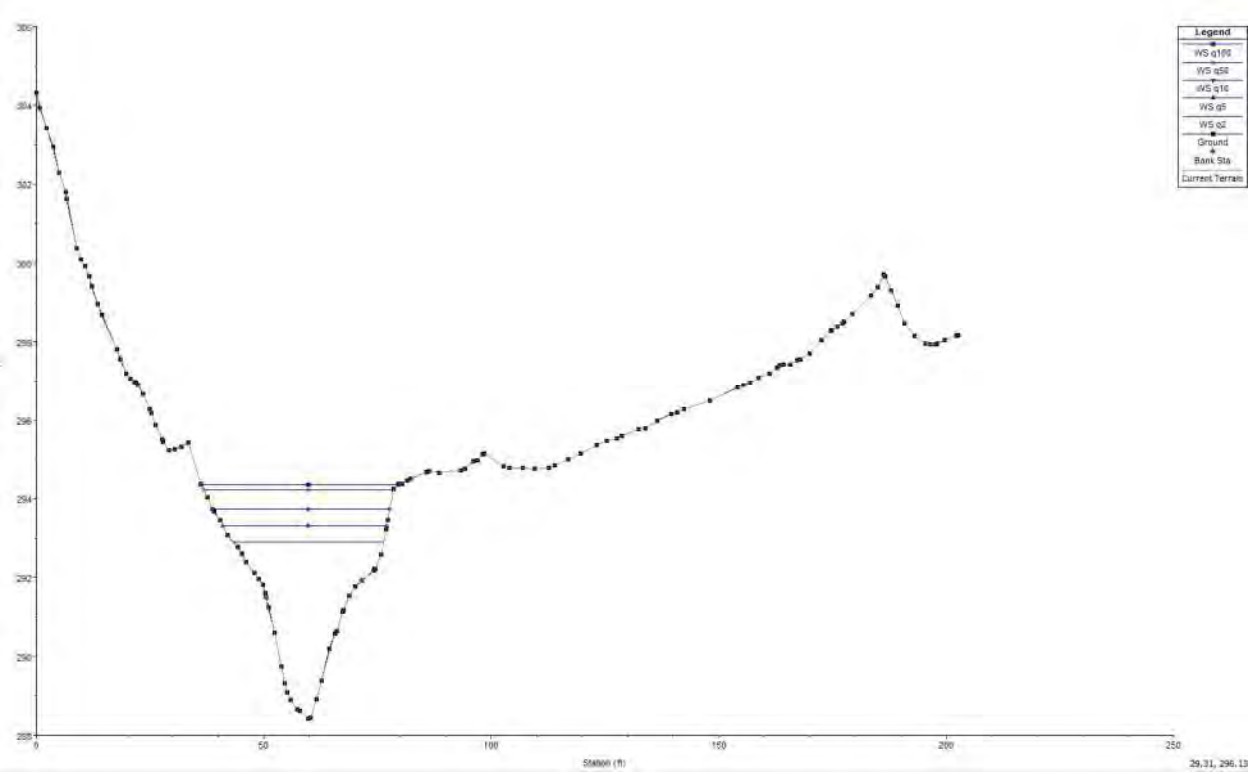

Figure 9: Steeper Valey Cross-Section Geometry (STA 7295) with Little Variation in Floodplain Inundation Extents

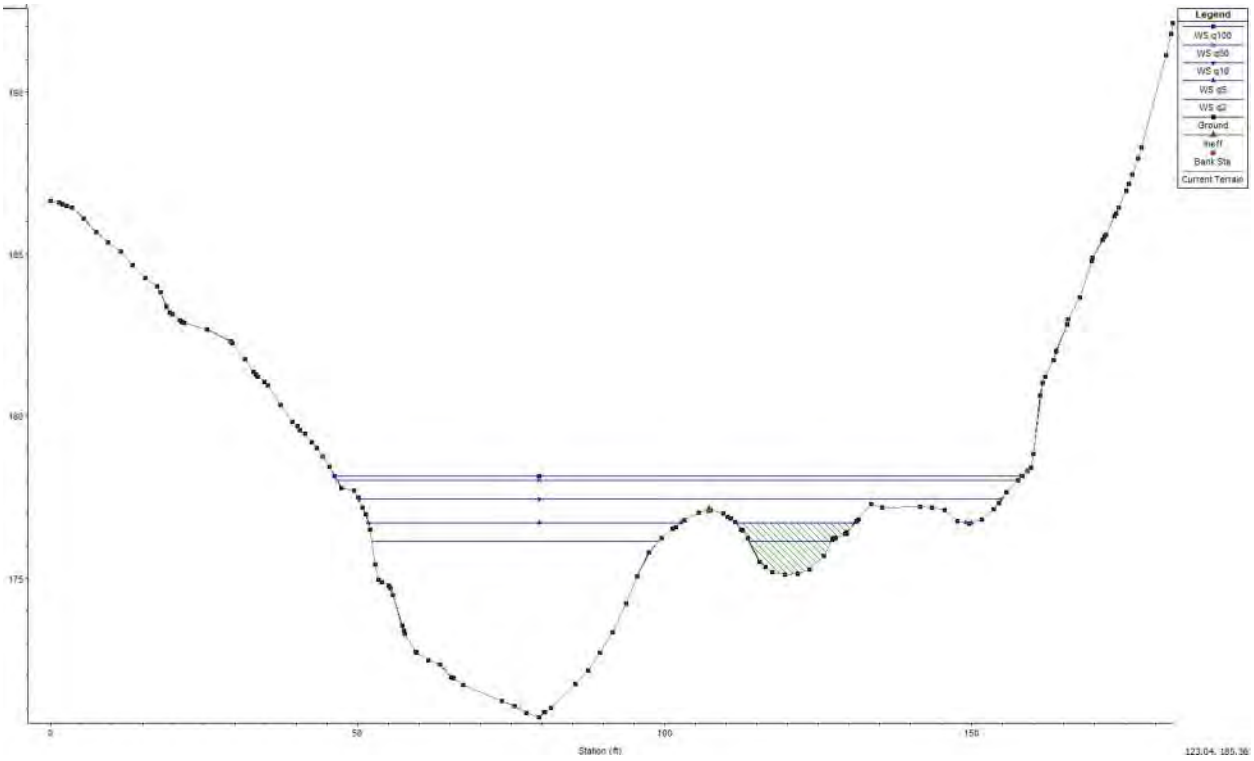

Figure 10:Flatter Overbank Topography Cross-Section Geometry (STA 582) with Significant Variation in Floodplain Inundation Extents

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.

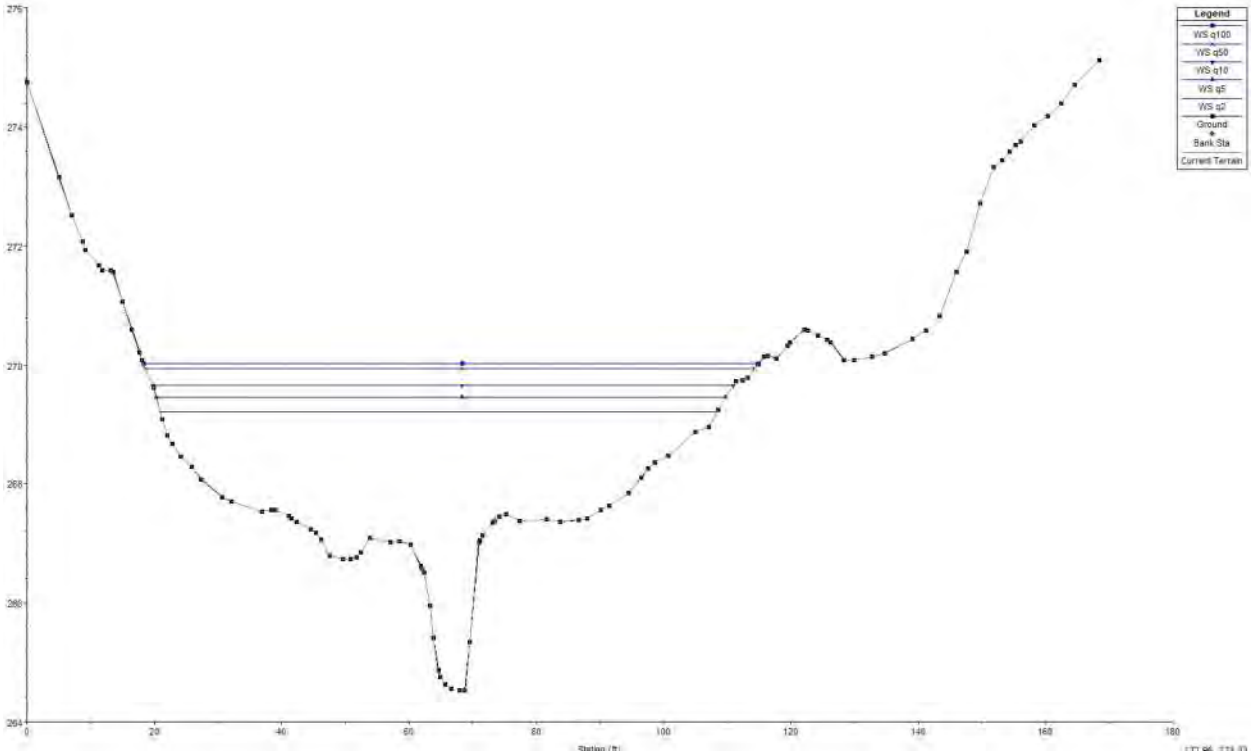

Figure 11: Potential Restoration Opportunity Location Identified During Previous Discussion with RECON

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

HYDRAULIC ANALYSIS NOT PERFORMED FOR TRIBUTARY. FURTHER INUNDATION OF TRIBUTARY NOT DEPICTED.

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'

HEC-RAS WORKMAP FOR SPRING CANYON

SHEET 1 OF 3

J-15013
DATE: DECEMBER 15, 2023

RICK ENGINEERING COMPANY
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619.291.0707
rickengineering.com
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Dec 15, 2023 - 8:46am

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HYDRAULIC ANALYSIS NOT PERFORMED FOR TRIBUTARY. FURTHER INUNDATION OF TRIBUTARY NOT DEPICTED

100 50 0 100 200 300

GRAPHIC SCALE: 1" = 100'

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

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HEC-RAS WORKMAP FOR SPRING CANYON

SHEET 2 OF 3

J-15013
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GRAPHIC SCALE: 1" = 100'

LEGEND

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

NOTES:

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HEC-RAS WORKMAP FOR SPRING CANYON

SHEET 3 OF 3

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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:

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40 20 0 40 80 120

GRAPHIC SCALE: 1" = 40'

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FLOODPLAIN INUNDATION EXHIBIT FOR SPRING CANYON

SHEET 1 OF 3

J-15013
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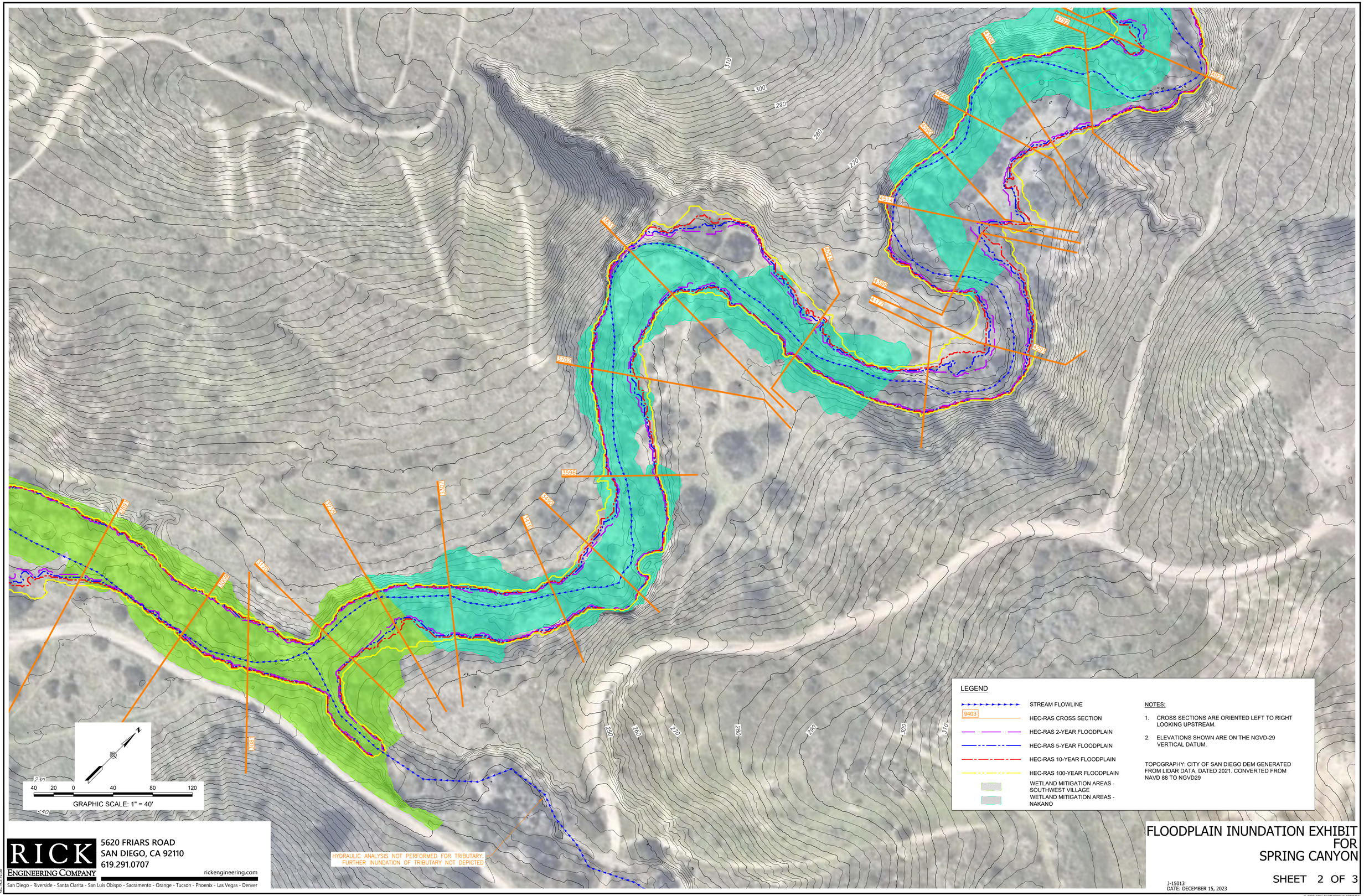

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FLOODPLAIN INUNDATION EXHIBIT FOR SPRING CANYON

SHEET 2 OF 3

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GRAPHIC SCALE: 1" = 40'

LEGEND

- STREAM FLOWLINE
- 9403 HEC-RAS CROSS SECTION
- HEC-RAS 2-YEAR FLOODPLAIN
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FLOODPLAIN INUNDATION EXHIBIT FOR SPRING CANYON

SHEET 3 OF 3

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Xref Path:

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)	
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Reach 1	9099	q10	840.00	325.49	330.16	330.16	331.22	0.011315	8.83	110.22	55.72	0.84
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Reach 1	9017	q2	555.00	323.69	327.60	327.60	328.58	0.014440	8.14	74.03	40.88	0.89
Reach 1	9017	q5	698.00	323.69	328.00	328.00	329.03	0.013420	8.43	91.86	45.53	0.88
Reach 1	9017	q10	840.00	323.69	328.32	328.32	329.42	0.013307	8.83	106.62	48.47	0.88
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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	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	8827	q10	840.00	319.59	324.36	324.36	325.51	0.011914	8.76	103.76	52.14	0.84
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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
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Reach 1	8674	q2	555.00	315.59	320.15	320.15	321.21	0.014970	8.71	70.39	33.90	0.91
Reach 1	8674	q5	698.00	315.59	320.54	320.54	321.72	0.014247	9.26	84.21	36.75	0.91
Reach 1	8674	q10	840.00	315.59	320.91	320.91	322.17	0.013334	9.63	98.42	39.42	0.89
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Reach 1	8618	q2	555.00	314.67	319.15	319.15	320.12	0.012675	8.29	75.11	41.51	0.85
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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
Reach 1	8573	q10	840.00	314.09	319.20		319.52	0.002599	4.60	189.61	61.29	0.40
Reach 1	8573	q100	1156.00	314.09	319.98		320.36	0.002576	5.09	240.84	70.61	0.41
Reach 1	8537	q2	555.00	312.89	317.24	317.19	318.29	0.016758	8.24	68.73	32.17	0.94
Reach 1	8537	q5	698.00	312.89	317.78	317.61	318.82	0.013553	8.25	87.66	38.07	0.87
Reach 1	8537	q10	840.00	312.89	318.24	317.98	319.28	0.011348	8.35	106.33	44.50	0.82
Reach 1	8537	q100	1156.00	312.89	319.15	318.69	320.15	0.008235	8.39	153.29	58.18	0.72
Reach 1	8519	q2	555.00	312.78	317.53		317.95	0.004926	5.21	107.89	38.26	0.53
Reach 1	8519	q5	698.00	312.78	318.04		318.52	0.004557	5.56	127.83	39.79	0.52
Reach 1	8519	q10	840.00	312.78	318.48		319.01	0.004417	5.92	145.72	42.74	0.53
Reach 1	8519	q100	1156.00	312.78	319.29		319.95	0.004300	6.62	184.89	53.38	0.53
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
Reach 1	8355	q5	698.00	309.17	314.46	314.46	315.03	0.008079	6.99	122.28	78.25	0.65
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

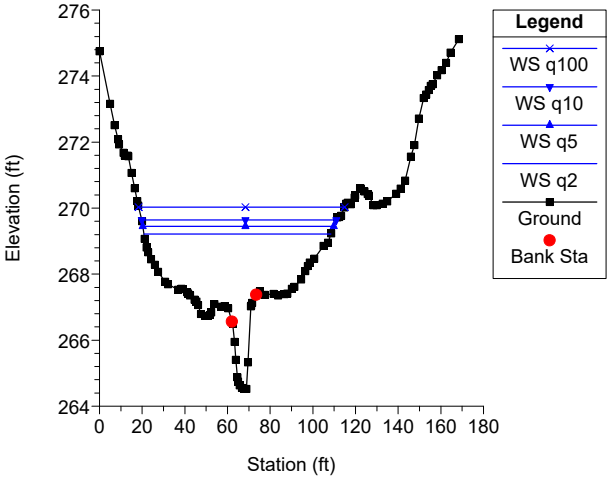
HEC-RAS Plan: Sprg_Cnyn_Ex River: SpringCanyon Reach: Reach 1 (Continued)

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



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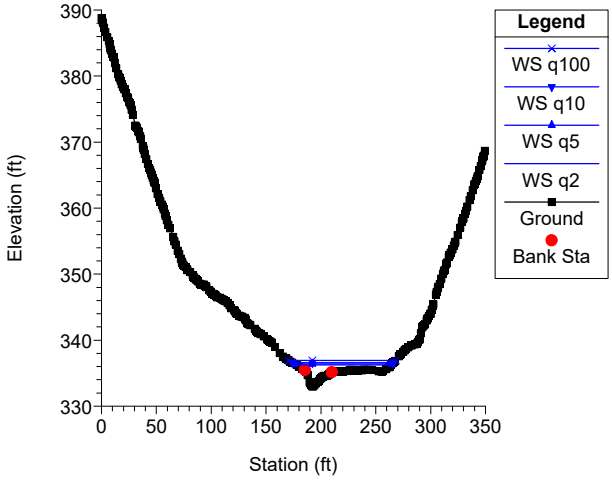

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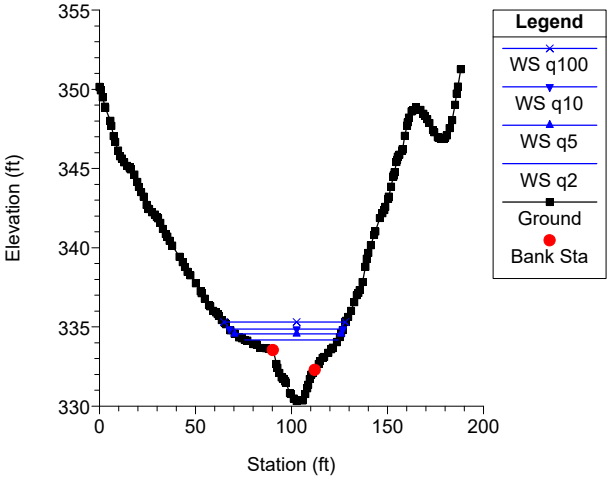

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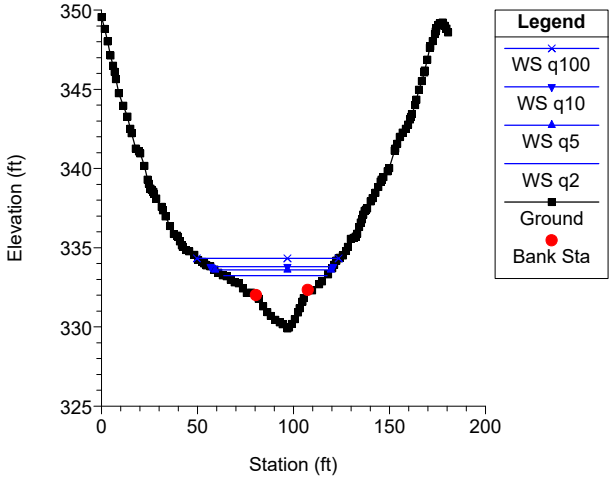

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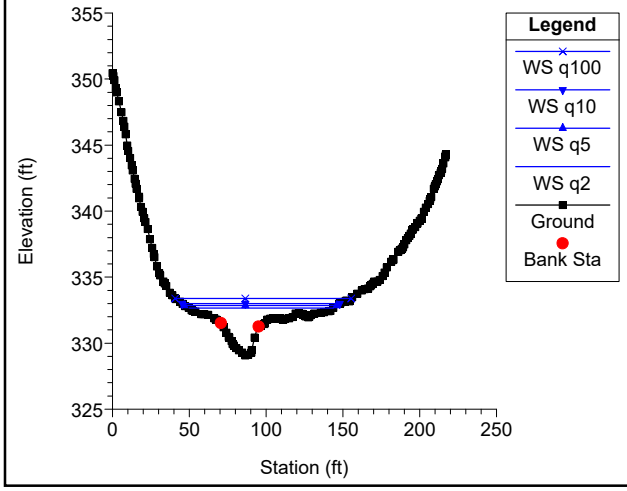

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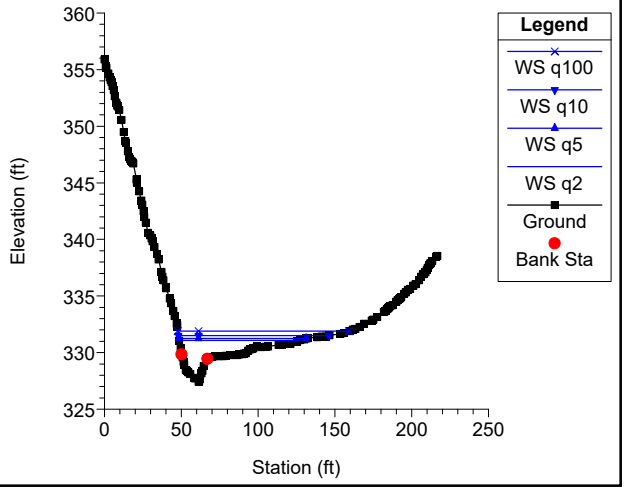

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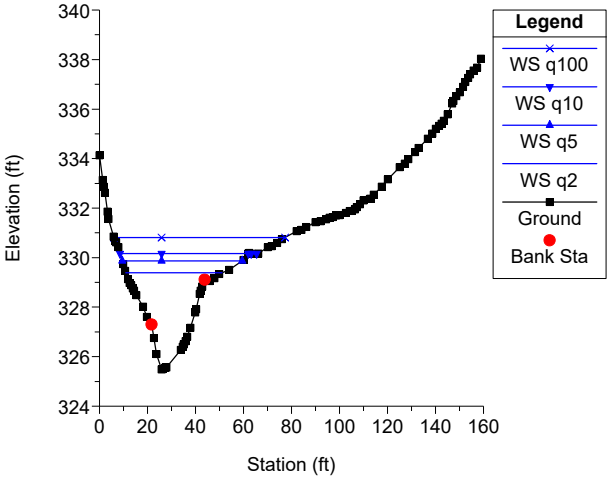

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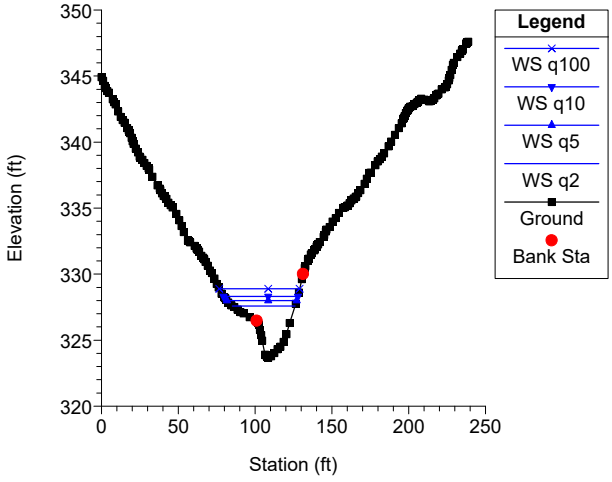

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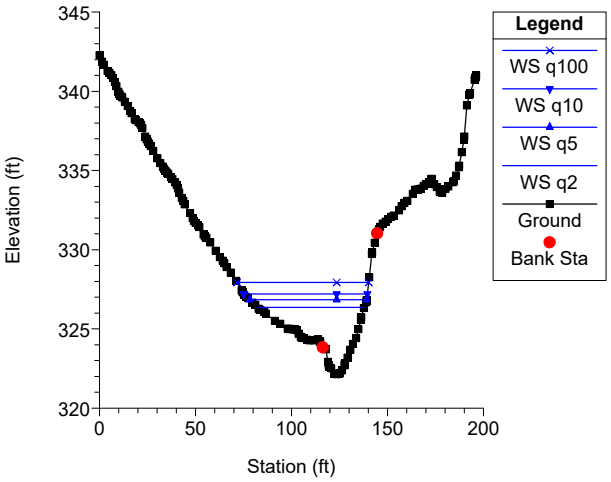

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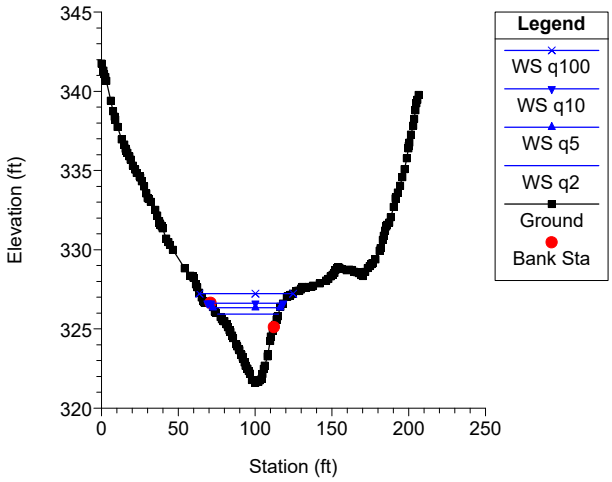

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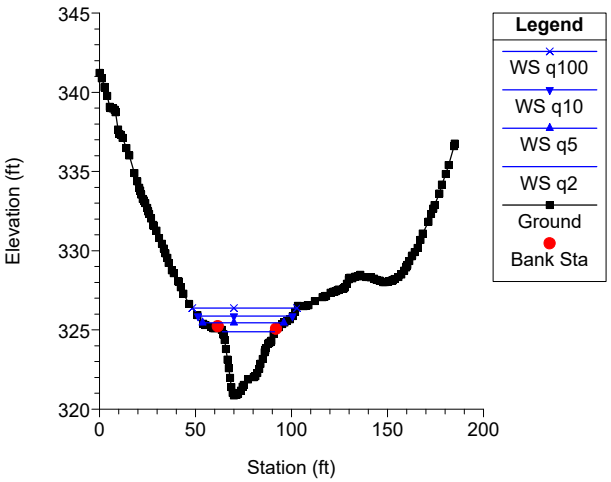

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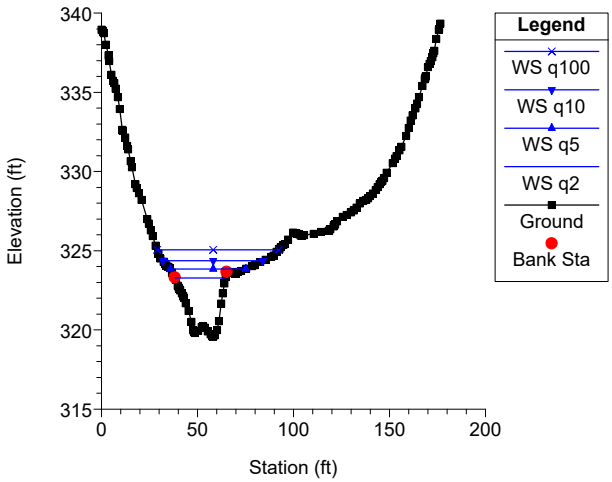

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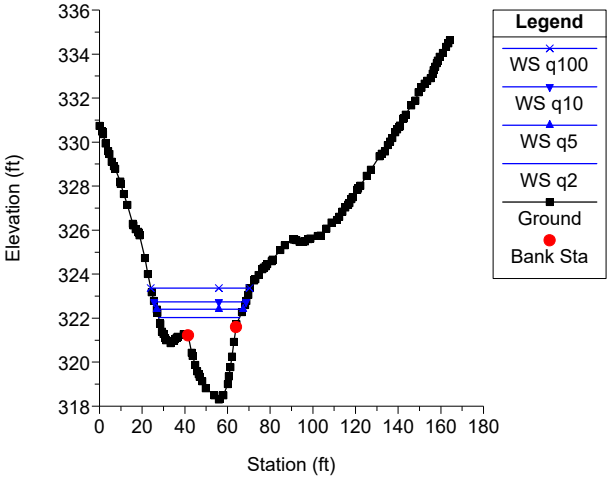

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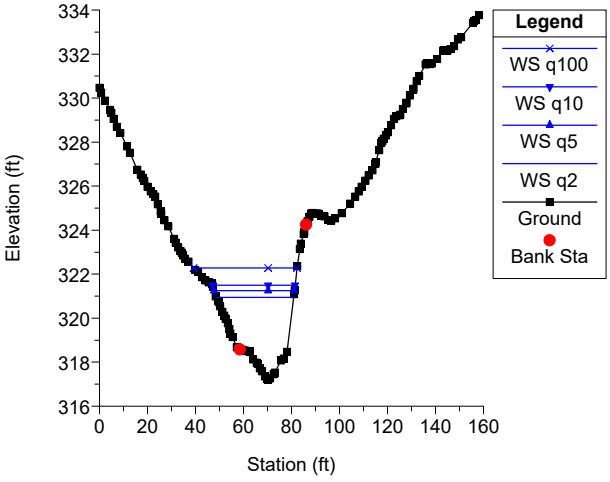

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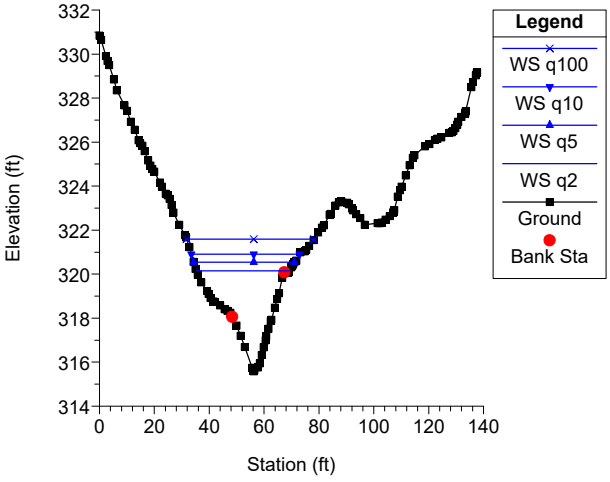

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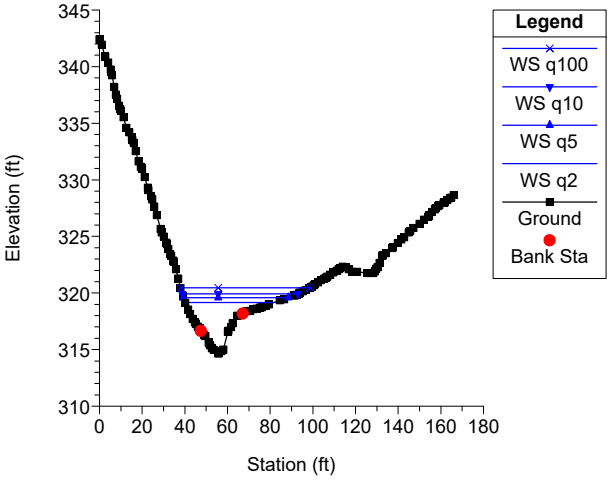

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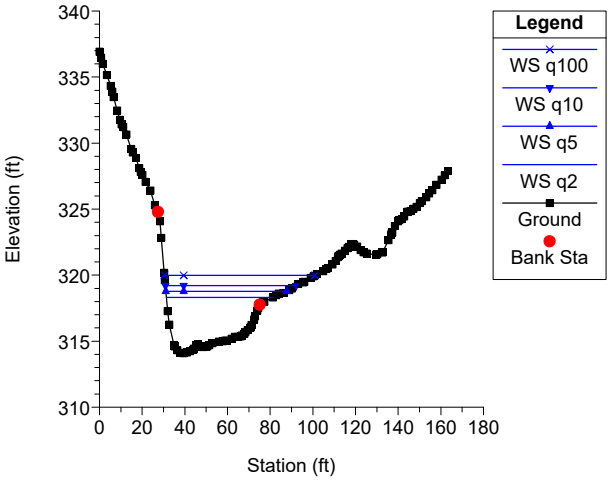

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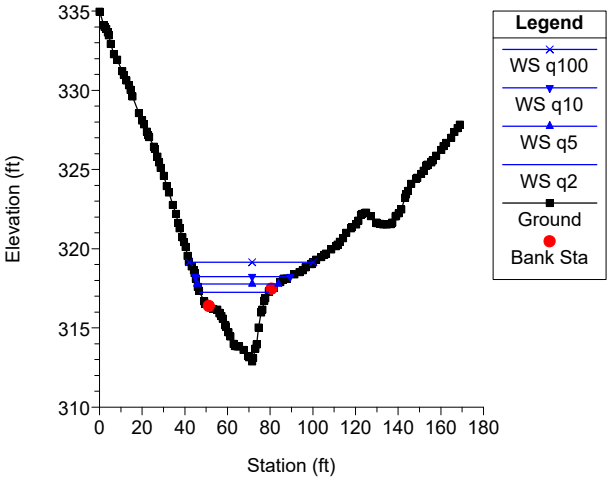

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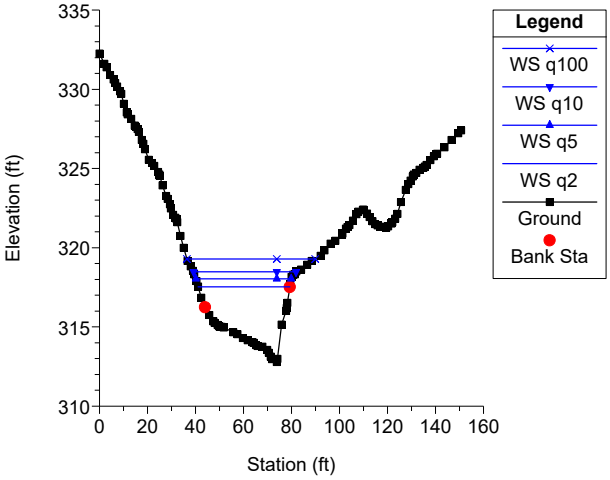

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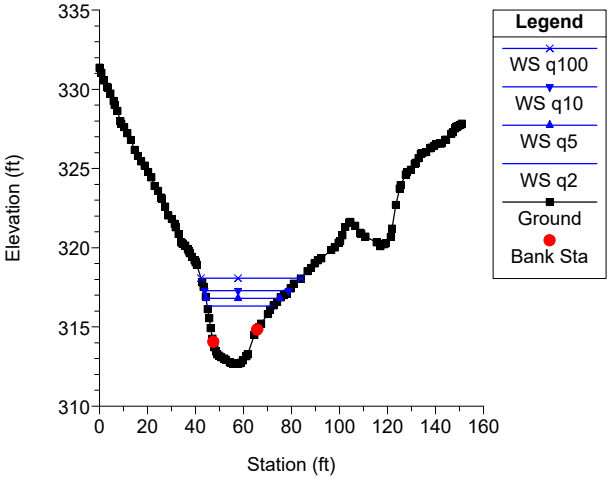

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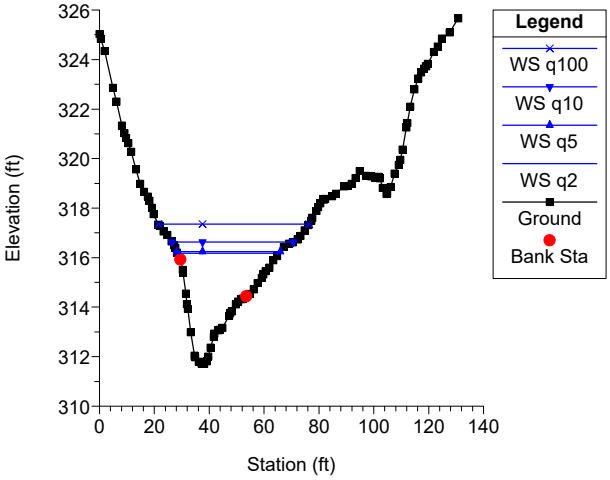

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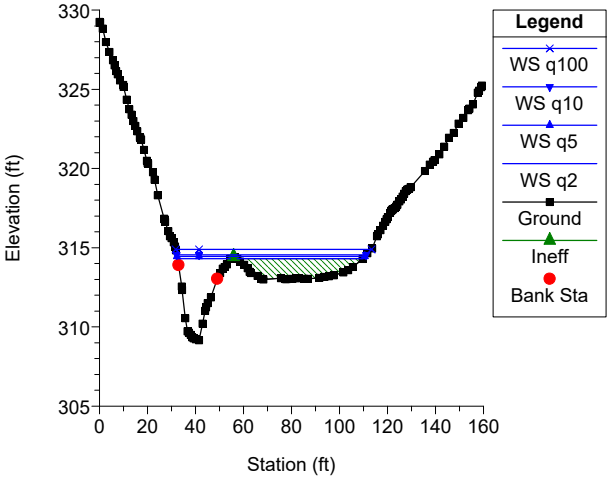

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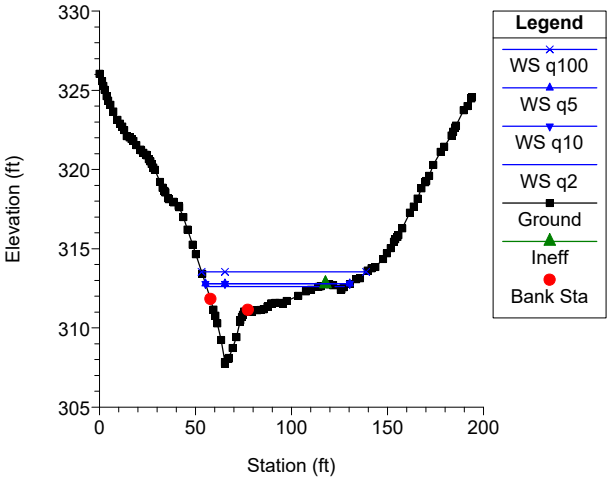

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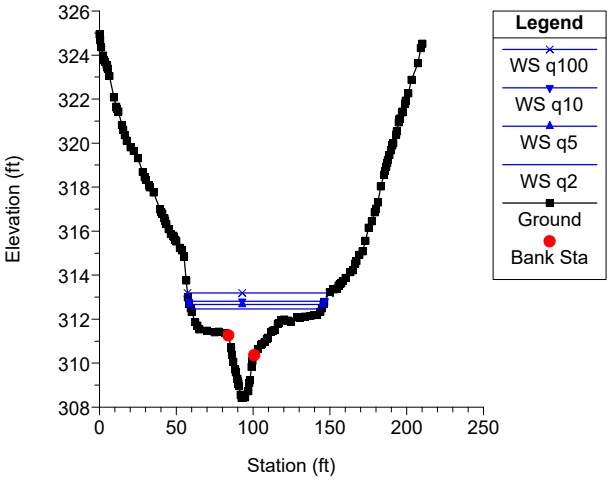

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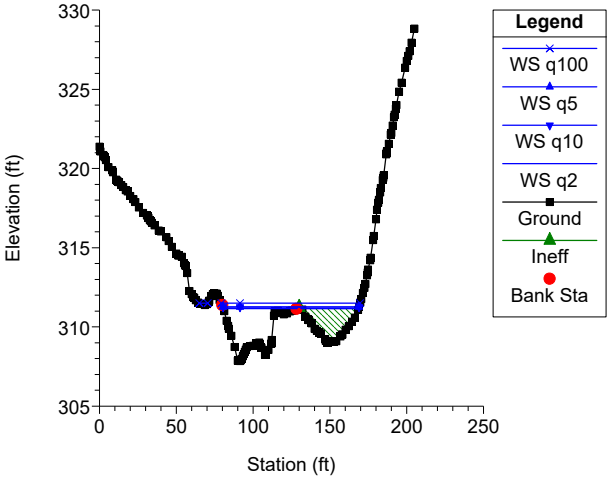

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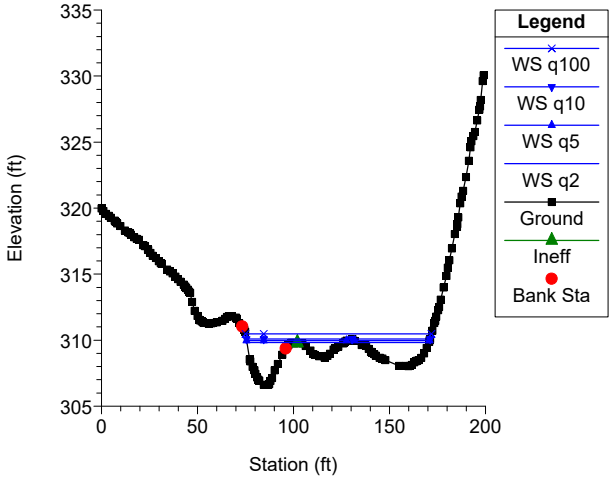

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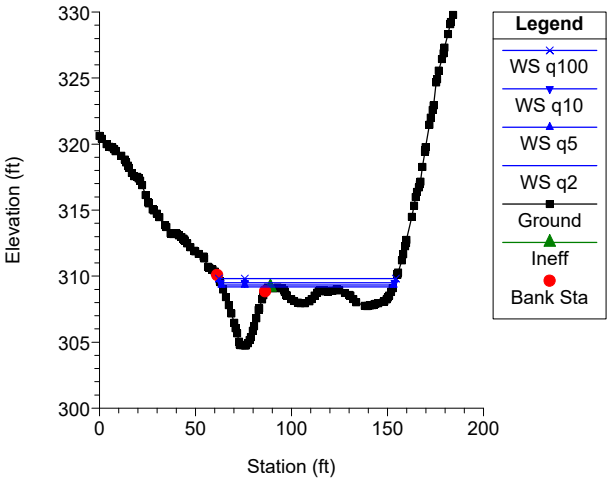

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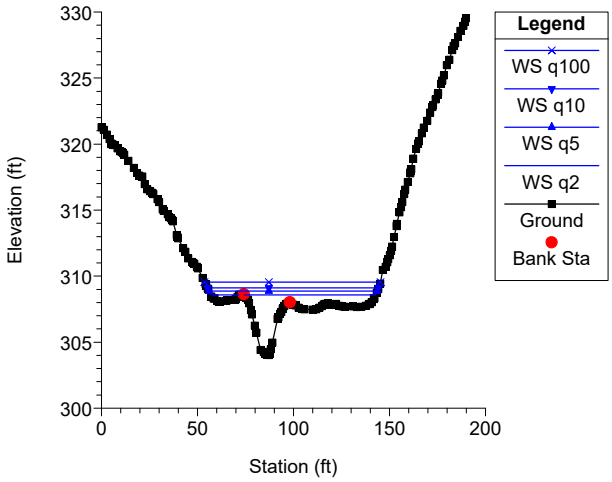

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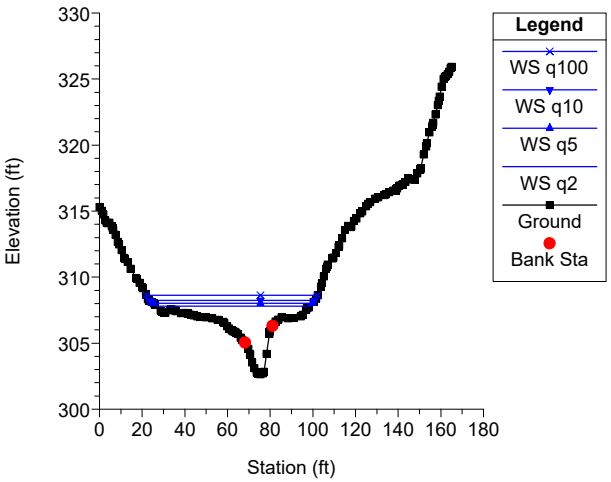

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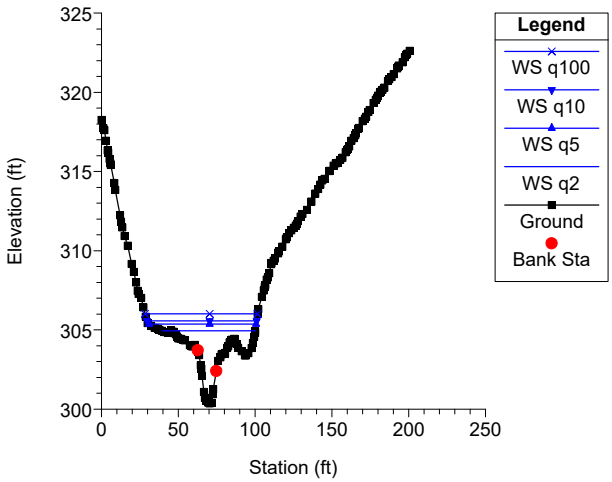

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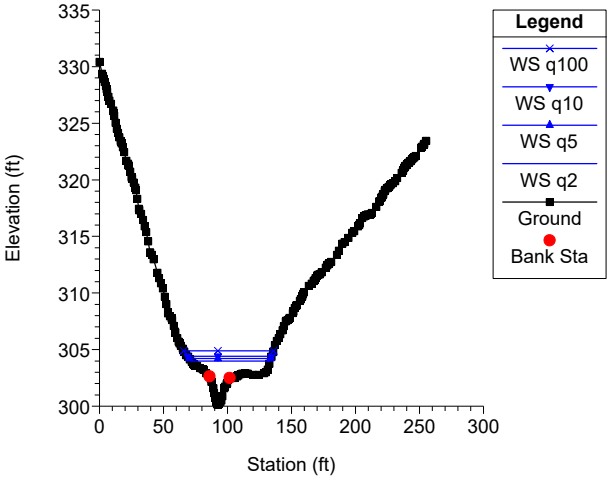

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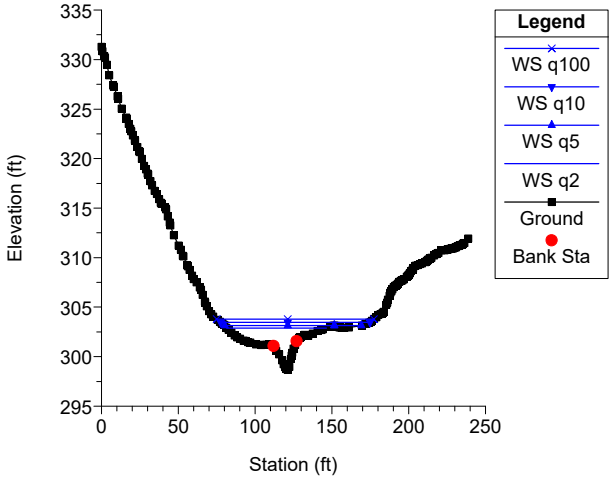

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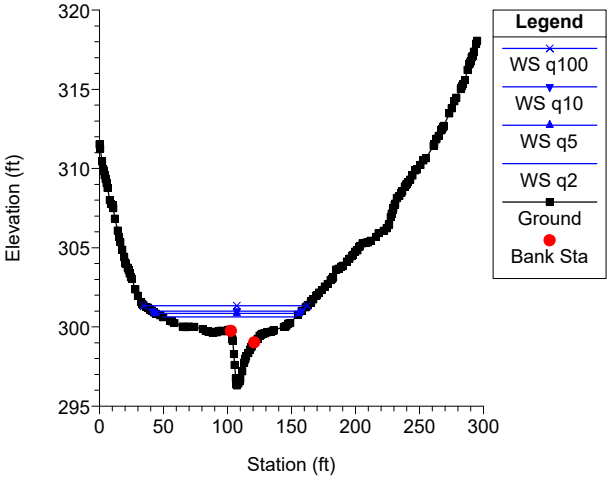

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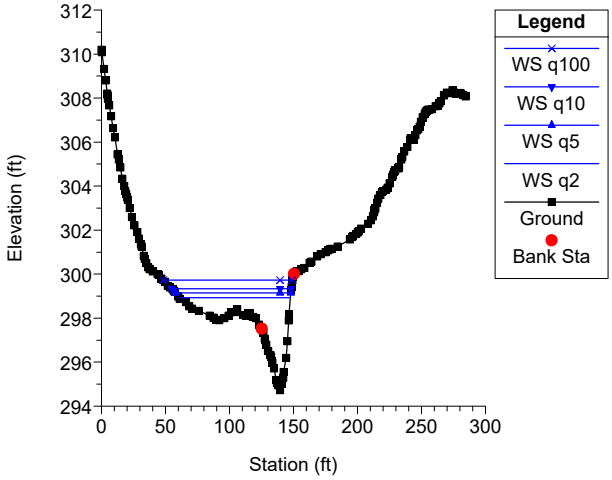

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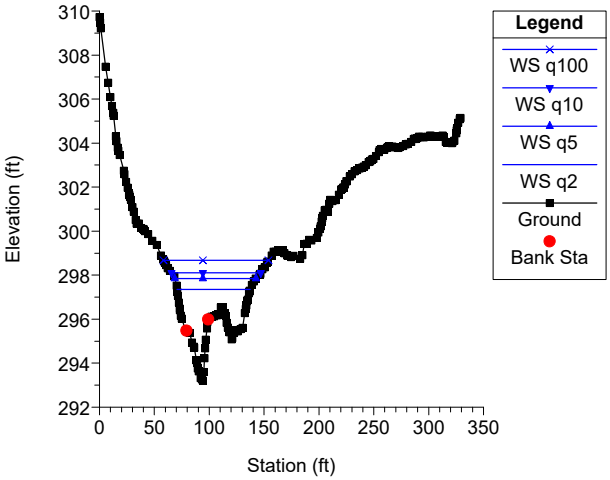

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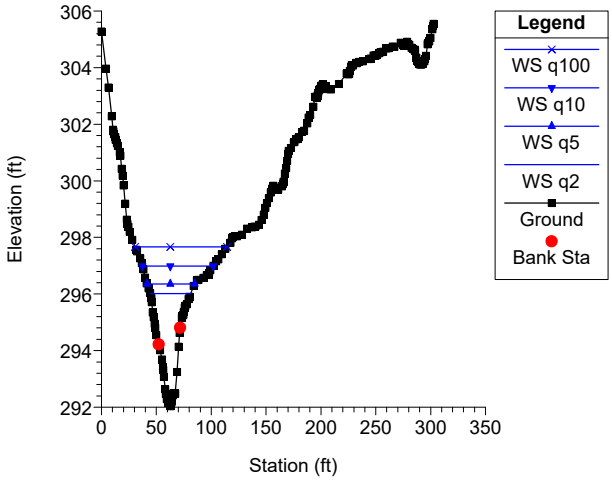

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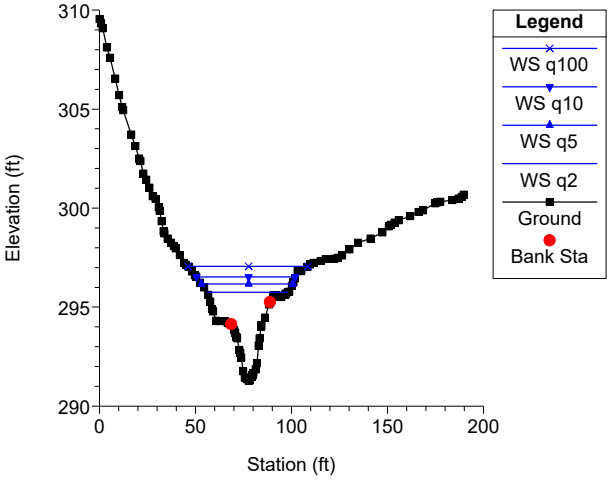

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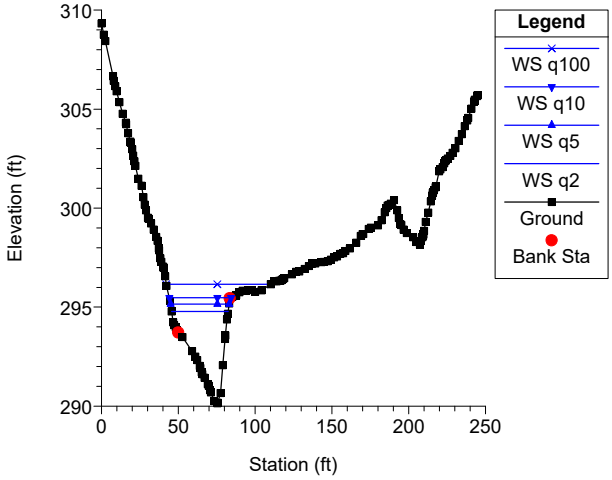

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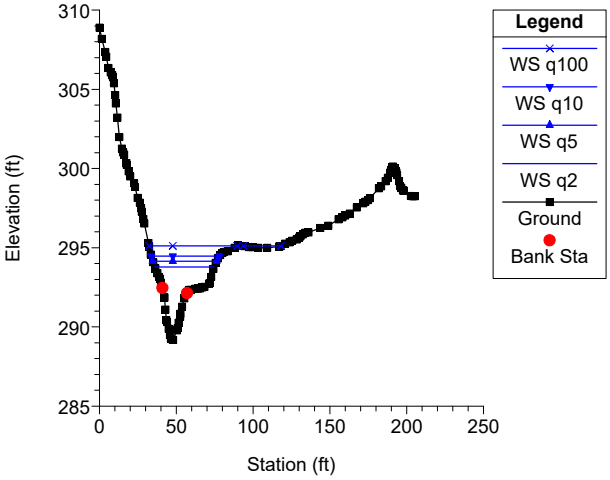

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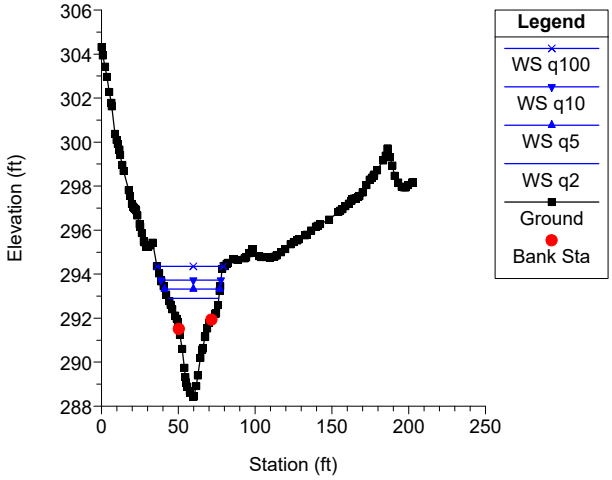

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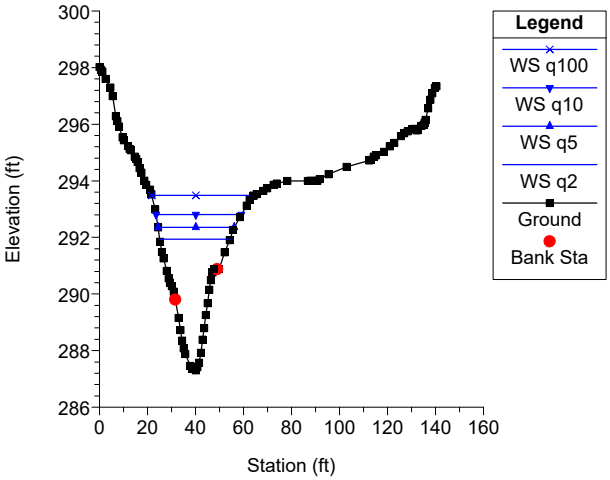

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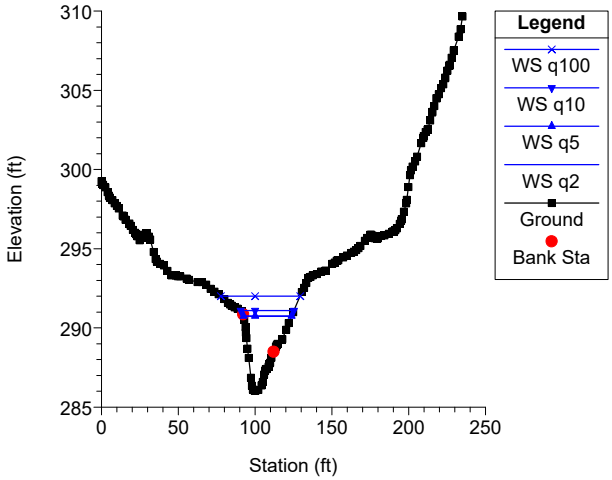

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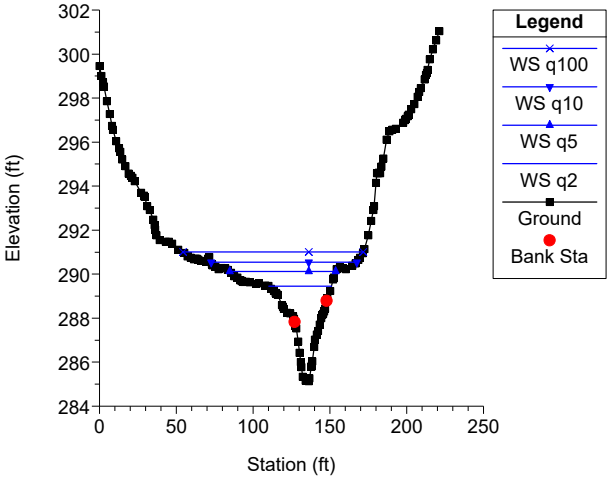

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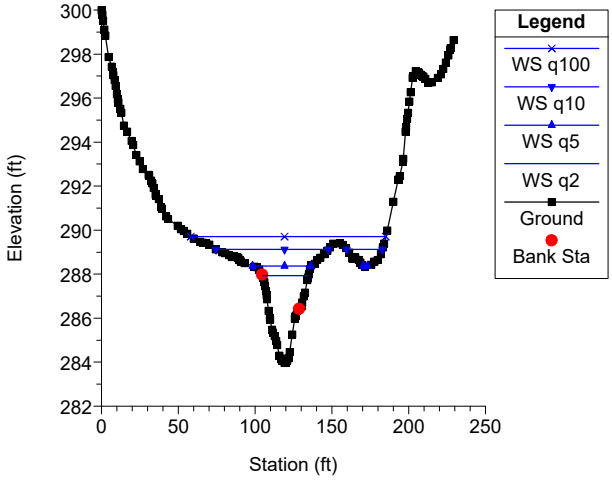

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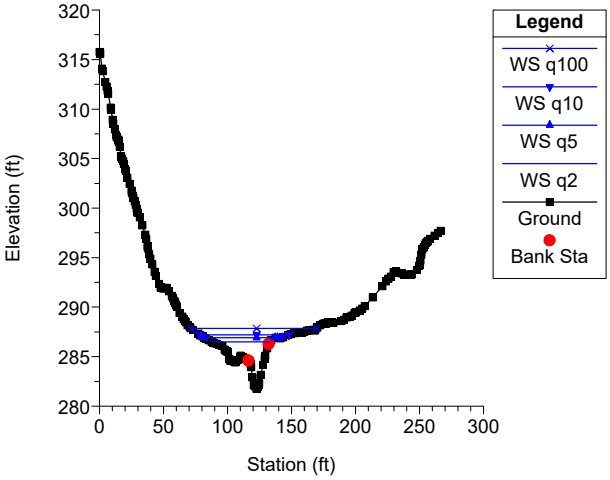

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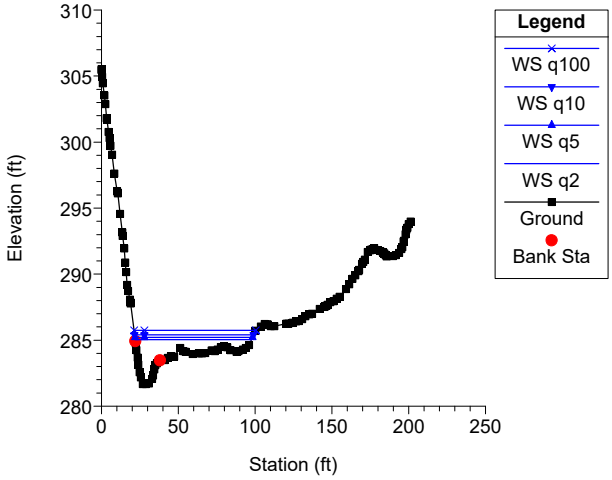

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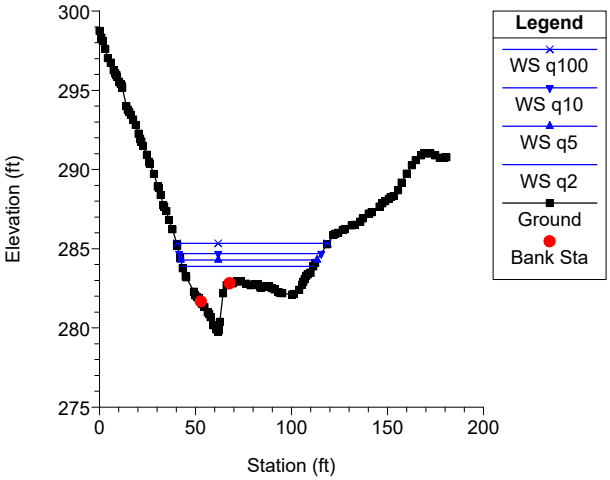

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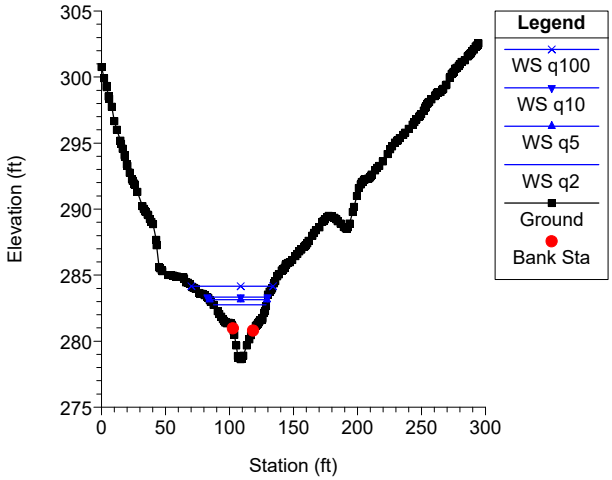

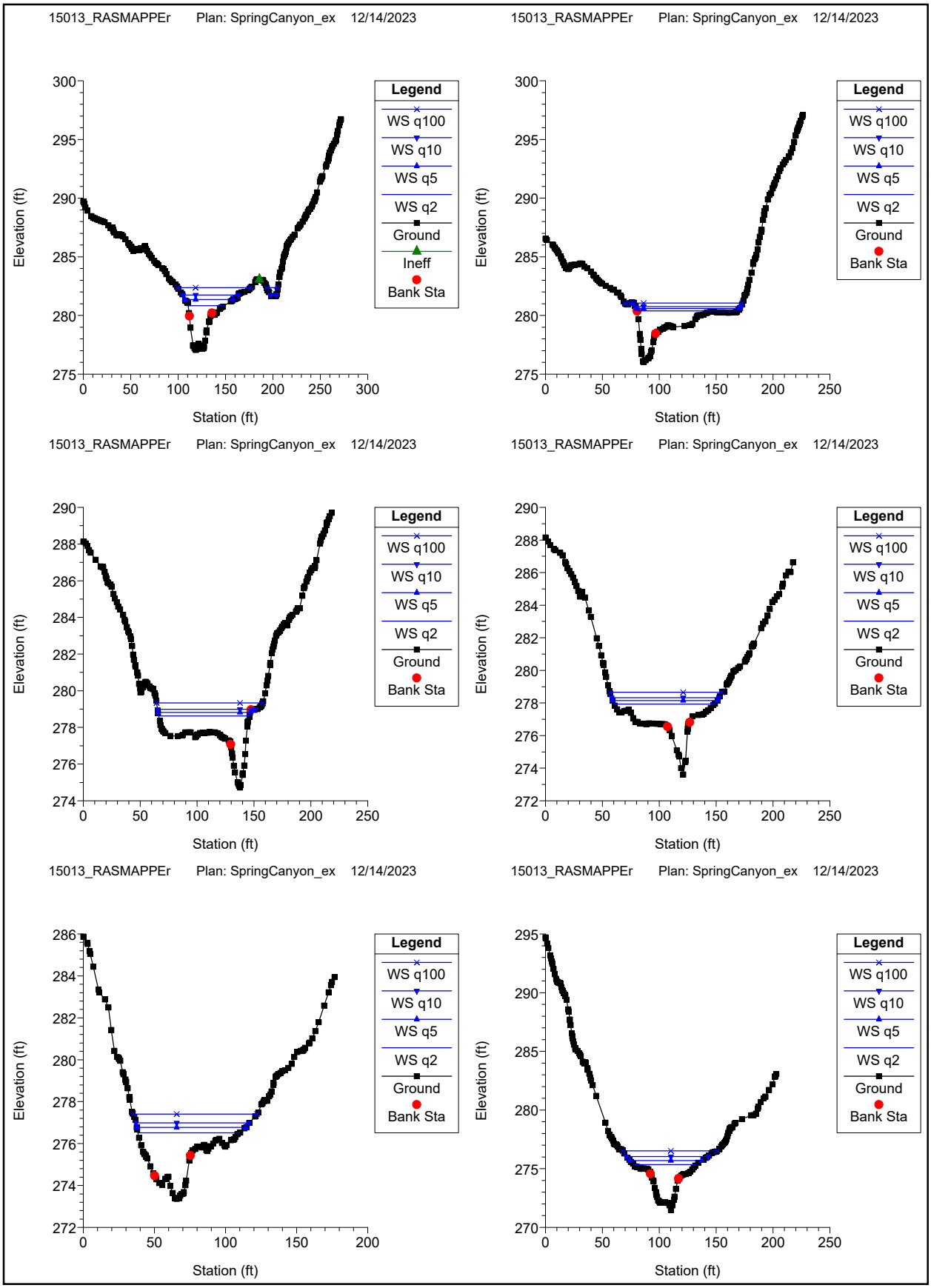
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15013_RASMAPPEr Plan: SpringCanyon_ex 12/14/2023
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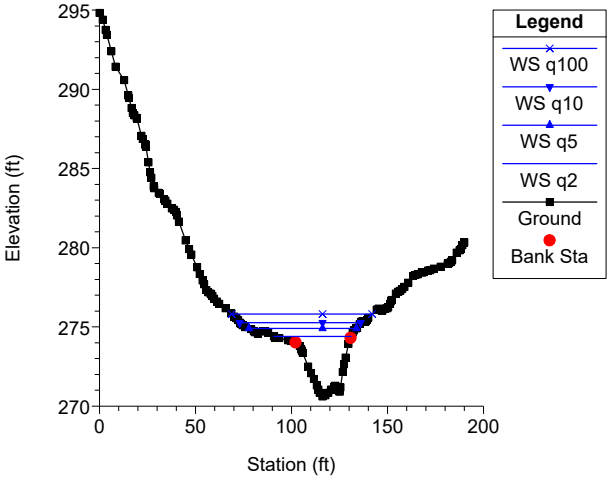

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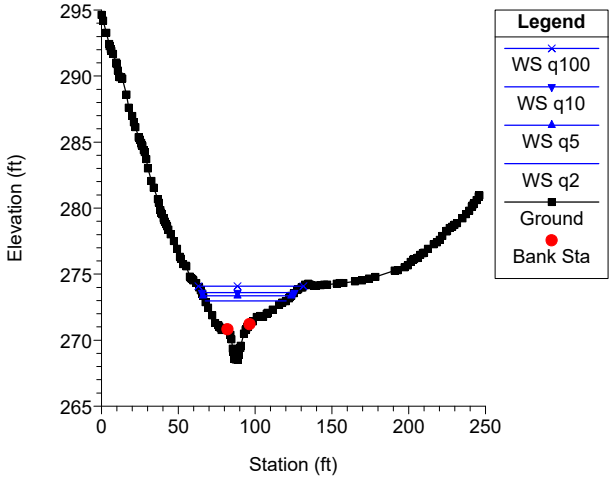

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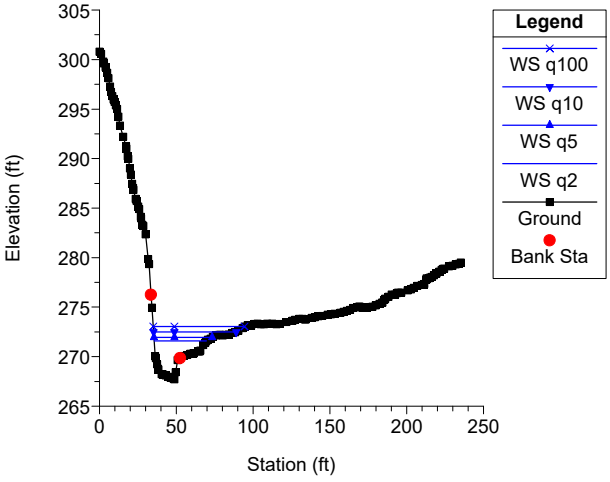

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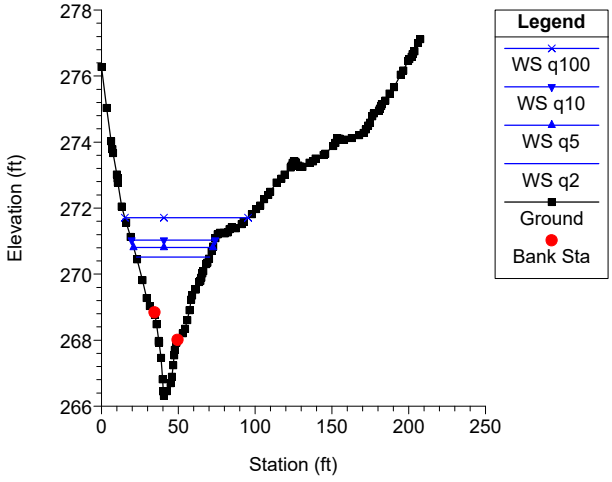

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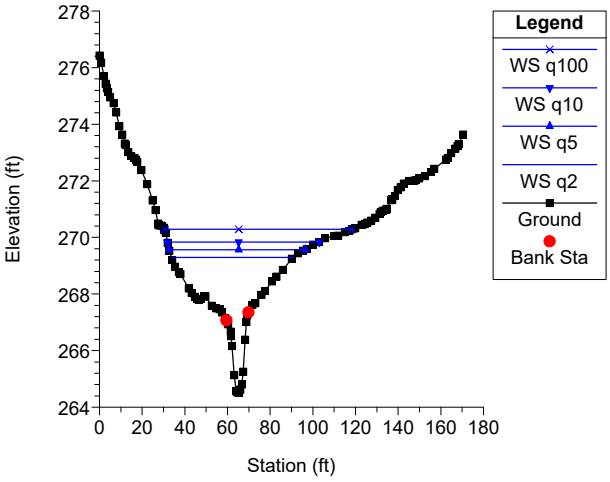

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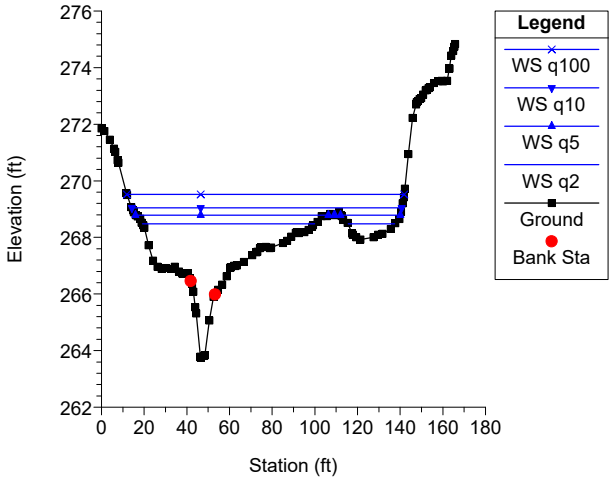

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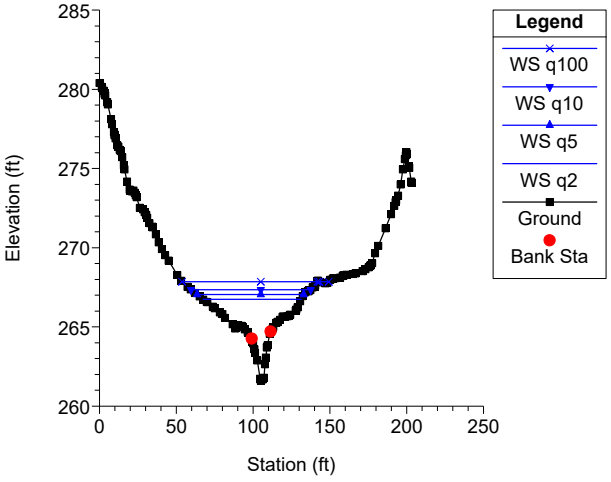

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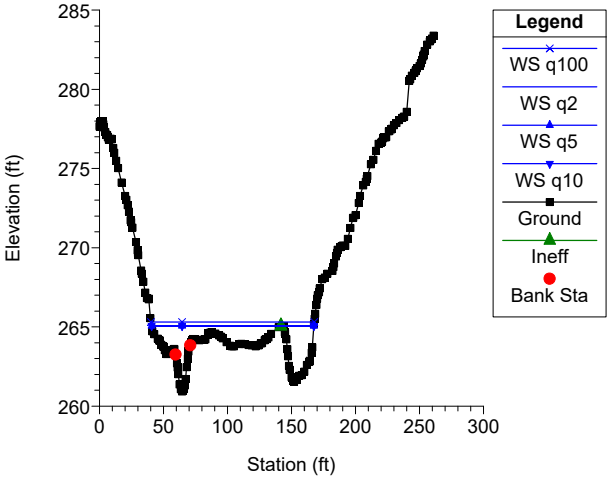

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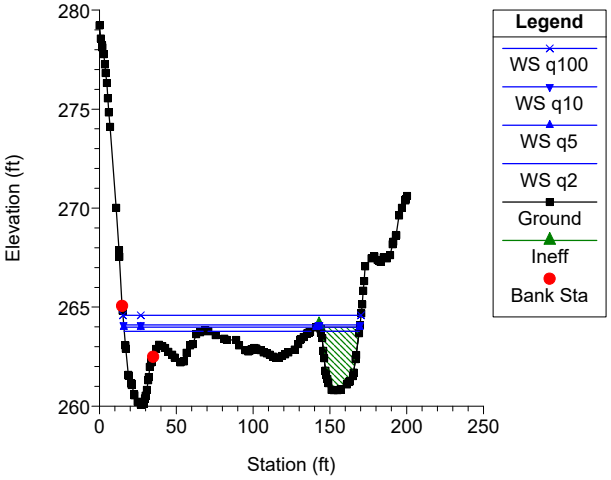

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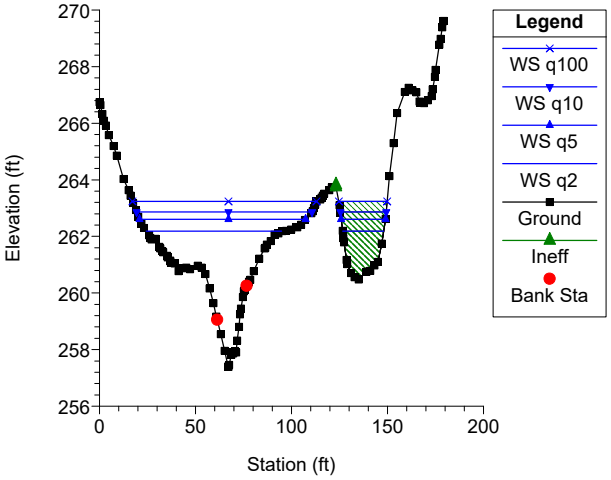

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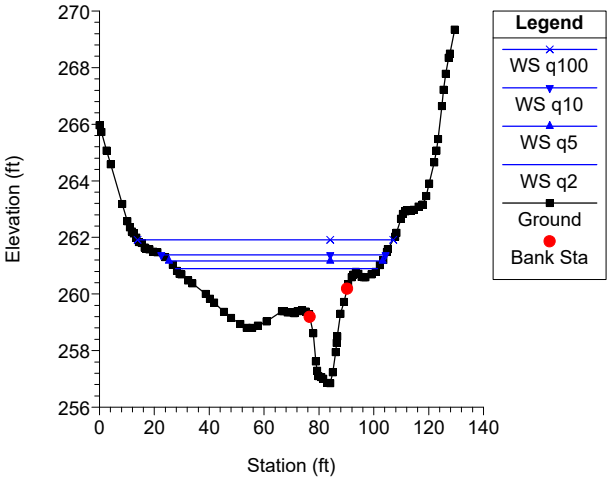

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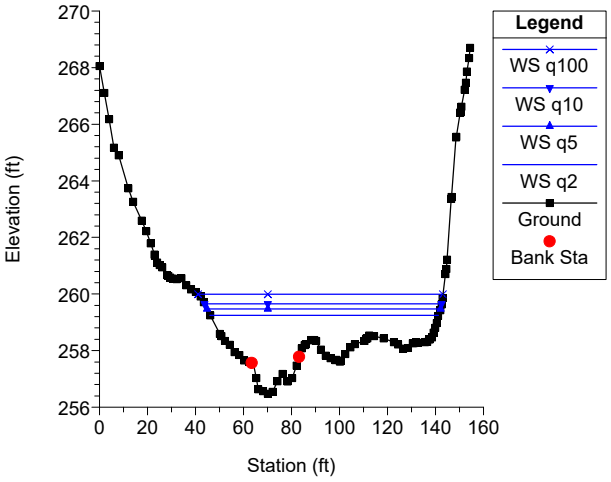

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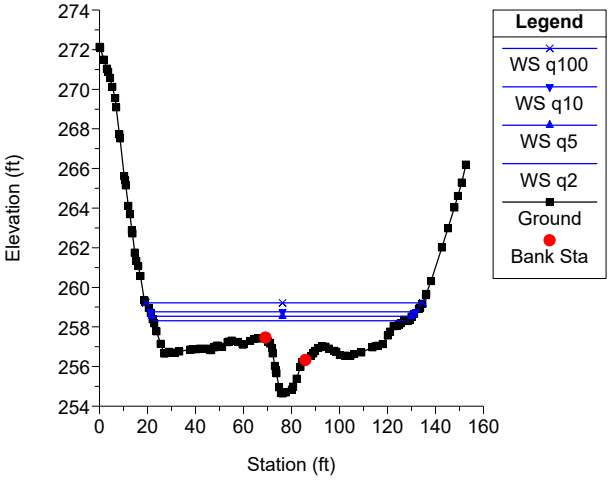

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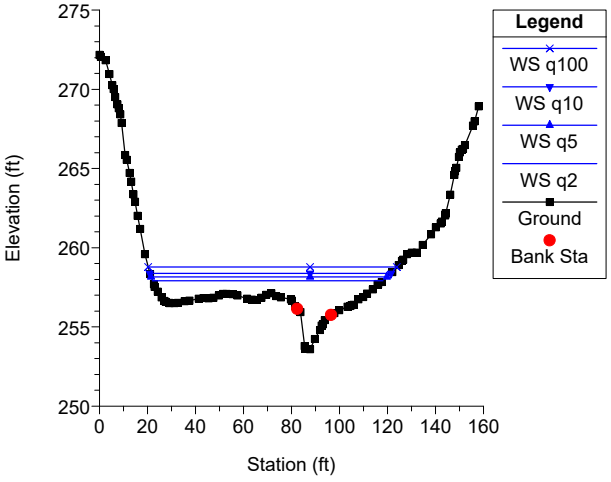

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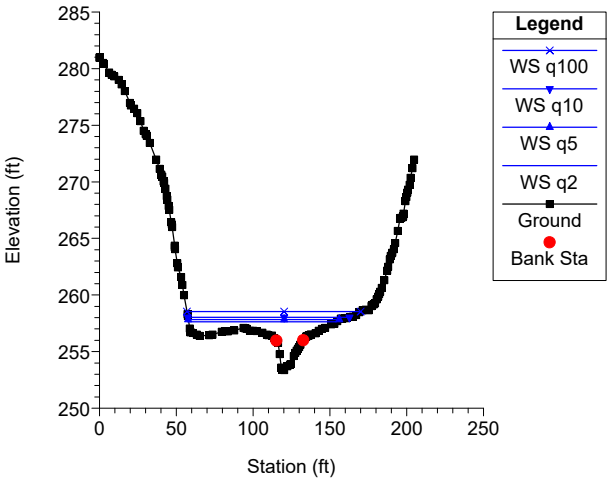

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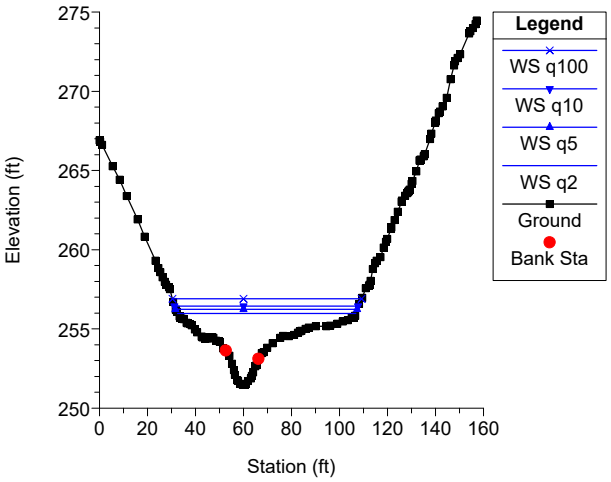

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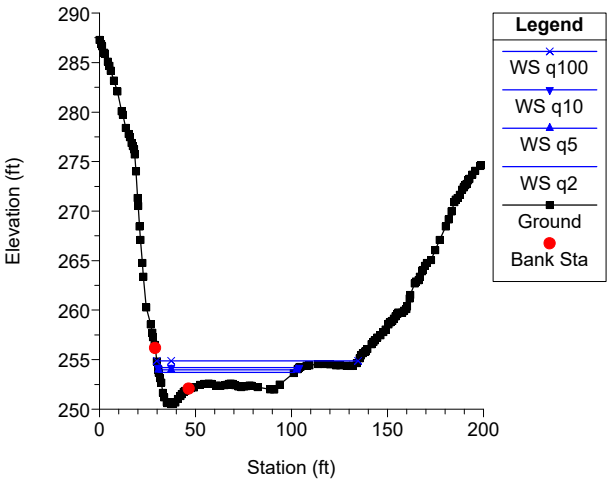

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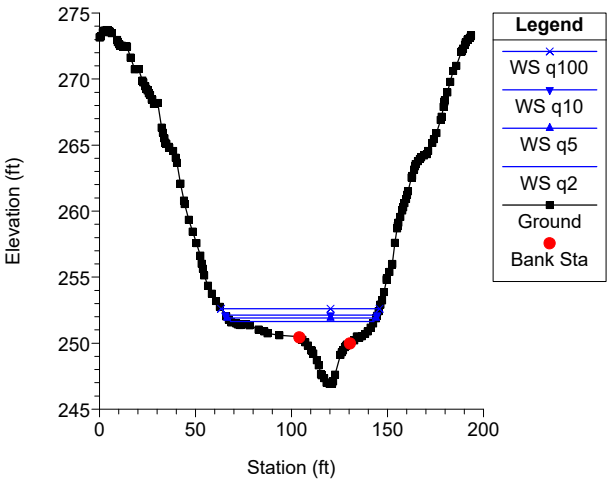

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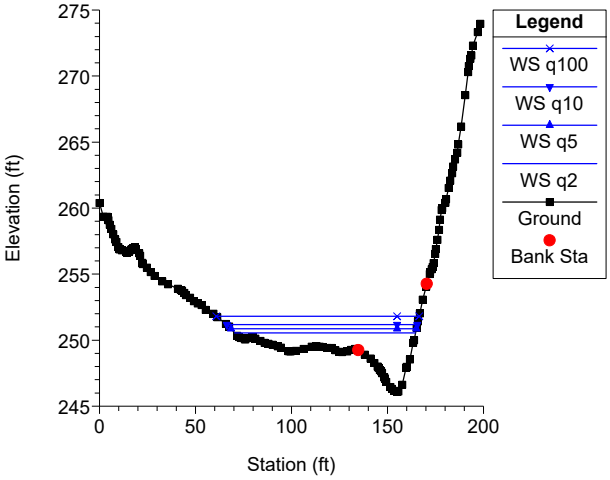

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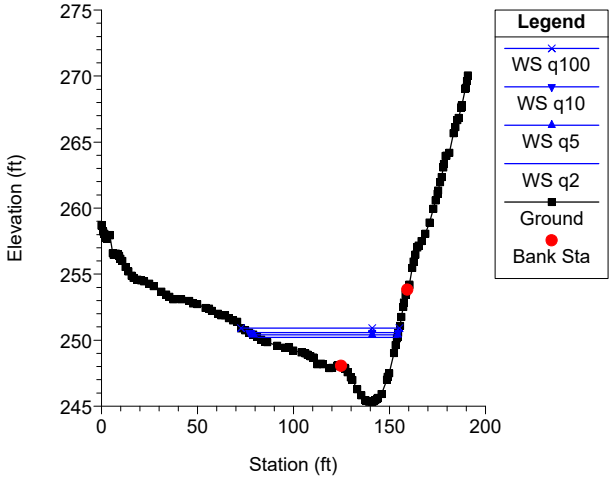

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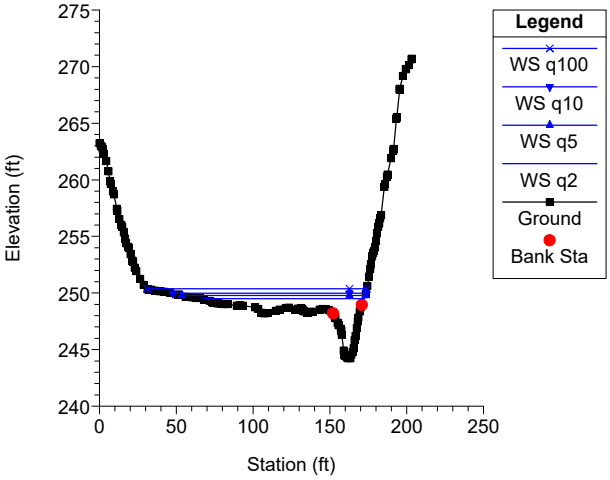

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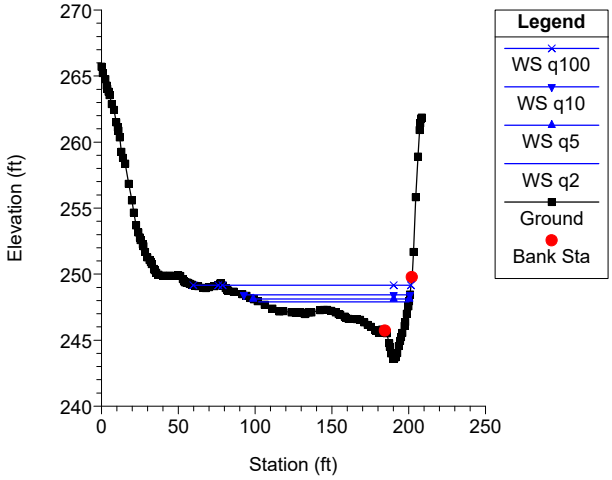

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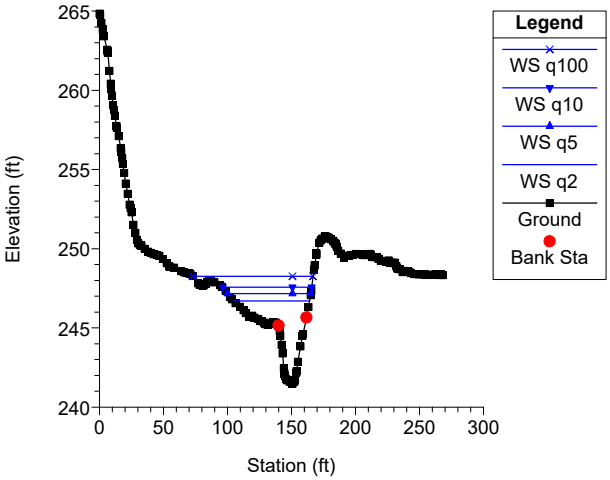

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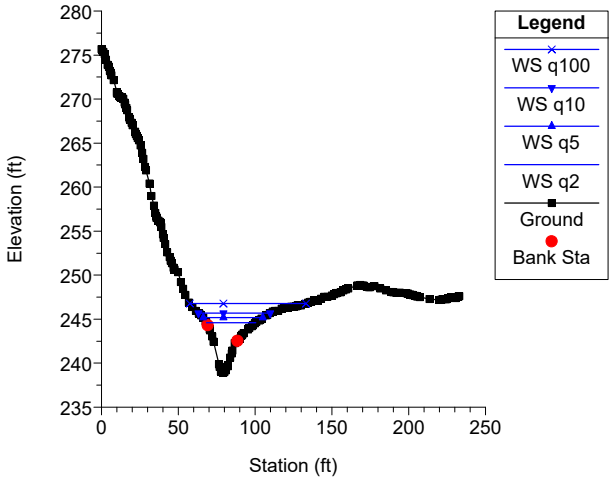

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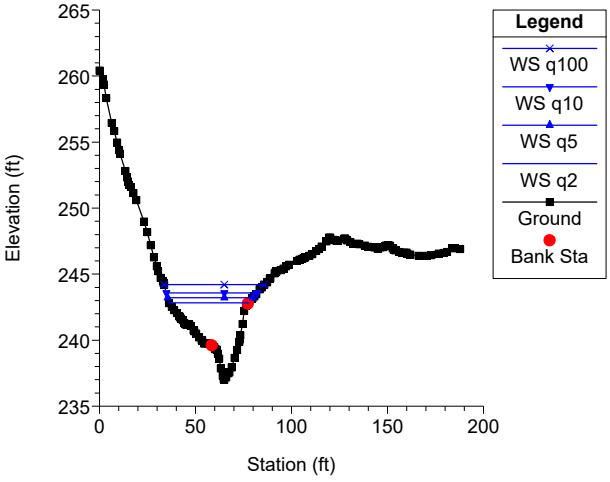

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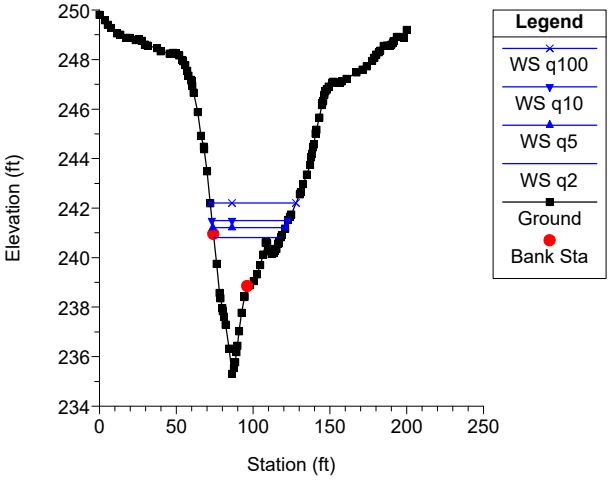

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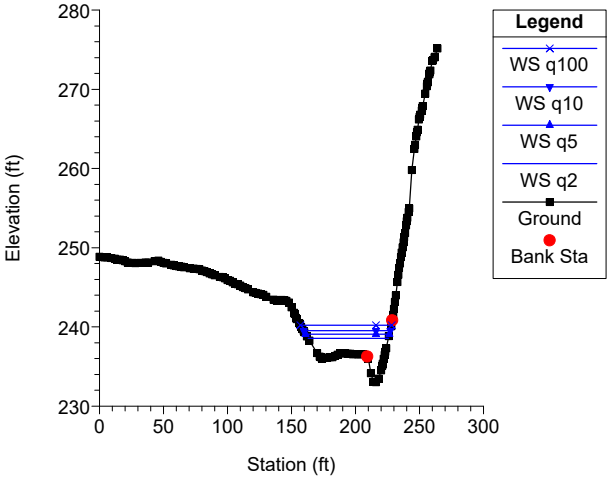

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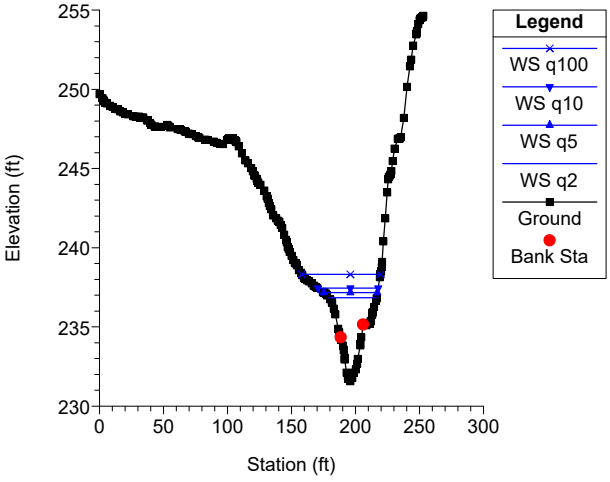

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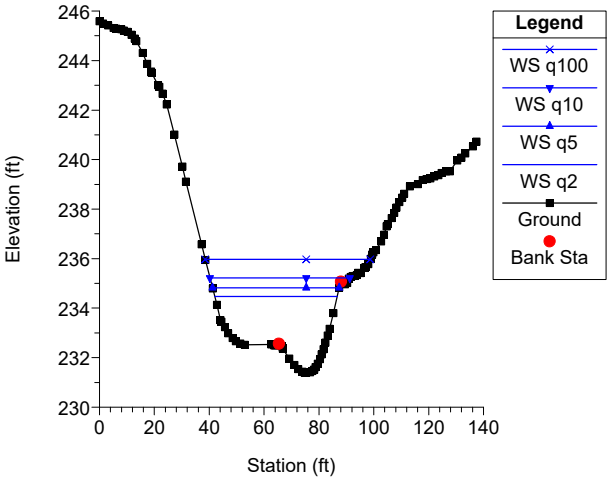

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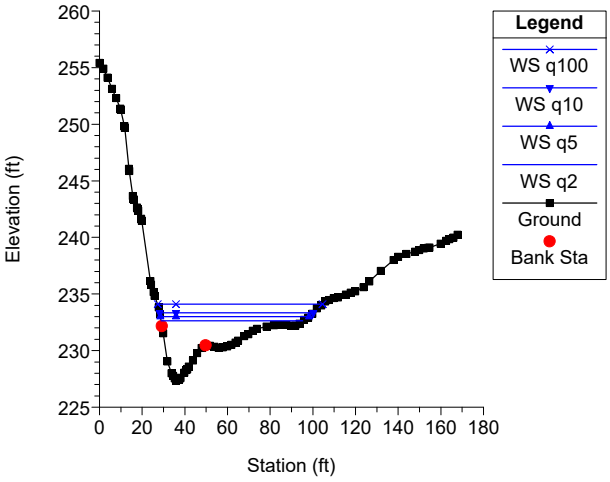

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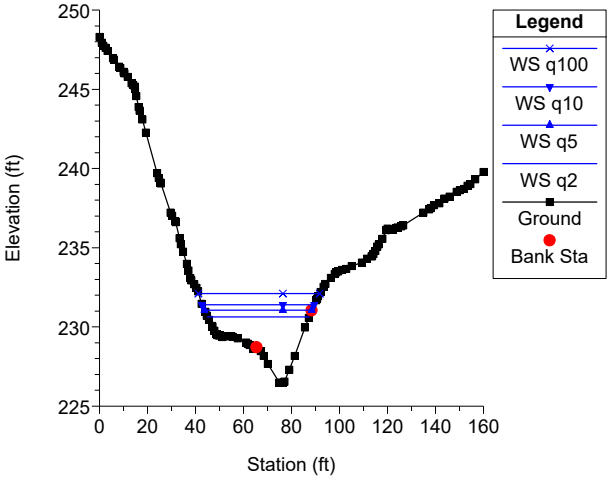

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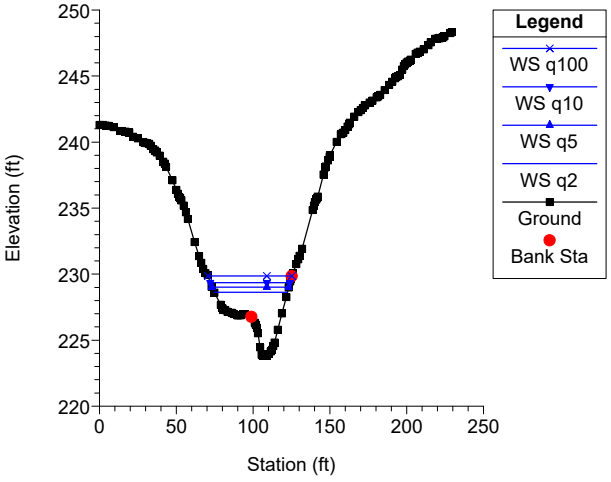

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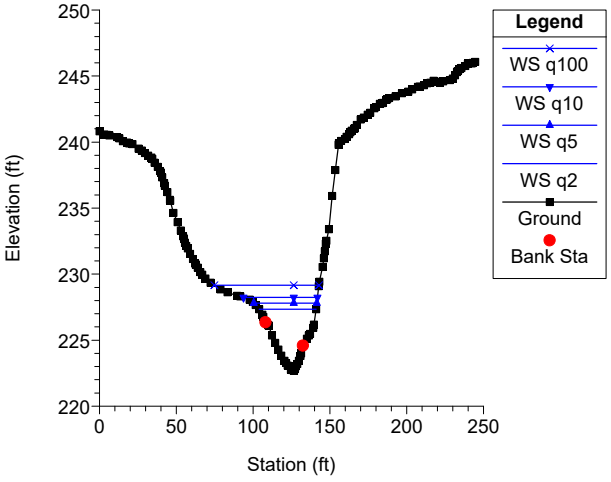

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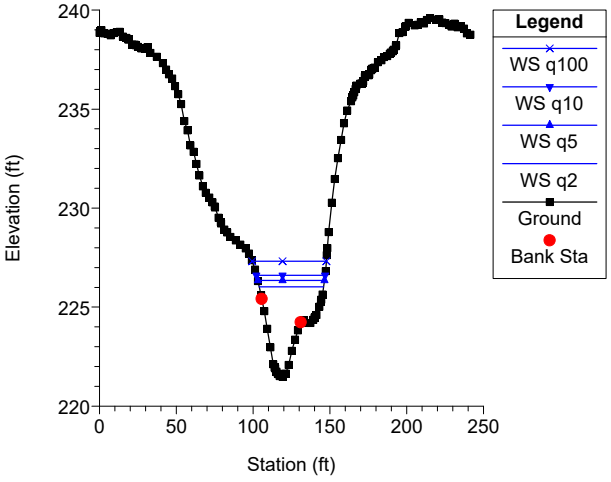

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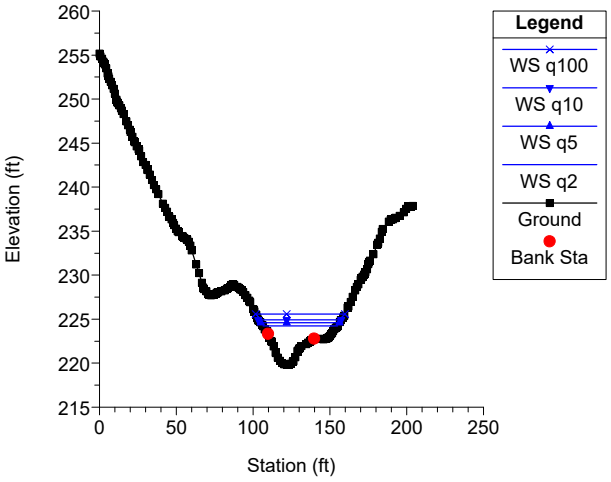

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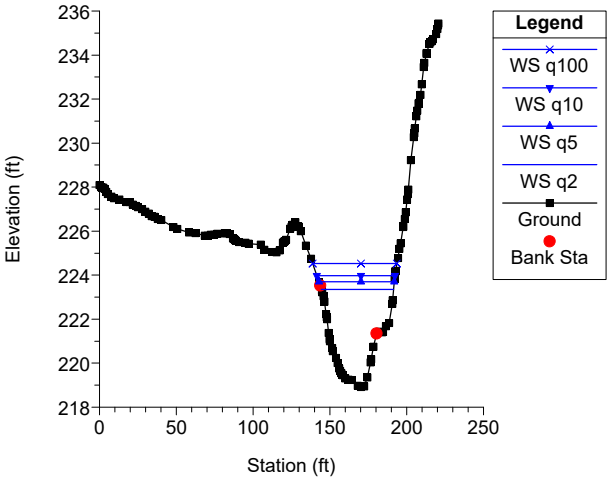

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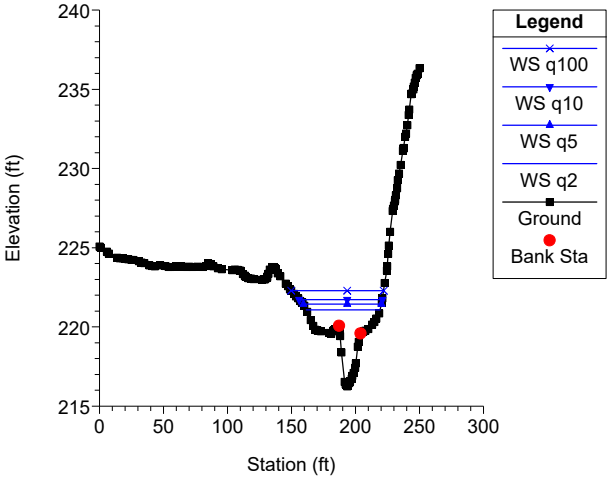

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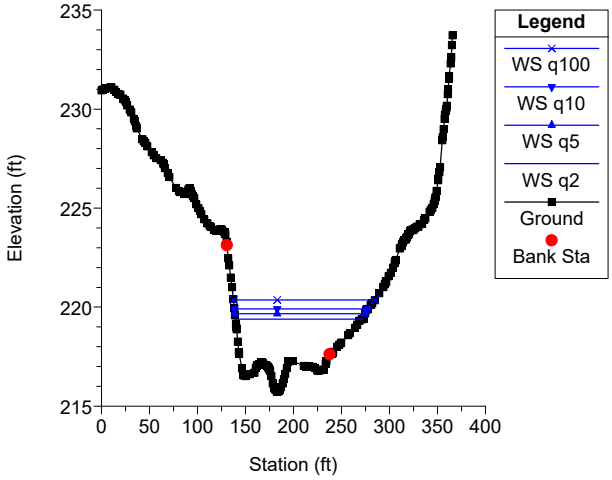

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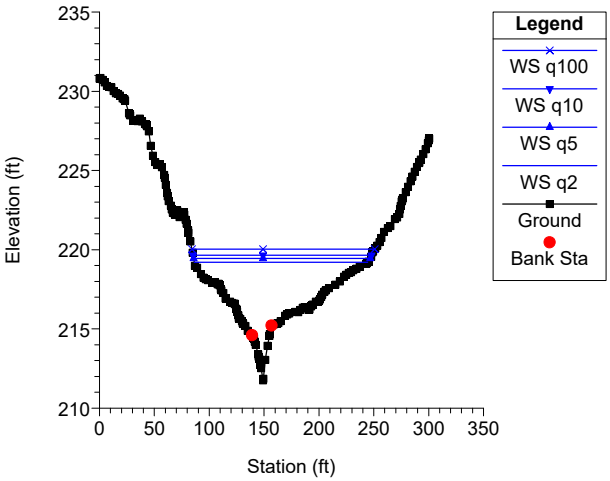

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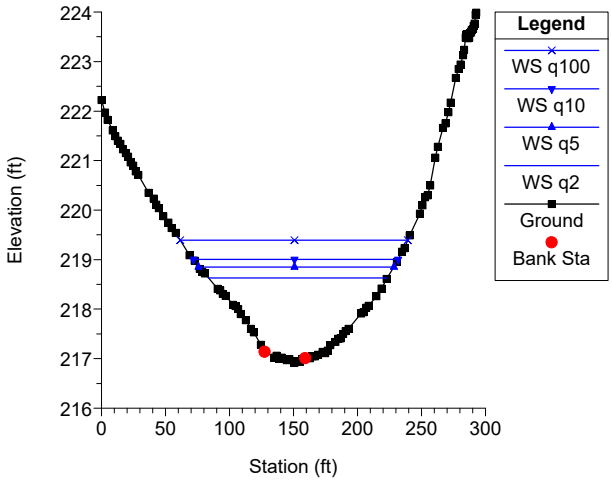

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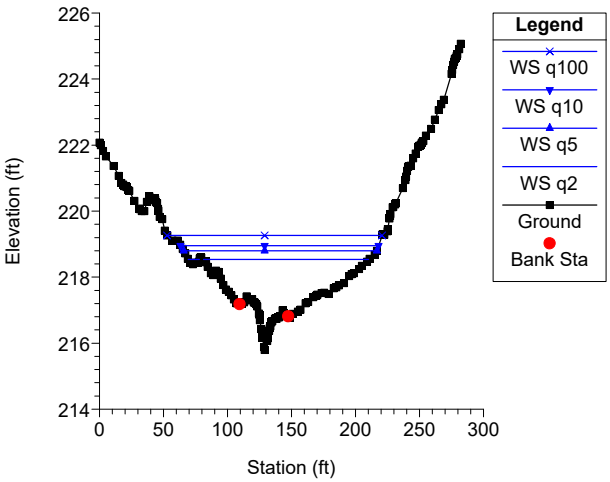

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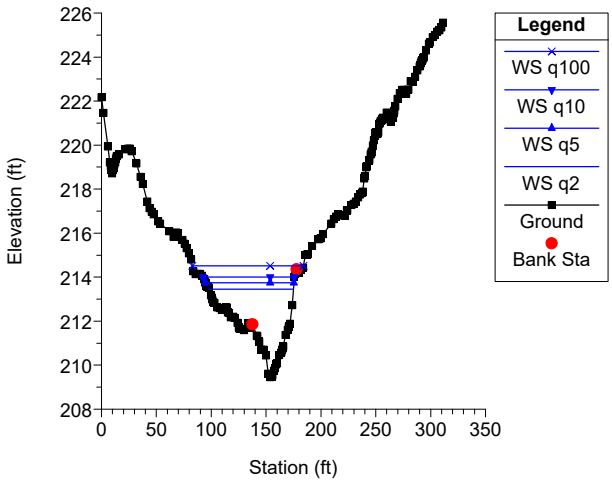

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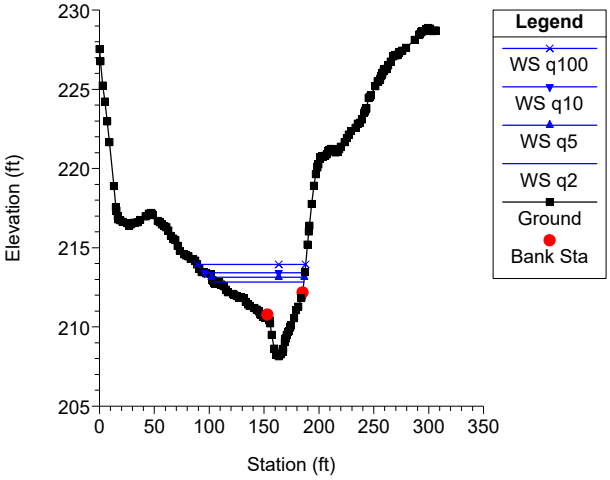

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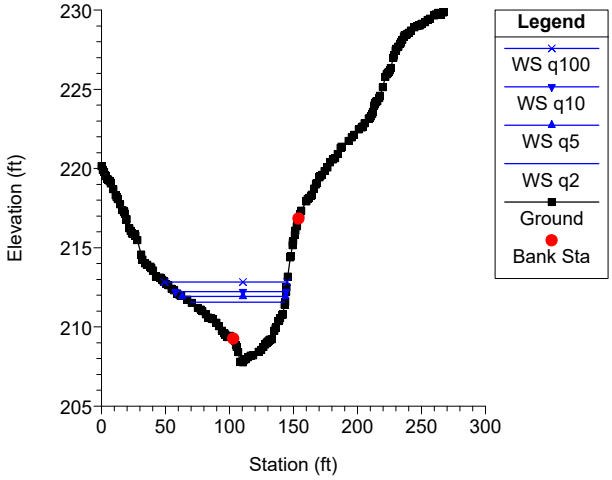

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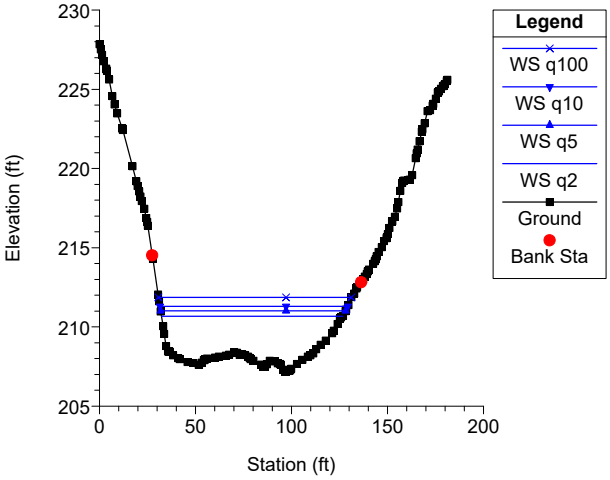

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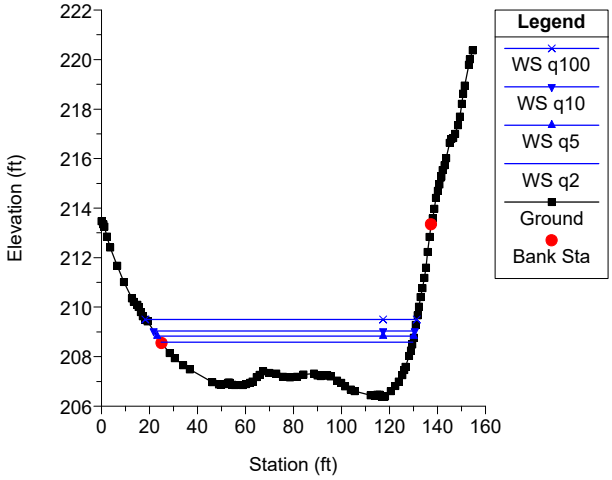

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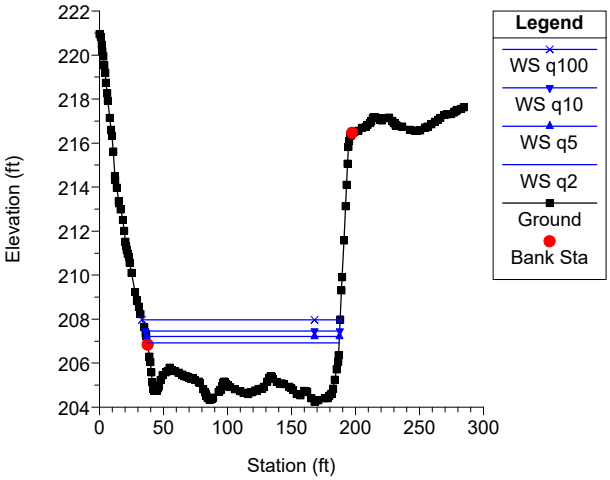

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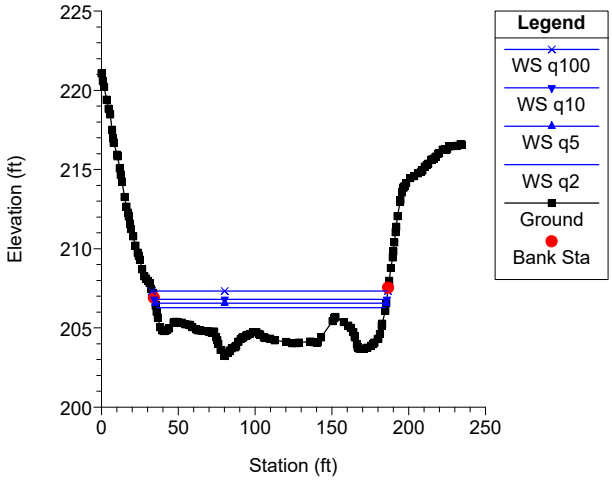

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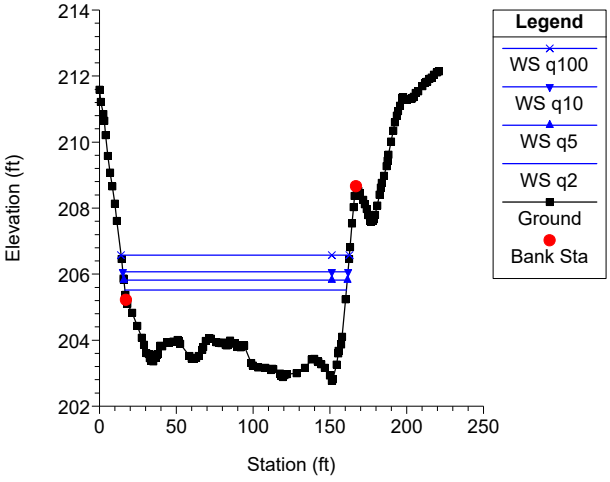

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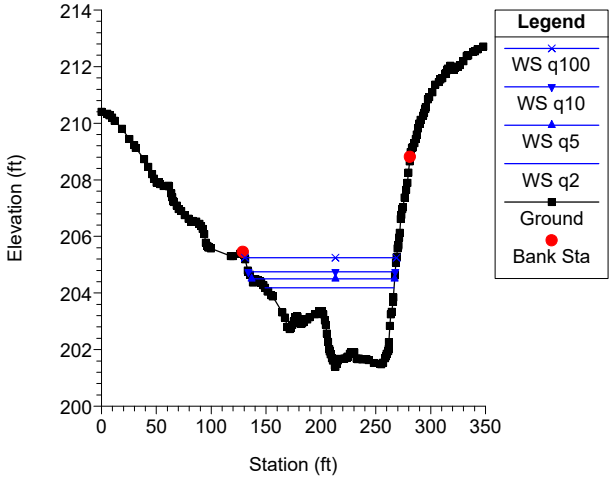

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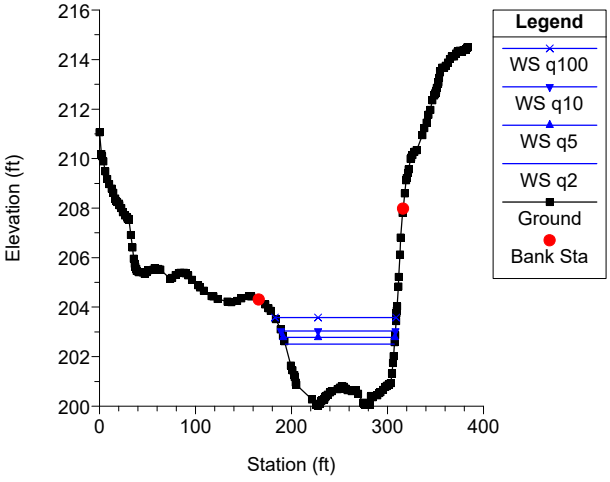

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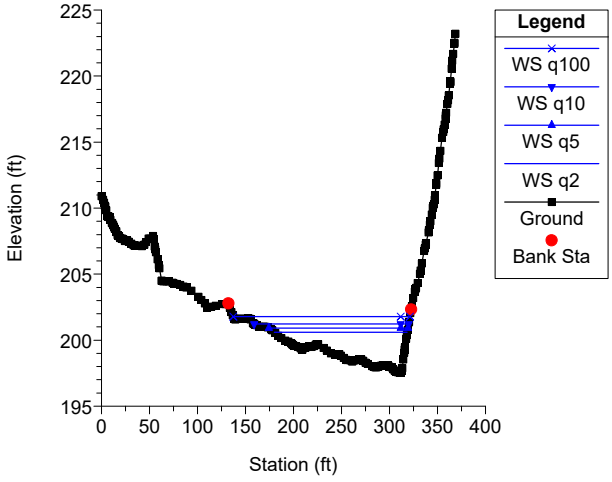

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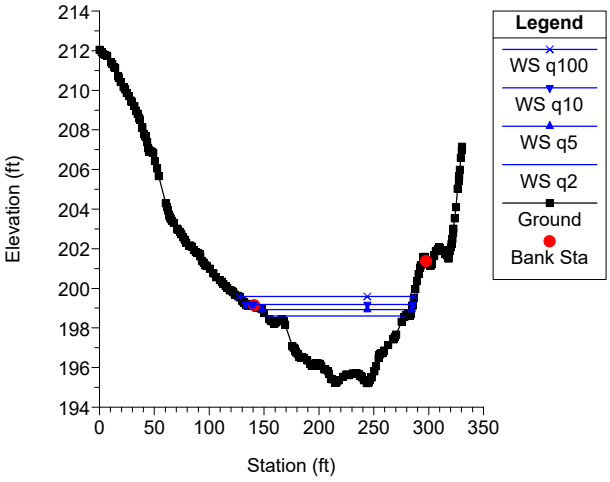

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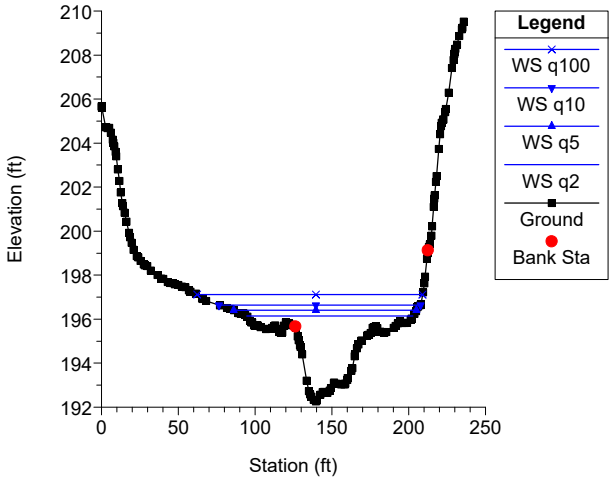

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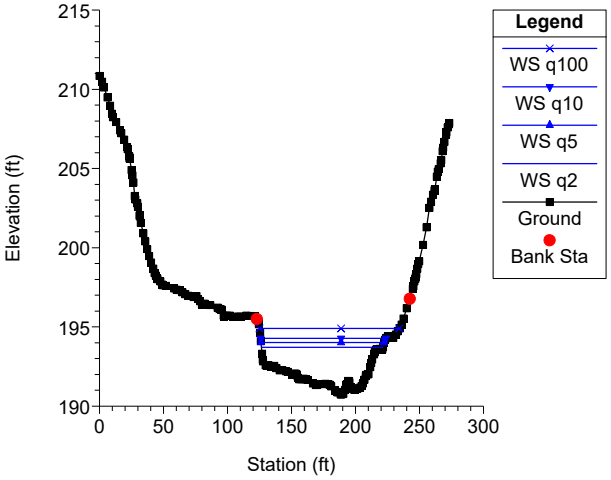

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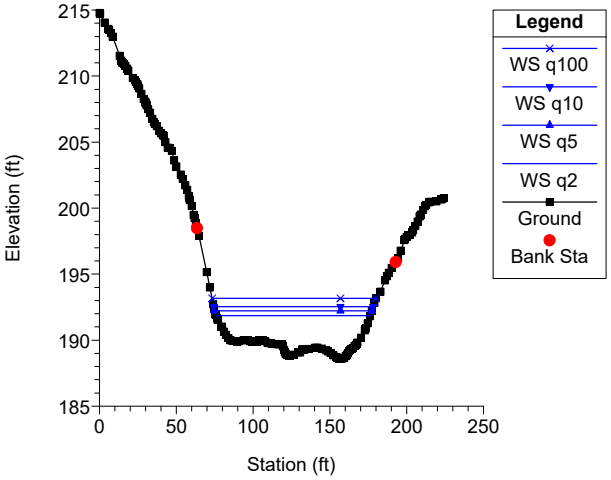

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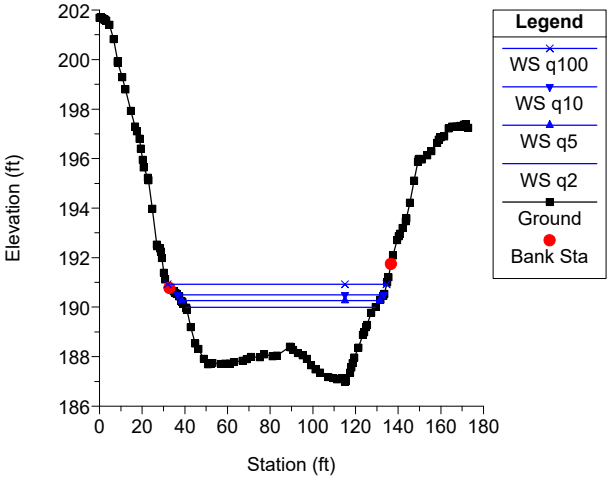

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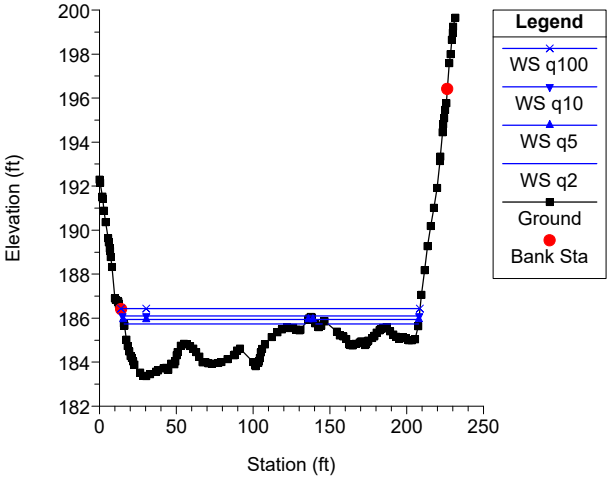

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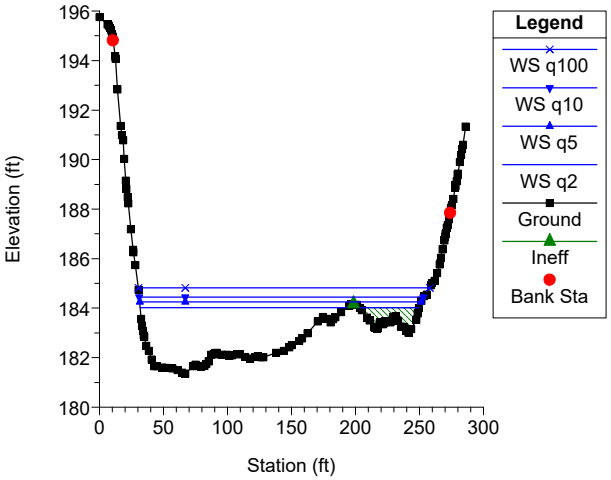

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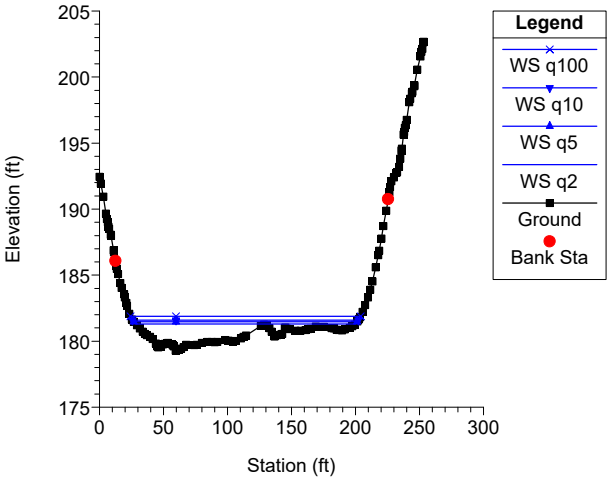

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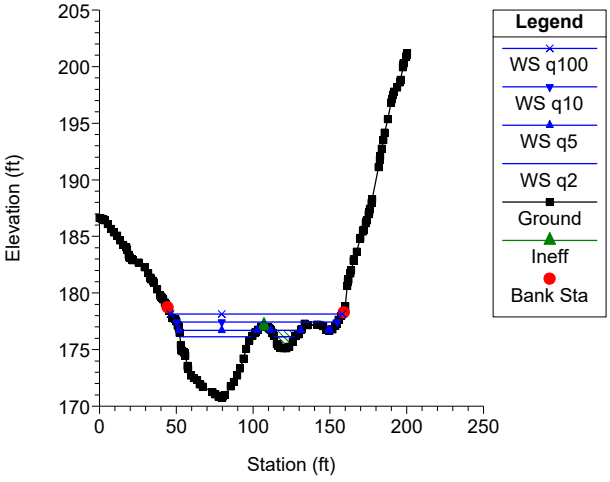

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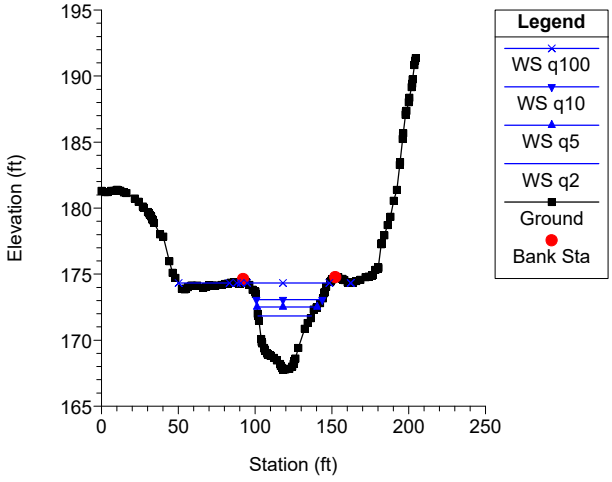

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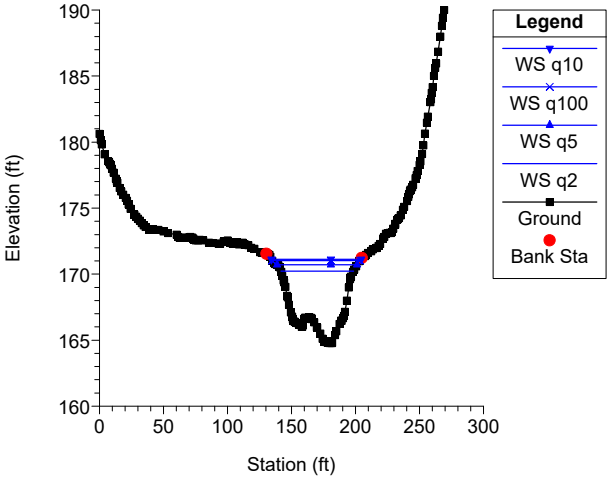

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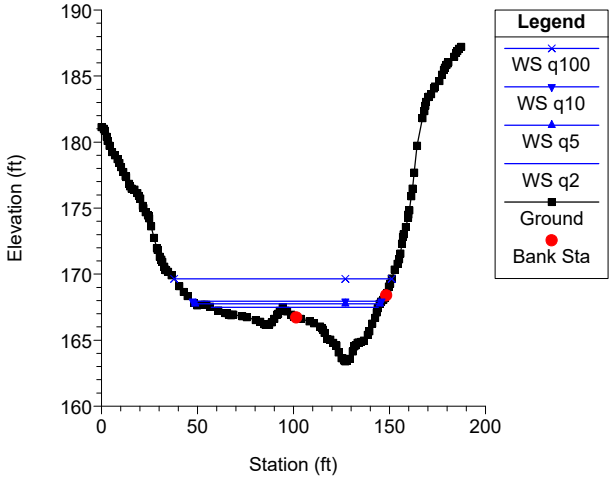

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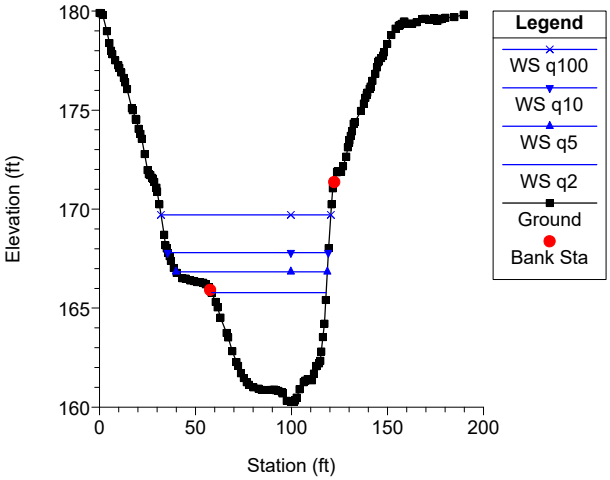

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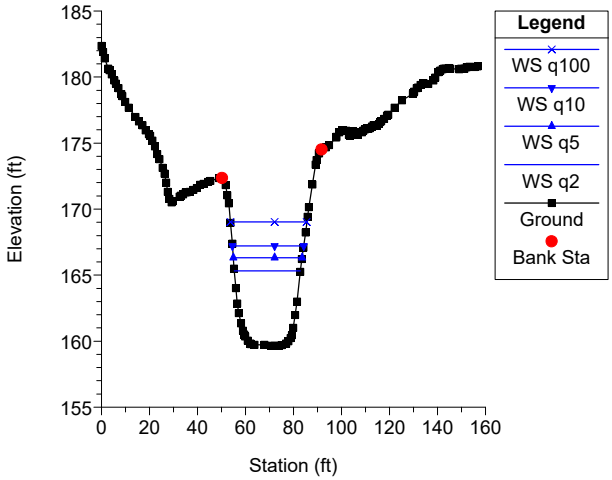

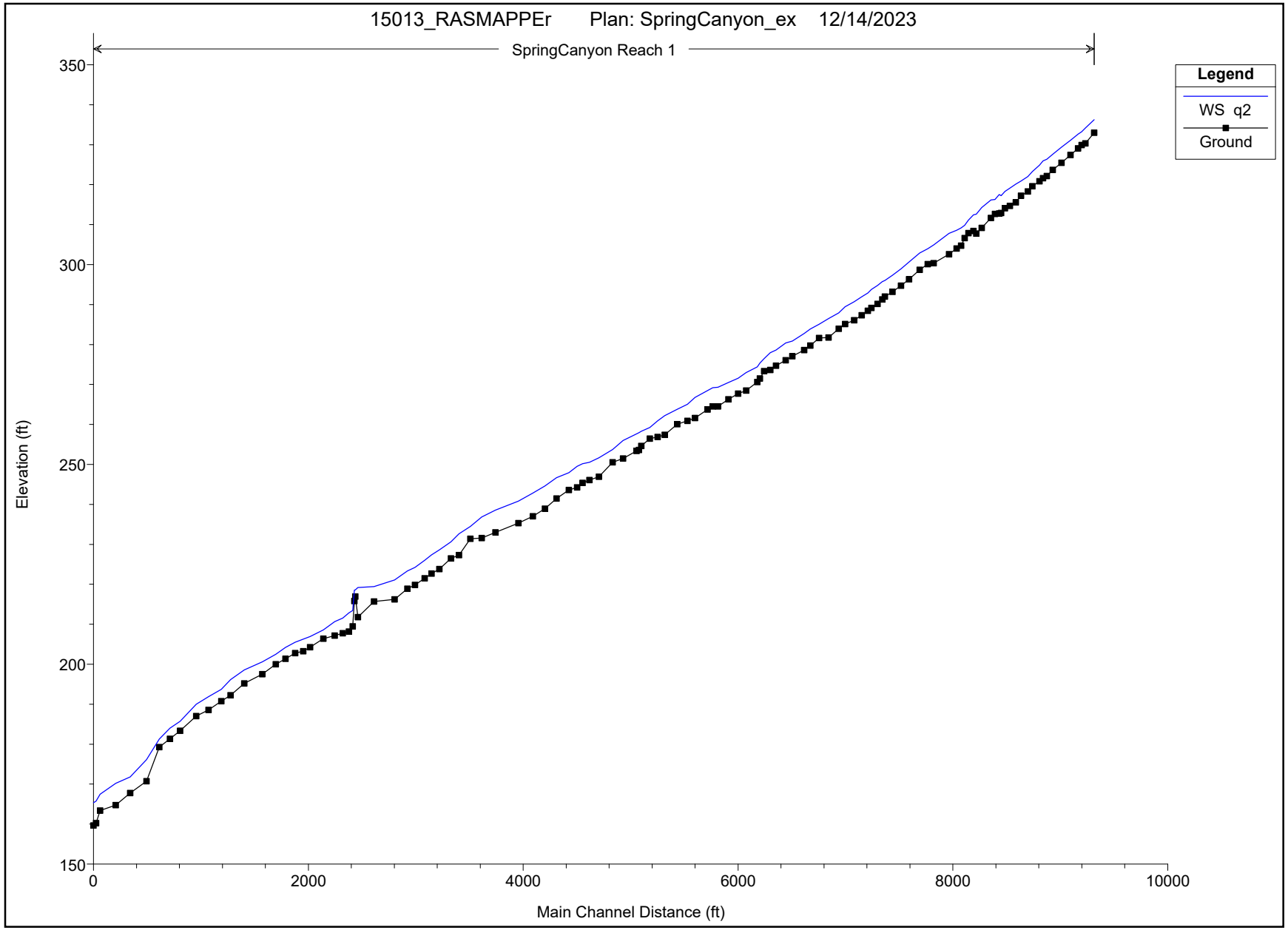
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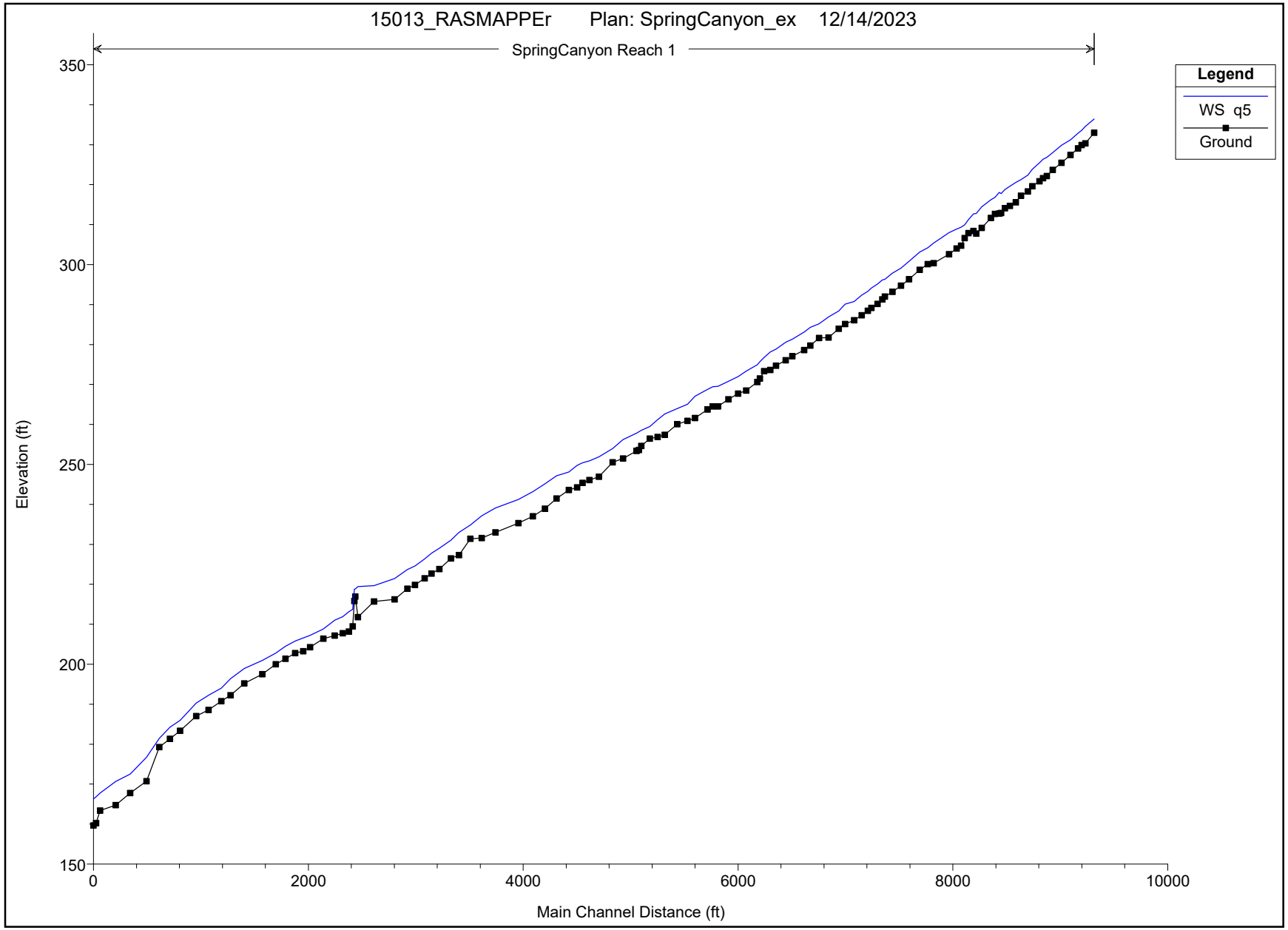
SpringCanyon Reach 1
Legend
WS q2
Ground
Elevation (ft)
350
300
250
200
150
0
2000
4000
6000
8000
10000
Main Channel Distance (ft)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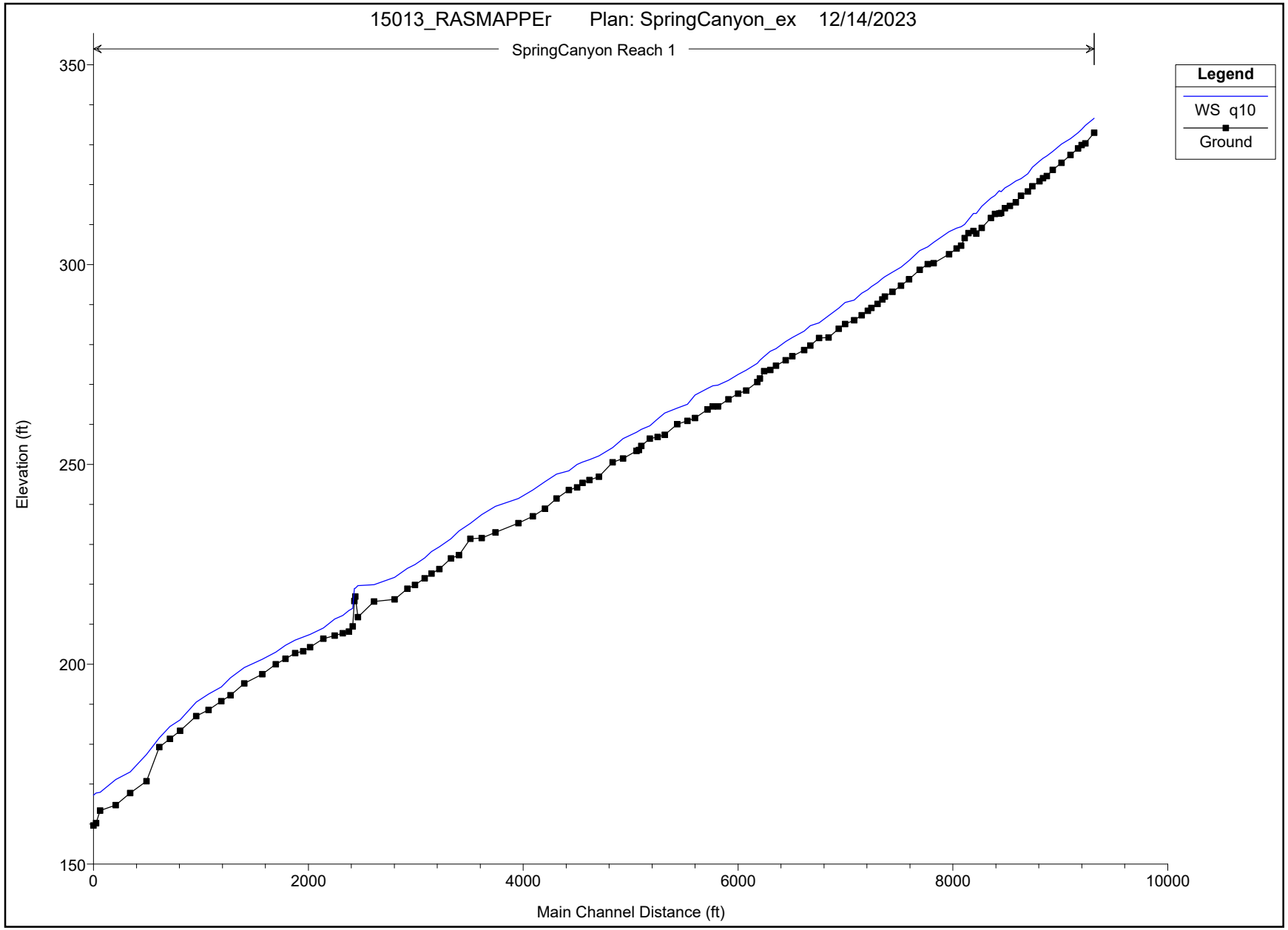
SpringCanyon Reach 1
Legend
WS q5
Ground
Elevation (ft)
350
300
250
200
150
0
2000
4000
6000
8000
10000
Main Channel Distance (ft)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SpringCanyon Reach 1
Legend
WS q10
Ground
Elevation (ft)
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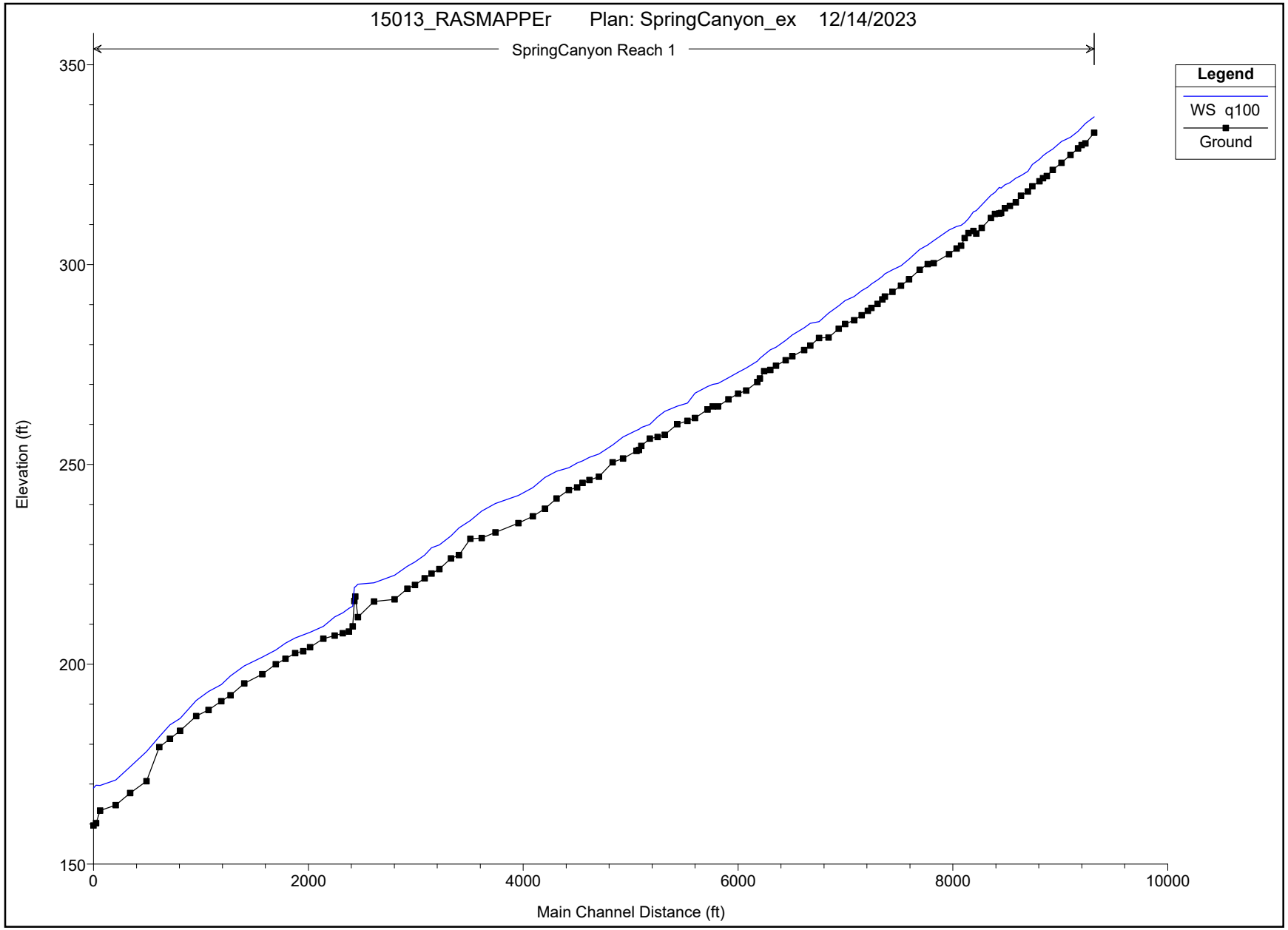
300
250
200
150
0
2000
4000
6000
8000
10000
Main Channel Distance (ft)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SpringCanyon Reach 1
Legend
WS q100
Ground
Elevation (ft)
350
300
250
200
150
0
2000
4000
6000
8000
10000
Main Channel Distance (ft)

ATTACHMENT 2

Spring Canyon 1971 and Present

Image Source: Historic Aerials, USDA (flown May 1953)

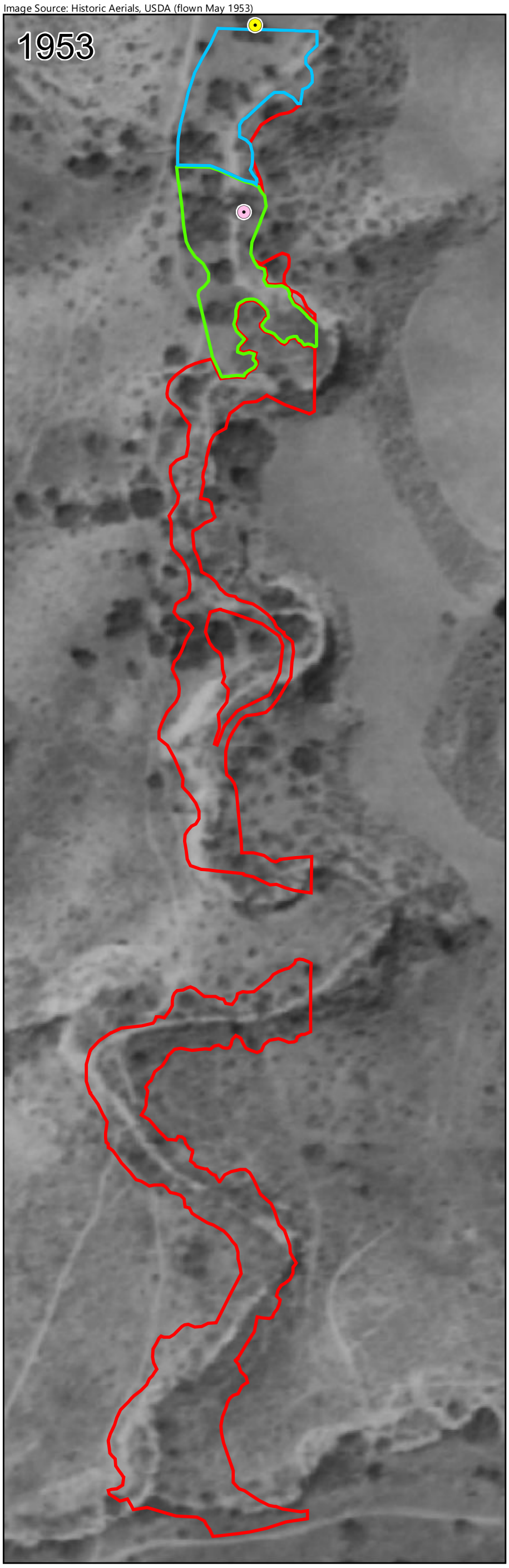

Image Source: Historic Aerials, USGS (flown August 1971)

Wetland Plan Area

- Wetland Creation (Establishment) Area for Nakano
- Wetland Creation (Establishment) as Partial/Potential Mitigation for Southwest Village
- Remainder of Wetland Plan Area

- Lemonade Berry (*Rhus integrifolia*)
- Peruvian Pepper Tree (*Schinus molle*)

0 Feet 130

RECON

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ATTACHMENT 2

Spring Canyon Historical Aerial Photographs

Image Source: Historic Aerials, LandisCor (flown February 1982)

Image Source: Historic Aerials, USGS (flown June 1996)

Wetland Plan Area

- Wetland Creation (Establishment) Area for Nakano
- Wetland Creation (Establishment) as Partial/Potential Mitigation for Southwest Village
- Remainder of Wetland Plan Area

- Lemonade Berry (*Rhus integrifolia*)
- Peruvian Pepper Tree (*Schinus molle*)

0 Feet 130

RECON

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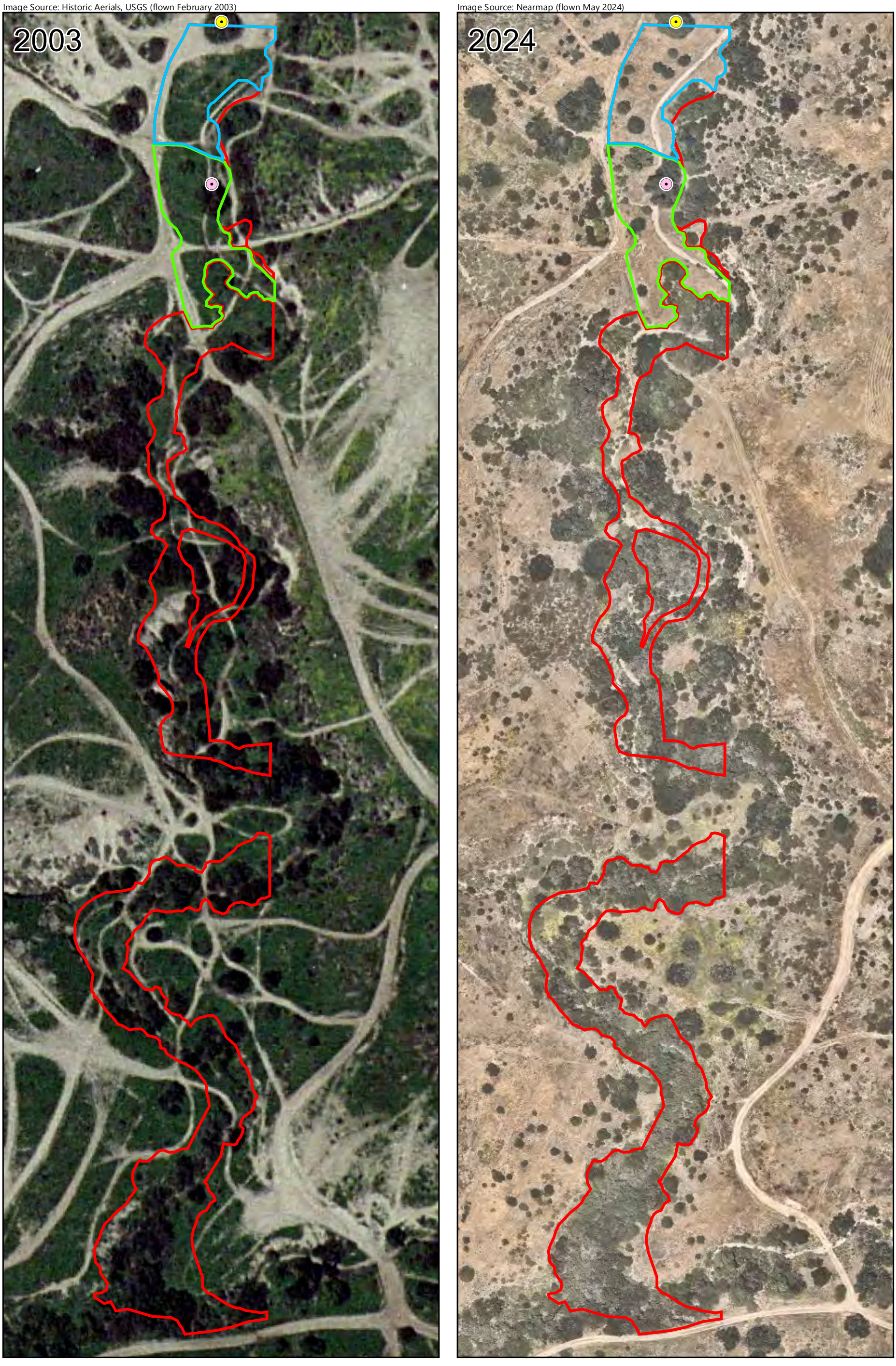
ATTACHMENT 2

Spring Canyon Historical Aerial Photographs

Image Source: Historic Aerials, USGS (flown February 2003)

Image Source: Nearmap (flown May 2024)



Wetland Plan Area

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- Remainder of Wetland Plan Area

- Lemonade Berry (*Rhus integrifolia*)
- Peruvian Pepper Tree (*Schinus molle*)

0 Feet 130

RECON

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ATTACHMENT 2

Spring Canyon Historical Aerial Photographs

ATTACHMENT 3

Summary of Drilling and Groundwater Measurements Nakano and Southwest Village Mitigation Areas, San Diego, California

Project No. 06847-42-08
July 11, 2024

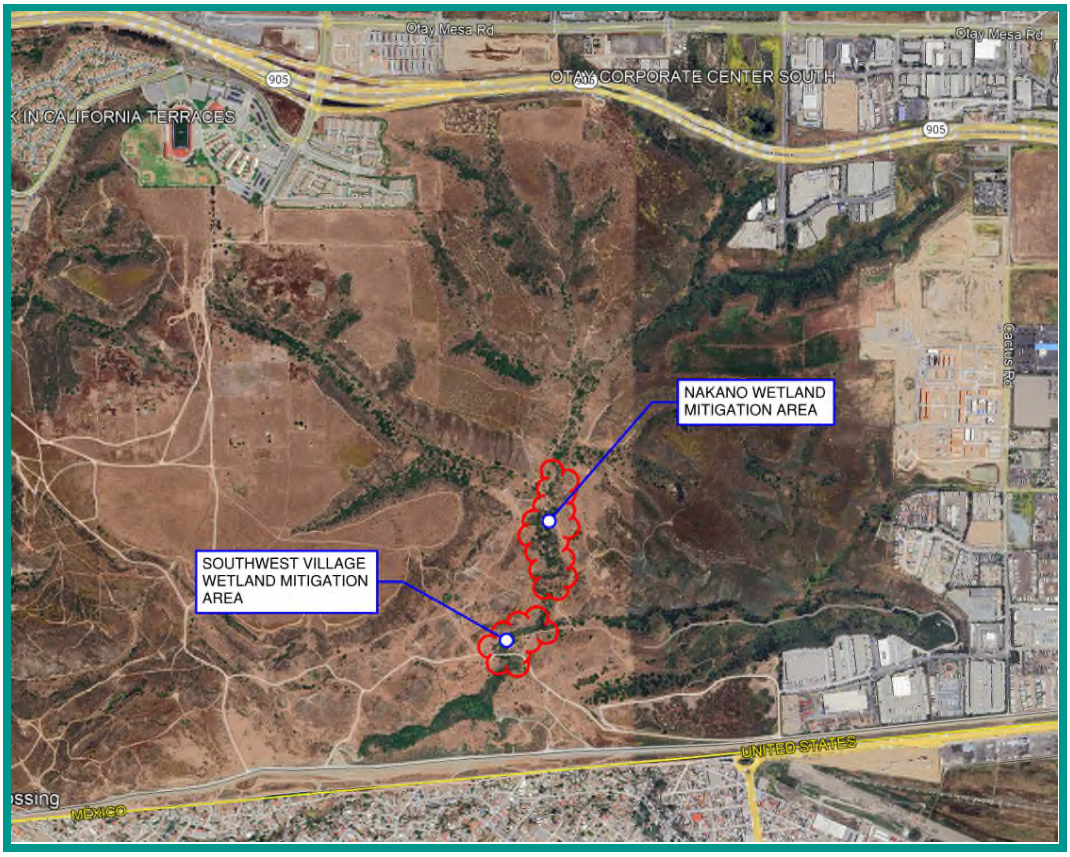
Tri Pointe Homes
13520 Evening Creek Drive North, Suite 300
San Diego, California 92128

Attention: Mr. Allen Kashani

Subject: SUMMARY OF DRILLING AND GROUNDWATER MEASUREMENTS
NAKANO AND SOUTHWEST VILLAGE WETLAND MITIGATION AREAS
SAN DIEGO, CALIFORNIA

Dear Mr. Kashani:

In accordance with your request, we have prepared this letter to summarize drilling and groundwater depth measurements performed for the proposed Nakano and Southwest Village wetland mitigation areas. The approximate locations of the mitigation areas is shown on the Vicinity Map below.



Vicinity Map

Boring locations were determined by Recon Environmental. Boring locations are shown on the Site Plan, Figure 1. Logs of the borings are appended.

Drilling began on June 3, 2024, using a tripod drill rig equipped with 6-inch, solid flight augers. Due to abundant cobble, refusal was encountered at depths between 2 feet and 7.5 feet. We were able to advance one boring to a dept of 15 with the tri-pod rig (Boring B-1)

On June 5 and 6, 2024, we performed drilling with a track-mounted limited access drill rig equipped with an 18-inch auger and core barrel. Borings B-2 through B-5 were drilled using this drill rig. The borings were drilled to depths ranging from 7 feet to 18 feet. Table I summarizes the borings and depths where groundwater was encountered. At B-5 the drill rig had a mechanical breakdown and the boring was terminated at a depth of 7 feet.

Based on the exploratory borings, we found groundwater at depths ranging from approximately 7.5 feet to 15 feet below ground surface. Although we were not able to drill borings in the proposed Southwest Village wetland mitigation area due to sensitive habitat, it is our opinion that the groundwater depth would be similar to what we encountered in the Nakano wetland mitigation area considering their proximity.

Should you have any questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Noel G. Borja
Project Engineer

Rodney C. Mikesell
GE 2533

NGB:RCM:am

Attachments: Figure 1, Site Plan
Logs of Borings, GW-3 and LB-1 through LB-4

(e-mail) Addressee

TABLE I
SUMMARY OF BORINGS AND GROUNDWATER MEASUREMENTS

Boring No.	Total Drill Depth (feet)	Measured Groundwater Depth (feet)
B-1	15	10.8
B-2	11.5	7.5*
B-3	18	15**
B-4	17	10.5*

*Depth measured from creek bottom
**Seepage encountered

NAKANO AND SOUTHWEST VILLAGE WETLAND MITAGATION AREAS SAN DIEGO, CALIFORNIA

0’ 50’ 100’ 150’ 200’

SCALE 1”=100’(on 11x17)

GEOCON LEGEND

B-5 .....APPROX. LOCATION OF EXPLORATORY BORING

THE GEOGRAPHICAL INFORMATION MADE AVAILABLE FOR DISPLAY WAS PROVIDED BY GOOGLE EARTH, SUBJECT TO A LICENSING AGREEMENT. THE INFORMATION IS FOR ILLUSTRATIVE PURPOSES ONLY; IT IS NOT INTENDED FOR CLIENT'S USE OR RELIANCE AND SHALL NOT BE REPRODUCED BY CLIENT. CLIENT SHALL INDEMNIFY, DEFEND AND HOLD HARMLESS GEOCON FROM ANY LIABILITY INCURRED AS A RESULT OF SUCH USE OR RELIANCE BY CLIENT.

BORING LOCATION MAP

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

PROJECT NO. 06847 - 42 - 08
FIGURE 1
DATE 07 - 11 - 2024

Plotted:07/11/2024 12:35PM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\06847-42-08 (Southwest Village Wetlands)\SHEETS\06847-42-08 Boring Location Map.dwg

PROJECT NO. 06847-42-08

BORING B 1

ELEV. (MSL.) **273'** DATE COMPLETED **06/03/2024**

EQUIPMENT **Tripod Drill Rig w/ 6" SFA** BY: **N. BORJA**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**ALLUVIUM (Qal)** Loose, dry to damp, grayish brown to dark brown, Silty, fine to medium SAND			
2								
4				SC	Loose, moist, dark grayish brown, Clayey, fine to medium SAND; few gravel and cobble			
6				CL	Soft to firm, moist, dark brown, Silty CLAY			
8								
10			▼		-Becomes wet			
12				CL	Soft to firm, saturated, light brown, Sandy CLAY			
14								
					BORING TERMINATED AT 15 FEET Groundwater encountered at 10.5 feet Backfilled on 06/03/2024			

Figure A-1,
Log of Boring B 1, Page 1 of 1

06847-42-08.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. 06847-42-08

BORING B 2

ELEV. (MSL.) **271'** DATE COMPLETED **06/05/2024**

EQUIPMENT **LAR w/ 18" Auger** BY: **N. BORJA**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				GP	**ALLUVIUM (Qal)** Loose to medium dense, moist, dark brown, Sandy GRAVEL; some cobble up to 12" in diameter; some silt			
2				CL	Firm, moist, dark brown, Sandy CLAY; some gravel and cobble up to 8" in diameter -Becomes brown to olive brown			
4								
6				SC	Firm, moist, dark grayish brown, Silty to Sandy CLAY; few gravel and cobble			
8			▼		-Groundwater measured on 06/06/2024			
10								
					BORING TERMINATED AT 11.5 FEET Static groundwater encountered at 7.5 feet Backfilled on 06/05/2024			

06847-42-08.GPJ

Figure A-2,
Log of Boring B 2, Page 1 of 1

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ▼ ... WATER TABLE OR ▽ ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. 06847-42-08

BORING B 3

ELEV. (MSL.) **270'** DATE COMPLETED **06/06/2024**

EQUIPMENT **LAR w/ 18" Auger** BY: **N. BORJA**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**TOPSOIL** Loose, dry to damp, light grayish brown, Silty, fine to medium SAND; few gravel and cobble up to 6" in diameter			
2								
				SM	**ALLUVIUM (Qal)** Loose, damp, grayish brown, Silty, fine to medium SAND; trace gravel and cobble			
4					-Becomes dark gray			
6					-Becomes medium dense, brown to grayish brown, fine- to coarse-grained; few mica			
8					-Boulder up to 15" in diameter encountered at 7 feet			
				SC	**OTAY FORMATION (To)** Medium dense, moist, light grayish brown, Clayey, fine to medium SAND; few gravel and cobble			
10				ML	Stiff, damp light olive brown, Sandy SILT			
12				SM	Medium dense, moist to wet, light olive brown, Silty, fine to coarse SAND; trace gravel			
14			▽		-Minor seepage			
				CL	Stiff, damp, pink to light pink, Silty to Sandy CLAY			
16								
				ML	Stiff, moist, olive brown, Sandy SILT			
18					BORING TERMINATED AT 18 FEET Minor seepage encountered at approx. 15 feet Backfilled on 06/06/2024			

Figure A-3,
Log of Boring B 3, Page 1 of 1

06847-42-08.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ▽ ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. 06847-42-08

BORING B 4

ELEV. (MSL.) **267'** DATE COMPLETED **06/06/2024**

EQUIPMENT **LAR w/ 18" Auger** BY: **N. BORJA**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**ALLUVIUM (Qal)** Loose, dry to damp, light grayish brown, Silty SAND; little gravel and cobble			
2					-Becomes damp, dark brown gray; metal debris encountered			
				CL	Soft to firm, moist, dark brown, Sandy CLAY; some gravel and cobble up to 4" in diameter			
4								
6								
8								
10			▼		-Becomes dark olive brown with gravel and cobble			
12				CL	**OTAY FORMATION (To)** Stiff, moist, grayish brown, Sandy CLAY; trace gravel and cobble			
14				SC	Medium dense, wet, grayish brown, Clayey, fine to medium SAND; trace gravel and cobble -Excavates with caliche staining			
16				ML	Stiff, moist to wet, light grayish brown, Sandy SILT			
					BORING TERMINATED AT 17 FEET Groundwater encountered at 10.5 feet			

Figure A-4,
Log of Boring B 4, Page 1 of 1

06847-42-08.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ▼ ... WATER TABLE OR ▽ ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. 06847-42-08

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 5** ELEV. (MSL.) **266'** DATE COMPLETED **06/06/2024** EQUIPMENT **LAR w/ 18" Auger** BY: **N. BORJA**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**ALLUVIUM (Qal)** Loose, dry to damp, grayish brown to dark grayish brown, Silty, fine to medium SAND; few gravel and cobble up to 4" in diameter			
2								
				SC	Loose, moist, dark brown, Clayey, fine to coarse SAND; some gravel and cobble up to 10" in diameter; some silt			
4					-Difficult drilling due to rock			
6								
					BORING TERMINATED AT 7 FEET Mechanical breakdown on drilling Backfilled on 06/06/2024			

Figure A-5,
Log of Boring B 5, Page 1 of 1

06847-42-08.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

ATTACHMENT 2

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.

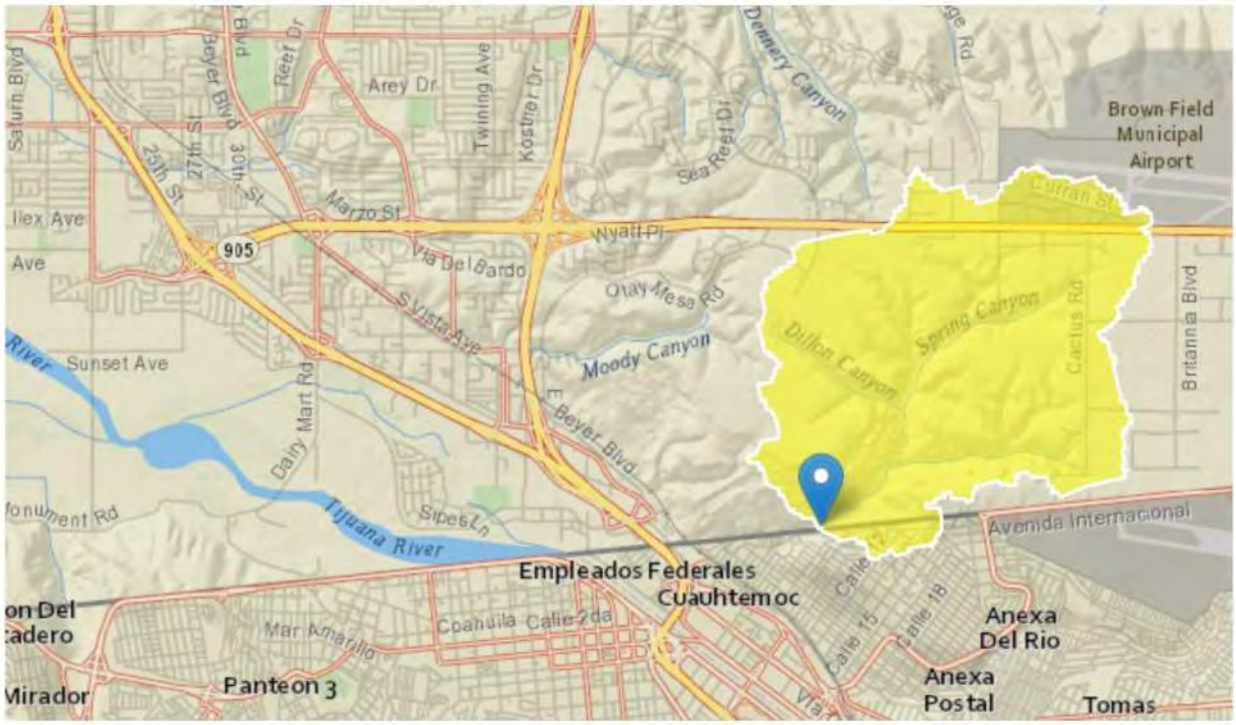


Figure 1: USGS StreamStats Spring Canyon Basin Delineation

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.

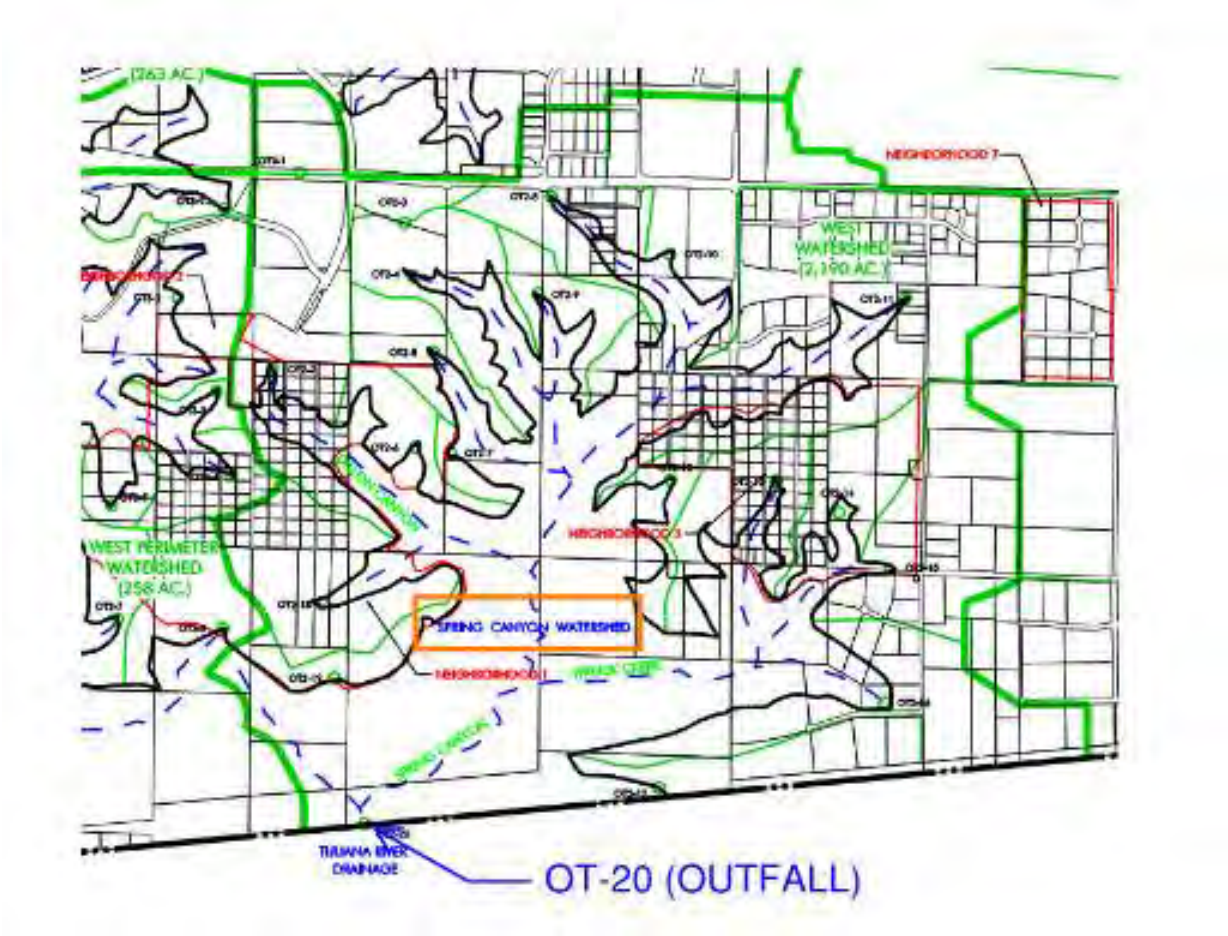


Figure 2: Drainage Map Excerpt of West Watershed (Kimley-Horn, 2007)

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.

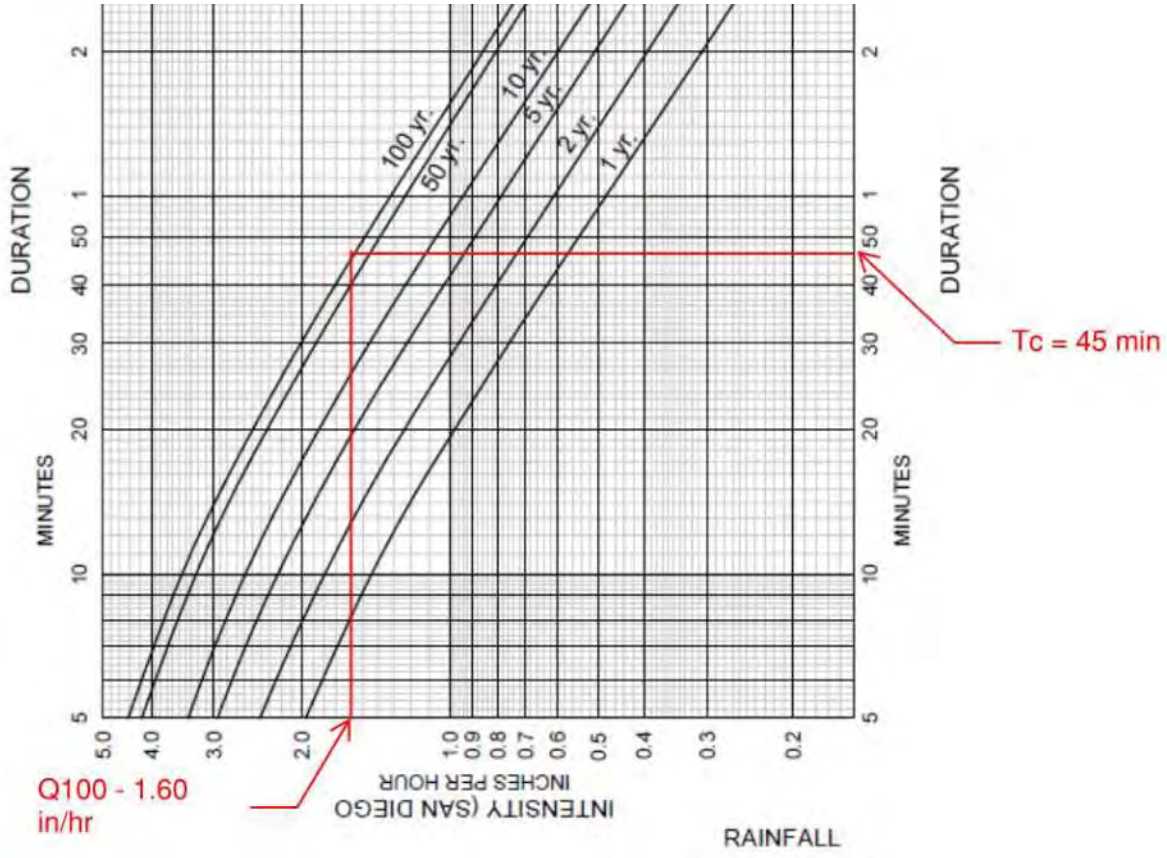


Figure 4: Tc Calculation from City of San Diego Intensity-Duration-Frequency Chart

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.

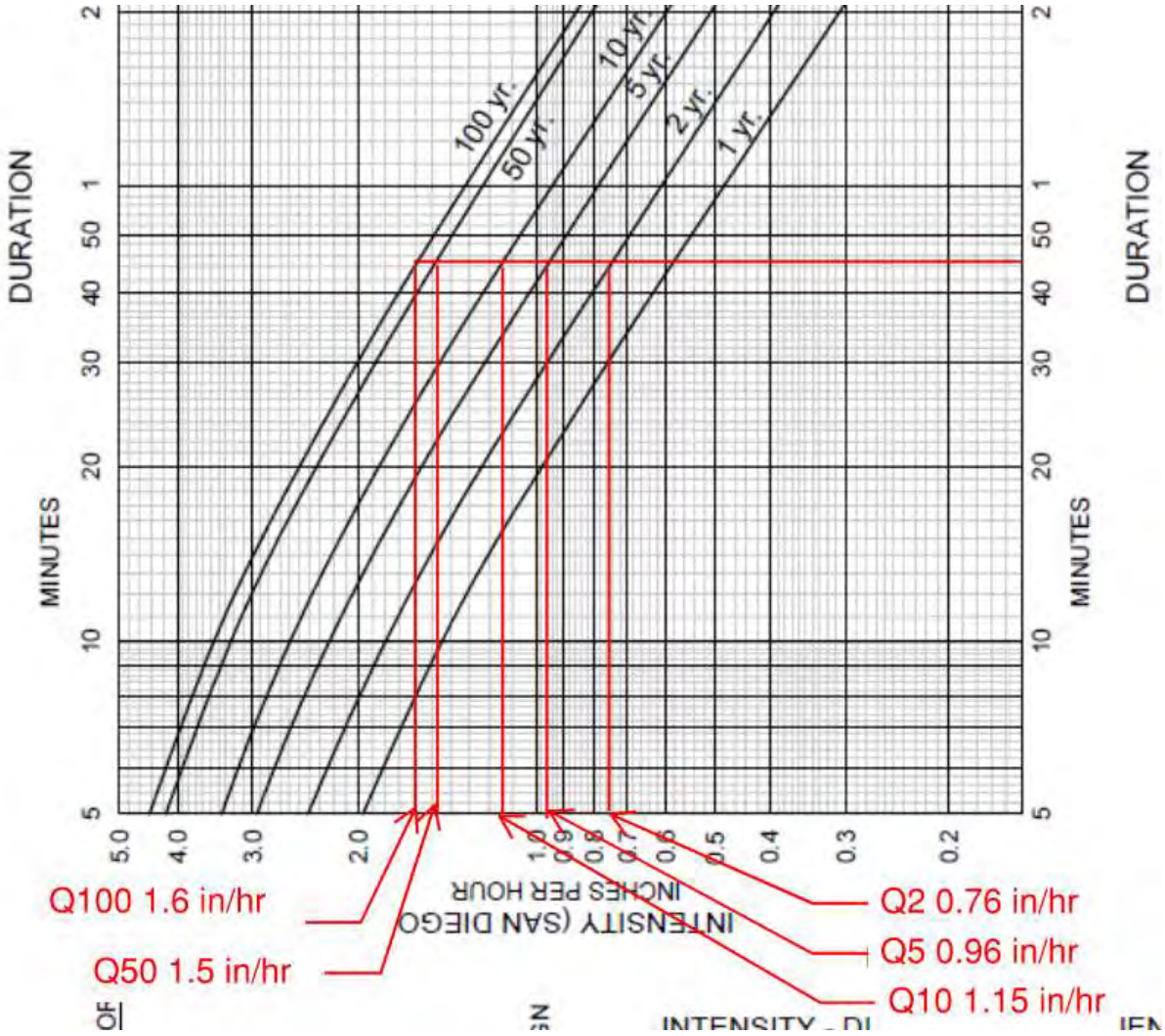


Figure 5: Overall Spring Canyon Watershed Intensity, City of San Diego IDF Chart

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.

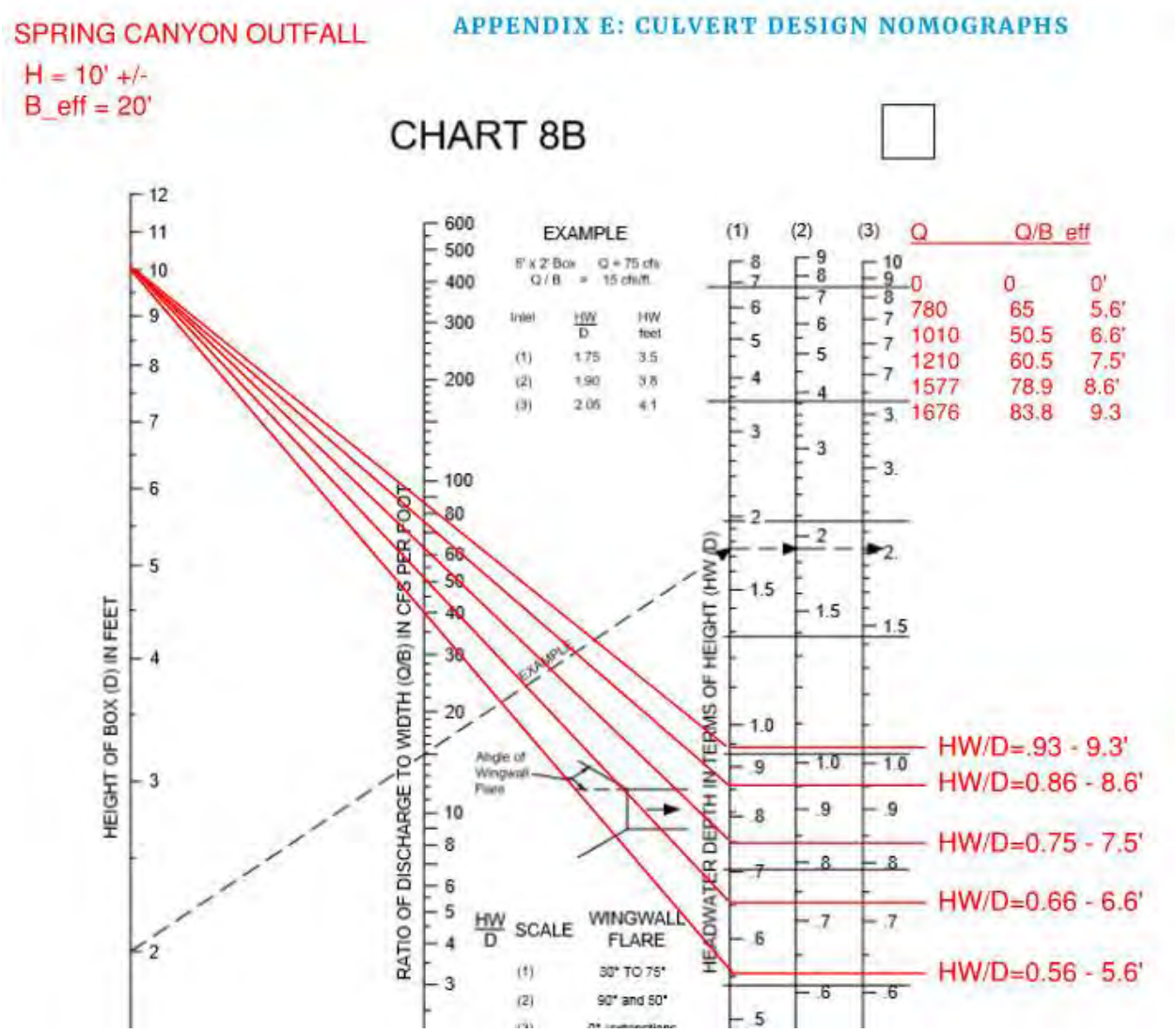


Figure 6: Inlet-Control Nomograph for Downstream Boundary Condition

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.

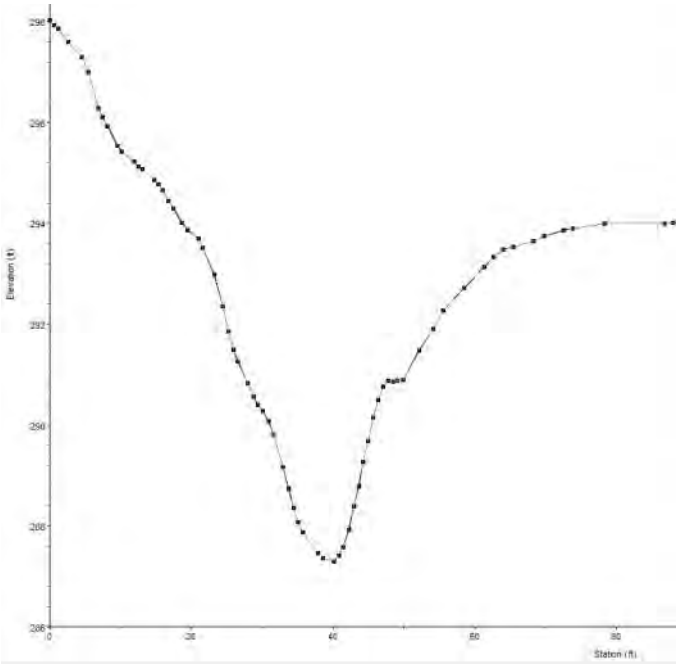


Figure 7: Upstream Cross-Section (7240) Showing Well-Defined Valley

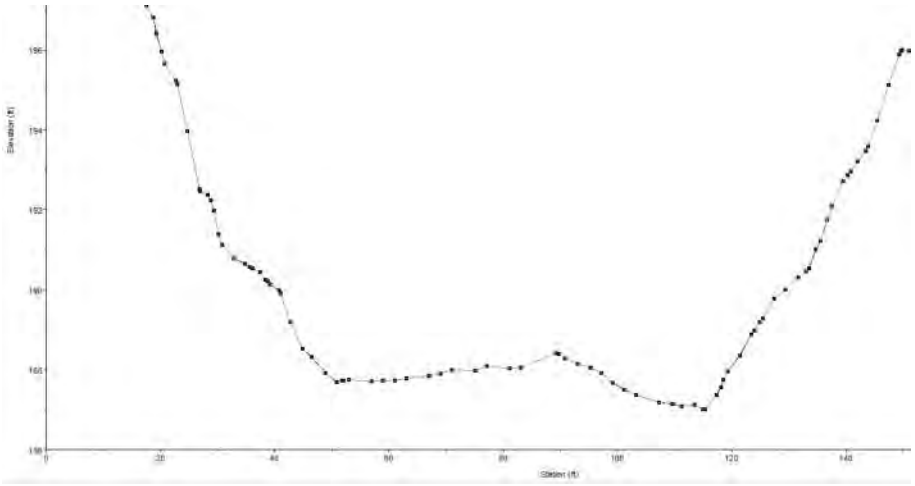


Figure 8: Downstream Cross-Section (1045) Showing Less Well-Defined Valley

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.

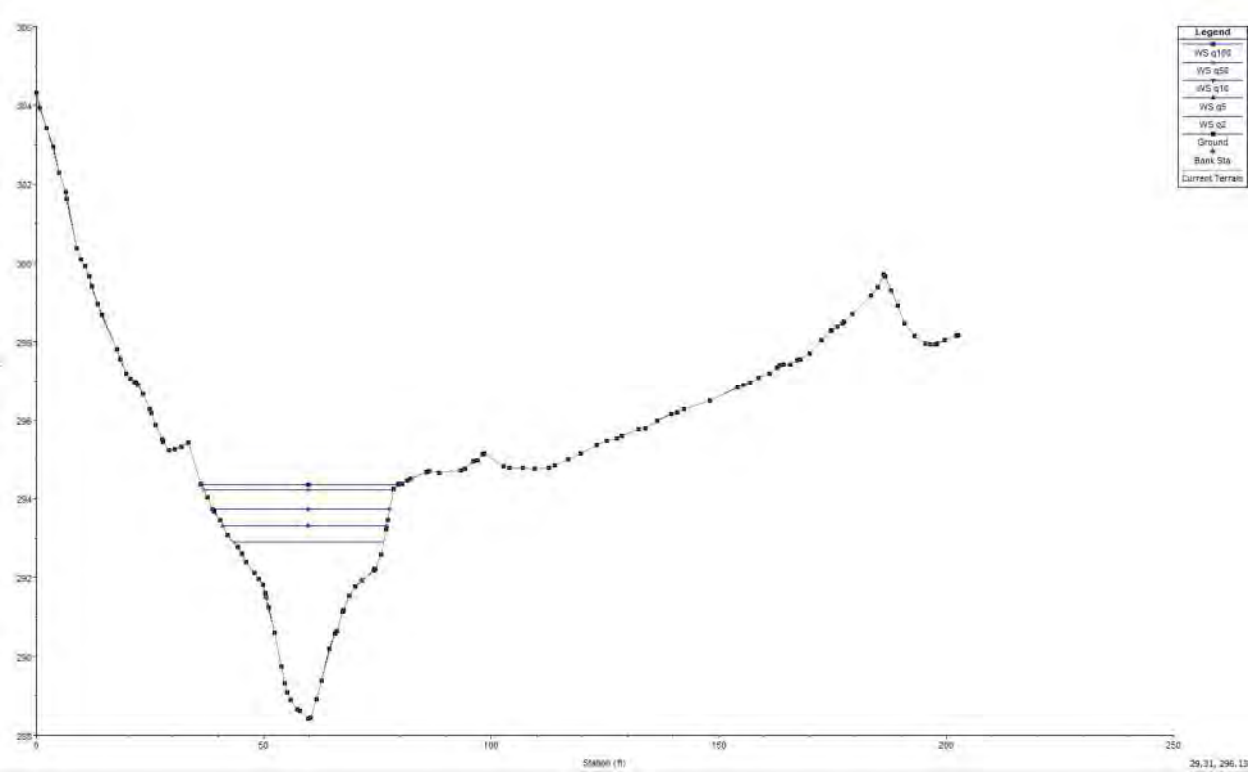


Figure 9: Steeper Valey Cross-Section Geometry (STA 7295) with Little Variation in Floodplain Inundation Extents

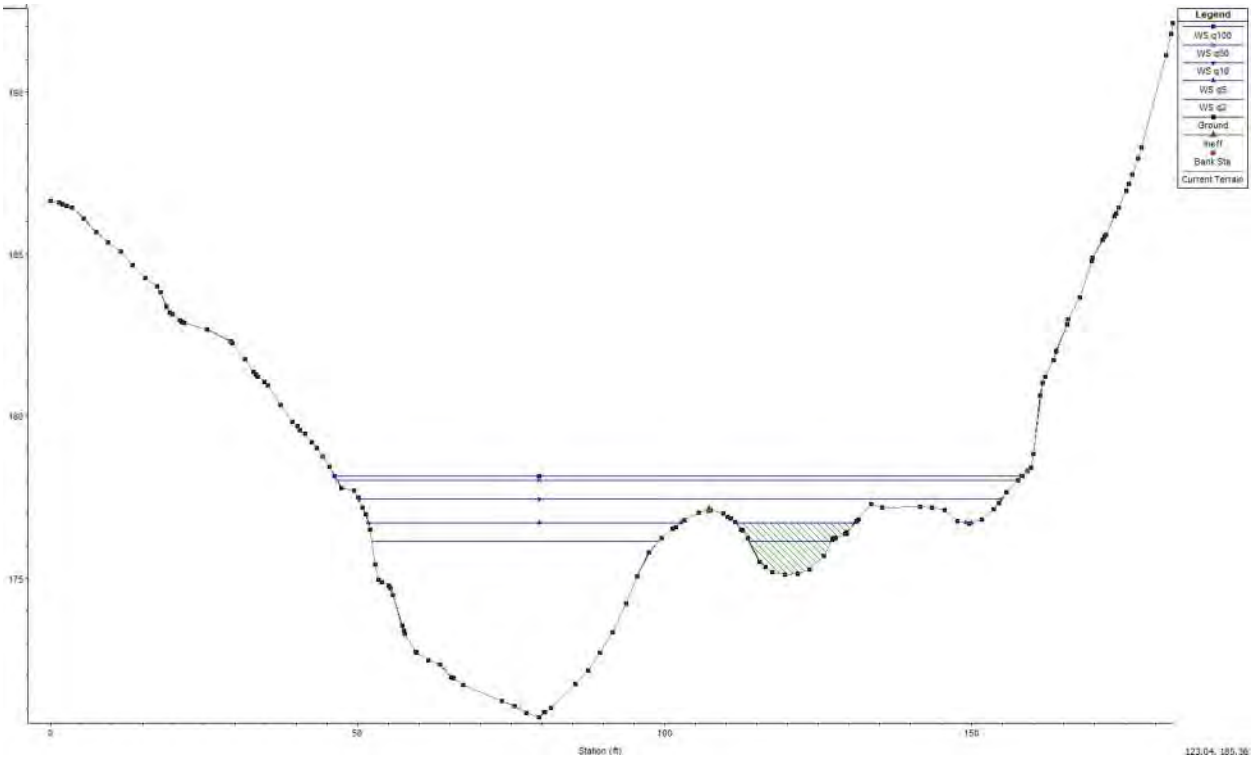


Figure 10:Flatter Overbank Topography Cross-Section Geometry (STA 582) with Significant Variation in Floodplain Inundation Extents

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.

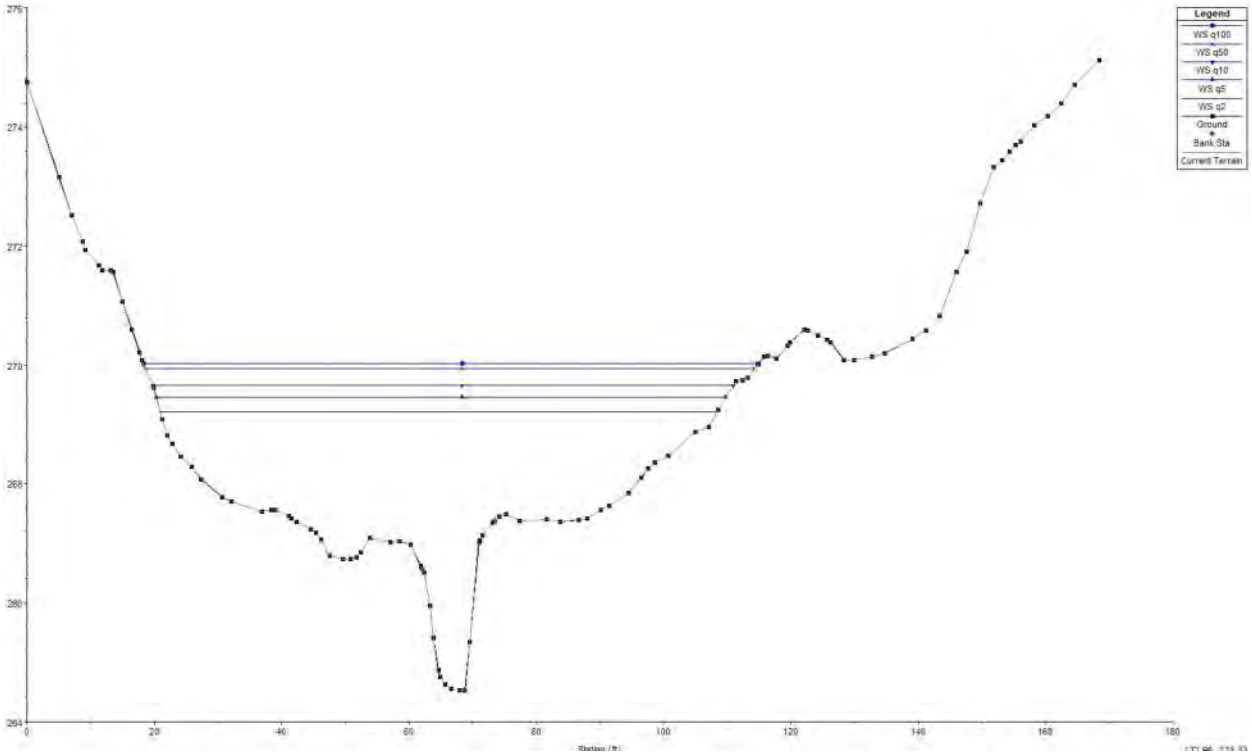


Figure 11: Potential Restoration Opportunity Location Identified During Previous Discussion with RECON

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

HYDRAULIC ANALYSIS NOT PERFORMED FOR TRIBUTARY. FURTHER INUNDATION OF TRIBUTARY NOT DEPICTED.

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

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GRAPHIC SCALE: 1" = 100'

HEC-RAS WORKMAP FOR SPRING CANYON

SHEET 1 OF 3

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HEC-RAS WORKMAP FOR SPRING CANYON

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HEC-RAS WORKMAP FOR SPRING CANYON

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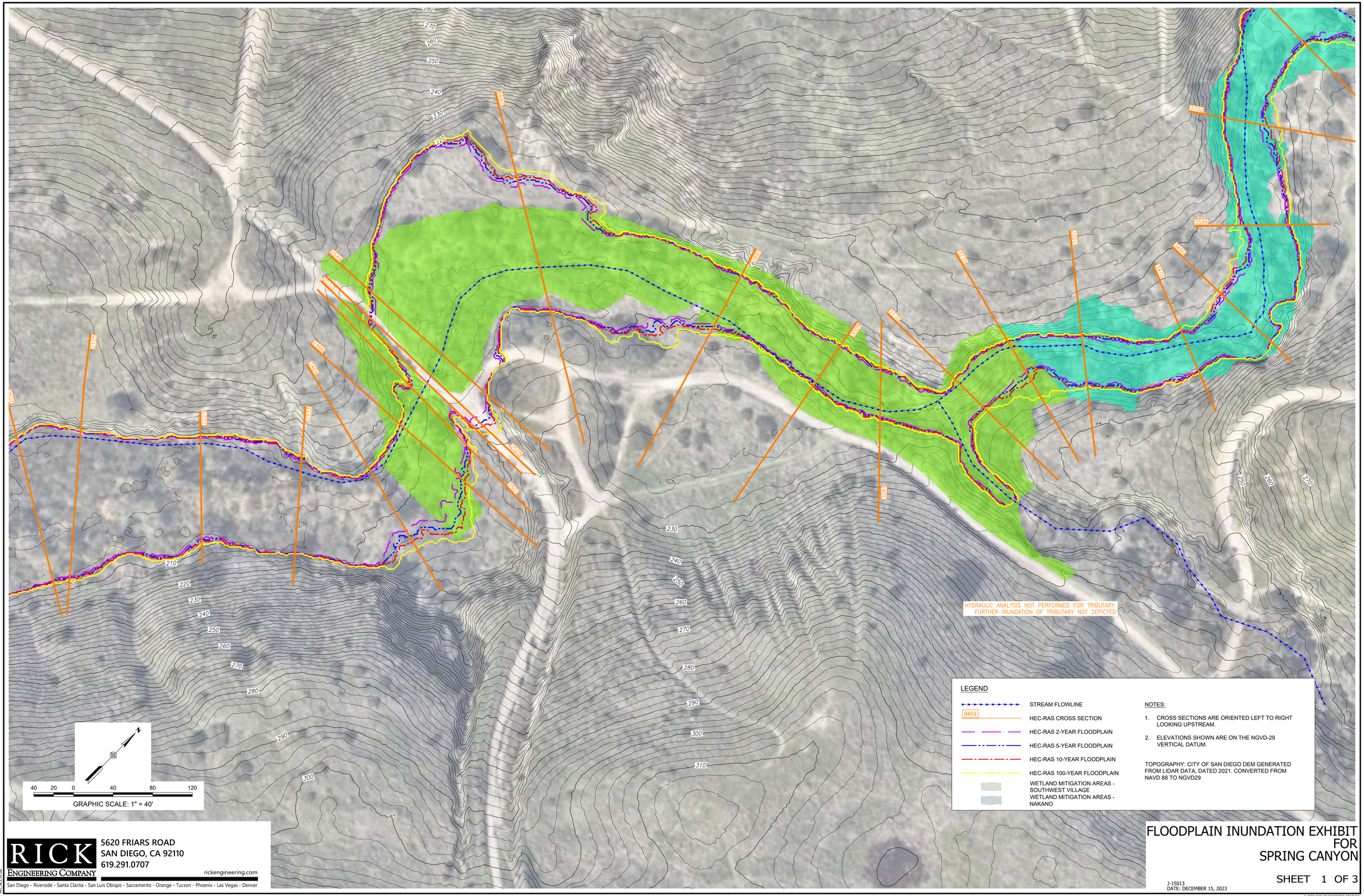

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FLOODPLAIN INUNDATION EXHIBIT FOR SPRING CANYON

SHEET 1 OF 3

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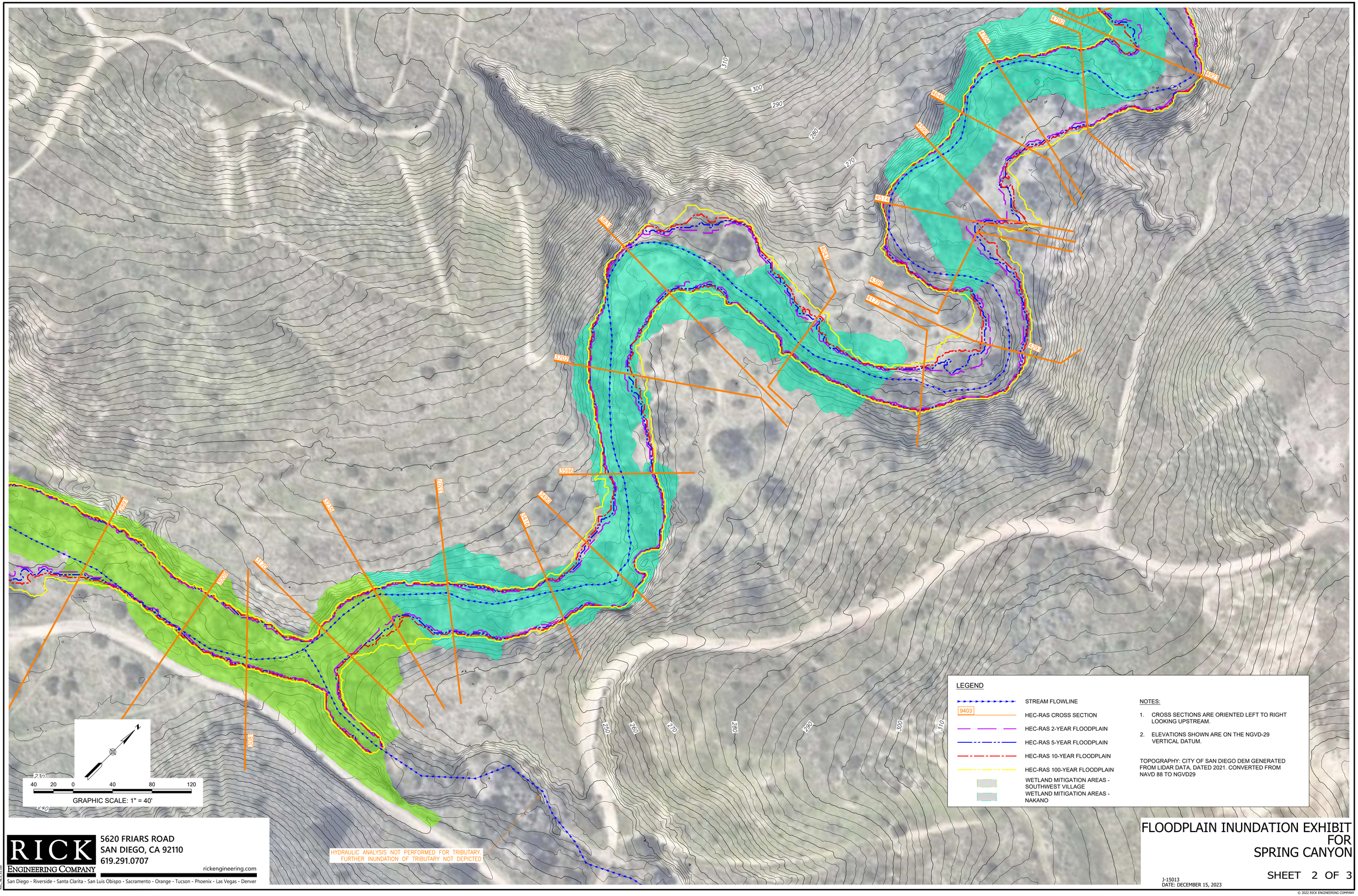
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FLOODPLAIN INUNDATION EXHIBIT FOR SPRING CANYON

SHEET 3 OF 3

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Xref Name:

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
Reach 1	9252	q5	698.00	329.06	332.86	332.86	333.44	0.008843	6.88	126.04	99.47	0.72
Reach 1	9252	q10	840.00	329.06	333.00	333.00	333.66	0.009588	7.41	140.62	102.60	0.76
Reach 1	9252	q100	1156.00	329.06	333.38	333.38	334.10	0.009311	7.90	181.42	114.56	0.76
Reach 1	9183	q2	555.00	327.44	331.08	331.08	331.67	0.010149	7.09	97.66	78.33	0.76
Reach 1	9183	q5	698.00	327.44	331.25	331.25	331.95	0.011409	7.82	111.11	82.79	0.81
Reach 1	9183	q10	840.00	327.44	331.50	331.50	332.21	0.010735	8.02	134.13	97.89	0.80
Reach 1	9183	q100	1156.00	327.44	331.89	331.89	332.65	0.010033	8.38	175.64	111.54	0.78
Reach 1	9099	q2	555.00	325.49	329.39	329.39	330.39	0.014226	8.35	72.81	40.09	0.90
Reach 1	9099	q5	698.00	325.49	329.87	329.87	330.84	0.011533	8.40	94.80	50.09	0.83
Reach 1	9099	q10	840.00	325.49	330.16	330.16	331.22	0.011315	8.83	110.22	55.72	0.84
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
Reach 1	9017	q5	698.00	323.69	328.00	328.00	329.03	0.013420	8.43	91.86	45.53	0.88
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
Reach 1	8962	q2	555.00	322.15	326.36		326.84	0.007241	6.22	106.76	55.39	0.64
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
Reach 1	8926	q5	698.00	321.61	326.35		327.05	0.009649	6.73	104.99	43.77	0.74
Reach 1	8926	q10	840.00	321.61	326.62		327.43	0.010272	7.27	117.41	47.80	0.77
Reach 1	8926	q100	1156.00	321.61	327.24	326.83	328.21	0.009597	8.03	151.22	61.02	0.77
Reach 1	8894	q2	555.00	320.86	324.88	324.88	326.07	0.019489	8.74	63.49	27.16	1.01
Reach 1	8894	q5	698.00	320.86	325.46	325.46	326.61	0.015999	8.64	82.90	42.40	0.94
Reach 1	8894	q10	840.00	320.86	325.87	325.87	327.03	0.013556	8.76	101.96	49.14	0.88
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
Reach 1	8827	q5	698.00	319.59	323.85	323.85	325.07	0.015282	8.90	80.36	39.43	0.92
Reach 1	8827	q10	840.00	319.59	324.36	324.36	325.51	0.011914	8.76	103.76	52.14	0.84
Reach 1	8827	q100	1156.00	319.59	325.06	325.06	326.21	0.009965	9.07	145.02	63.35	0.79
Reach 1	8786	q2	555.00	318.31	322.03	322.03	323.03	0.014082	8.29	73.39	37.98	0.89
Reach 1	8786	q5	698.00	318.31	322.40	322.40	323.51	0.013457	8.82	87.91	40.53	0.88
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
Reach 1	8721	q5	698.00	317.21	321.24	321.14	322.37	0.013922	8.86	84.76	33.54	0.90
Reach 1	8721	q10	840.00	317.21	321.50	321.46	322.84	0.015188	9.68	93.57	34.45	0.94
Reach 1	8721	q100	1156.00	317.21	322.28	322.28	323.80	0.014033	10.44	124.11	43.07	0.93
Reach 1	8674	q2	555.00	315.59	320.15	320.15	321.21	0.014970	8.71	70.39	33.90	0.91
Reach 1	8674	q5	698.00	315.59	320.54	320.54	321.72	0.014247	9.26	84.21	36.75	0.91
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
Reach 1	8573	q10	840.00	314.09	319.20		319.52	0.002599	4.60	189.61	61.29	0.40
Reach 1	8573	q100	1156.00	314.09	319.98		320.36	0.002576	5.09	240.84	70.61	0.41
Reach 1	8537	q2	555.00	312.89	317.24	317.19	318.29	0.016758	8.24	68.73	32.17	0.94
Reach 1	8537	q5	698.00	312.89	317.78	317.61	318.82	0.013553	8.25	87.66	38.07	0.87
Reach 1	8537	q10	840.00	312.89	318.24	317.98	319.28	0.011348	8.35	106.33	44.50	0.82
Reach 1	8537	q100	1156.00	312.89	319.15	318.69	320.15	0.008235	8.39	153.29	58.18	0.72
Reach 1	8519	q2	555.00	312.78	317.53		317.95	0.004926	5.21	107.89	38.26	0.53
Reach 1	8519	q5	698.00	312.78	318.04		318.52	0.004557	5.56	127.83	39.79	0.52
Reach 1	8519	q10	840.00	312.78	318.48		319.01	0.004417	5.92	145.72	42.74	0.53
Reach 1	8519	q100	1156.00	312.78	319.29		319.95	0.004300	6.62	184.89	53.38	0.53
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
Reach 1	8355	q5	698.00	309.17	314.46	314.46	315.03	0.008079	6.99	122.28	78.25	0.65
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

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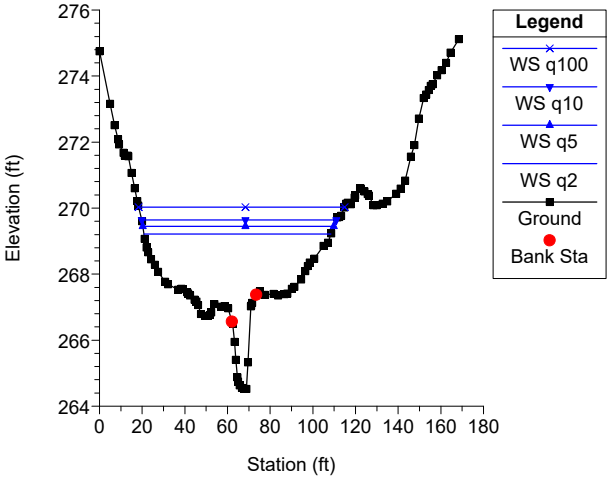

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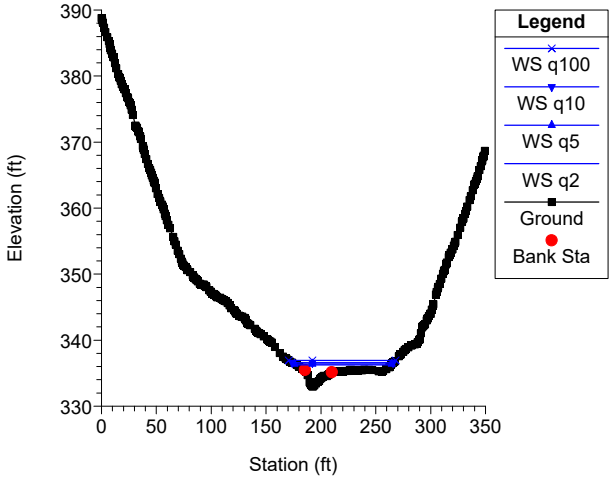

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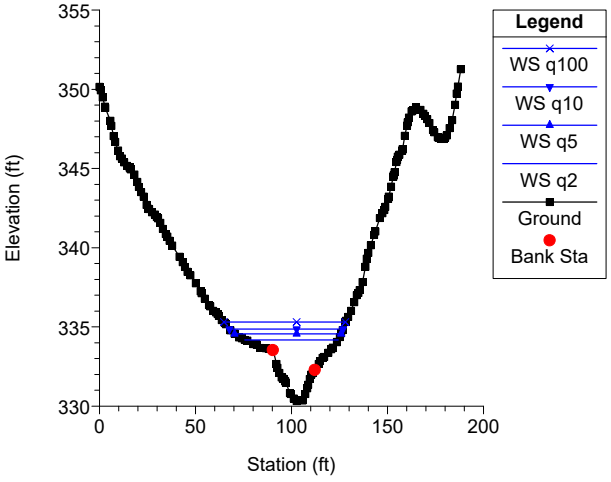

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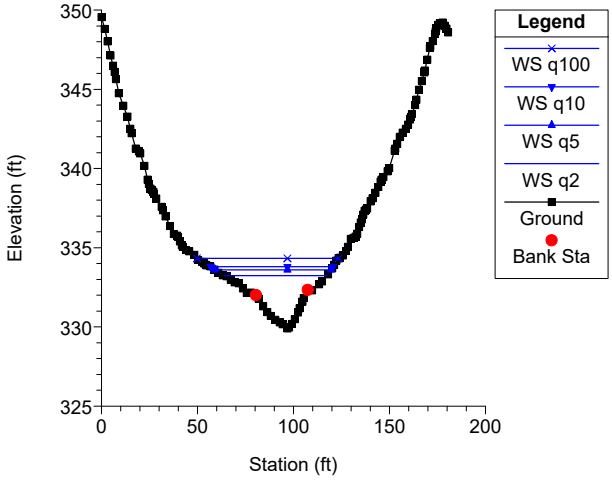

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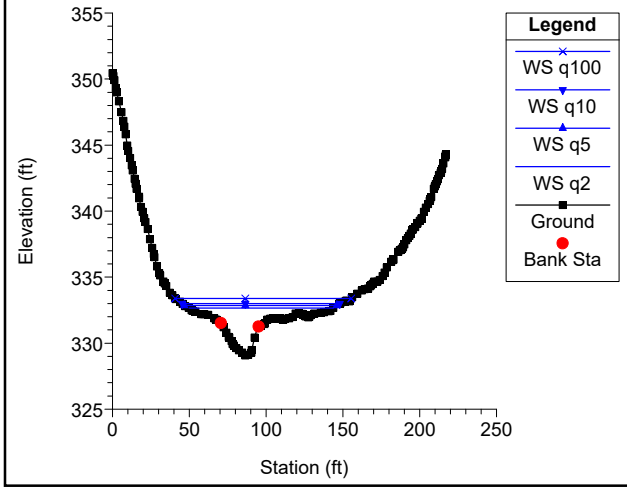

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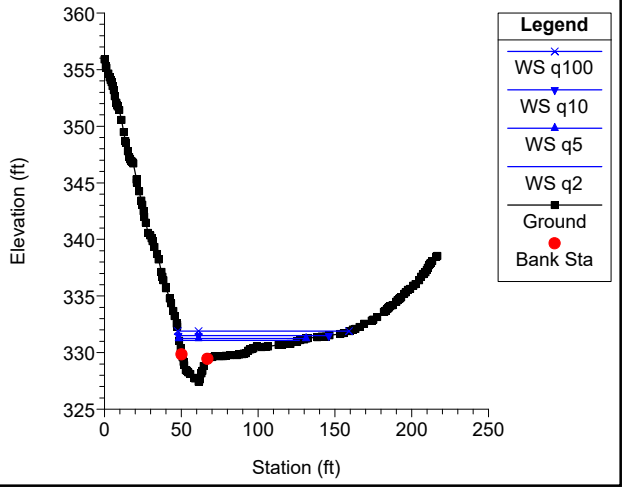

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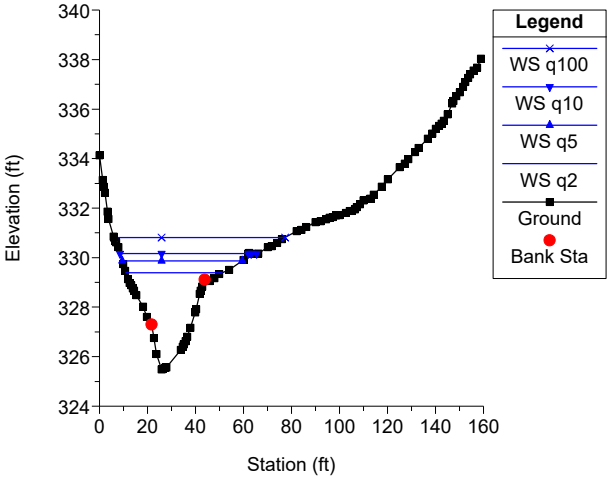

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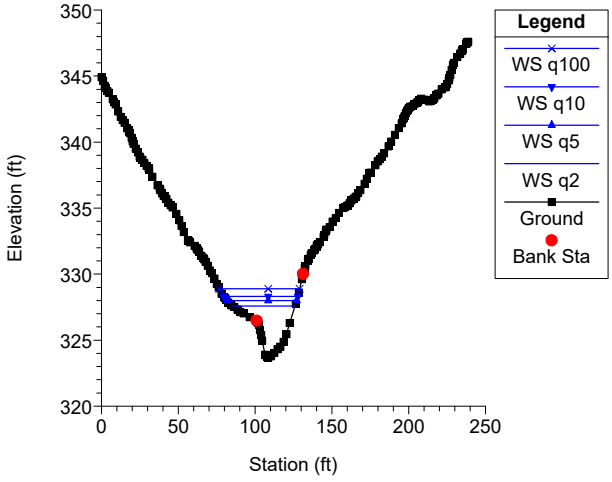

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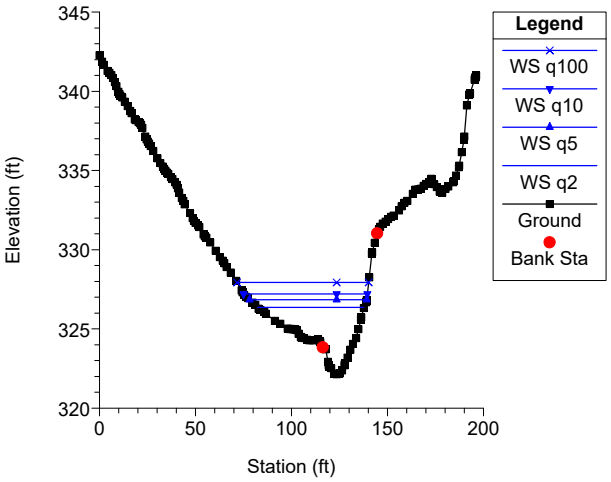

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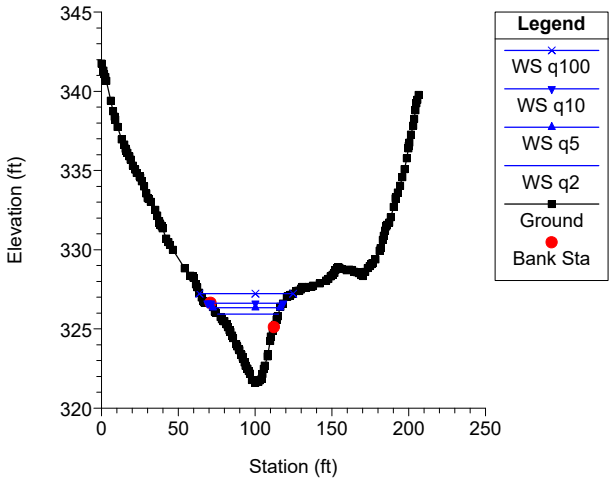

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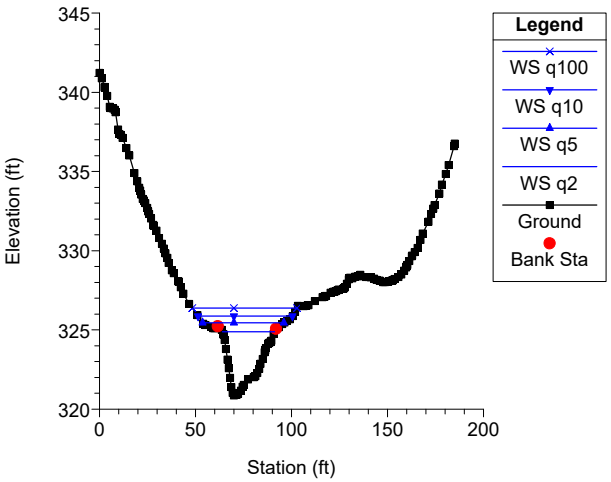

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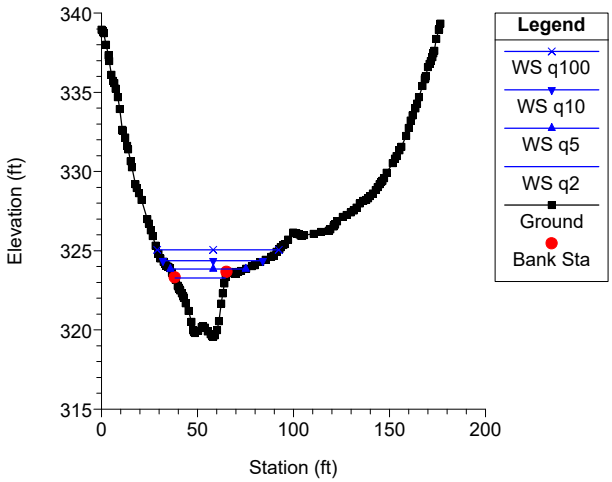

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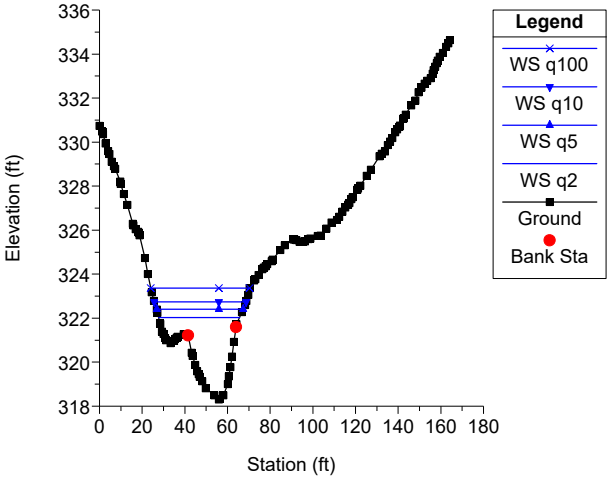

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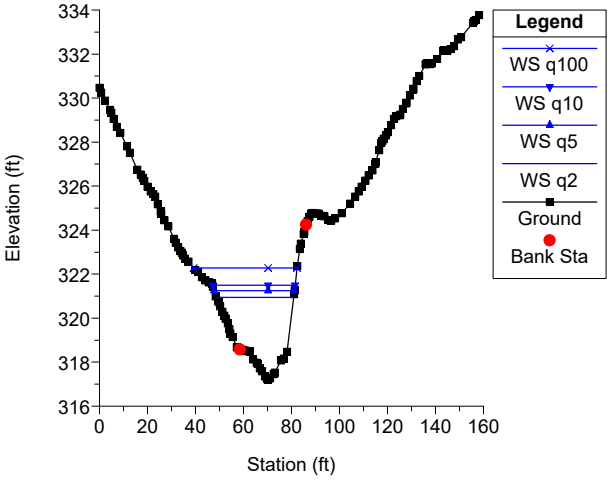

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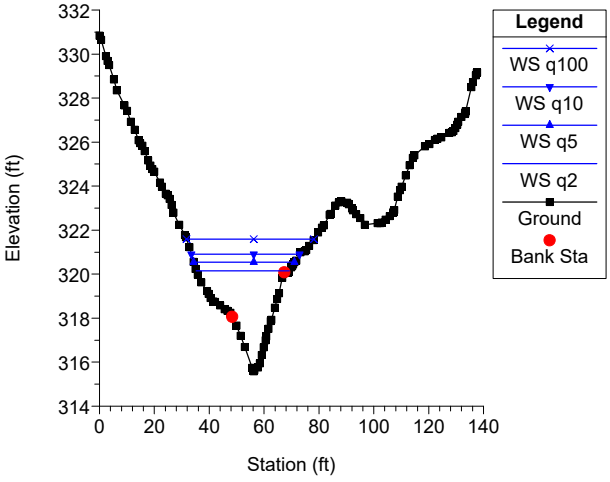

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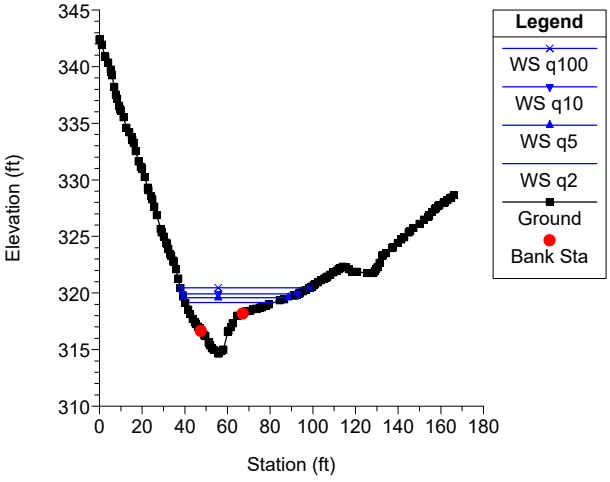

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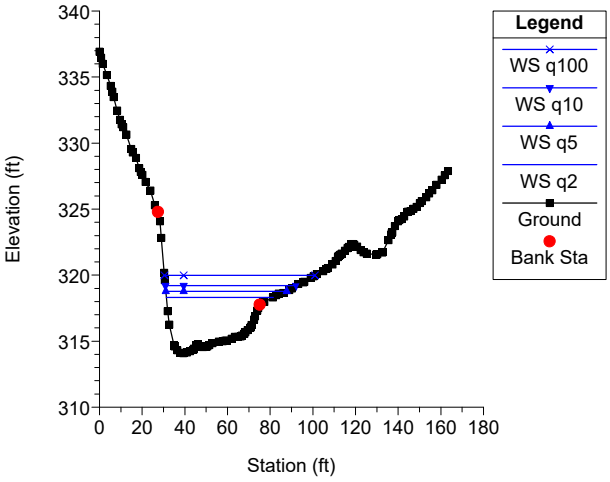

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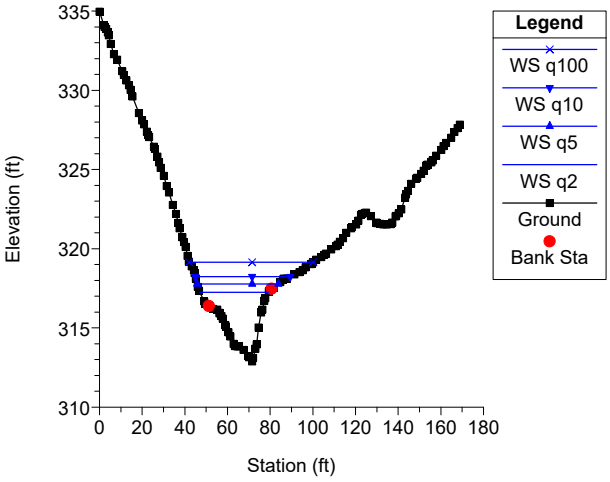

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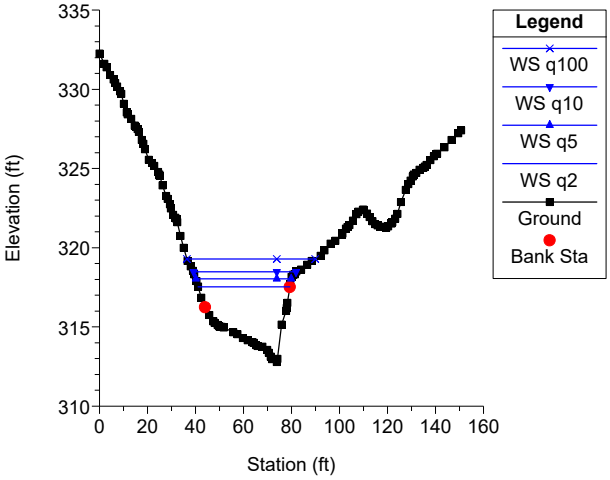

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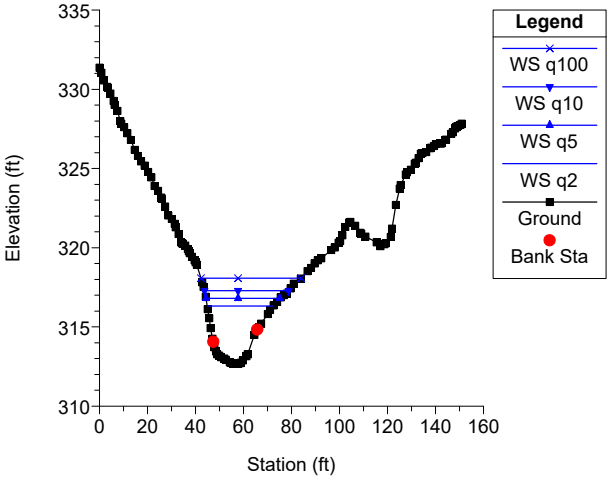

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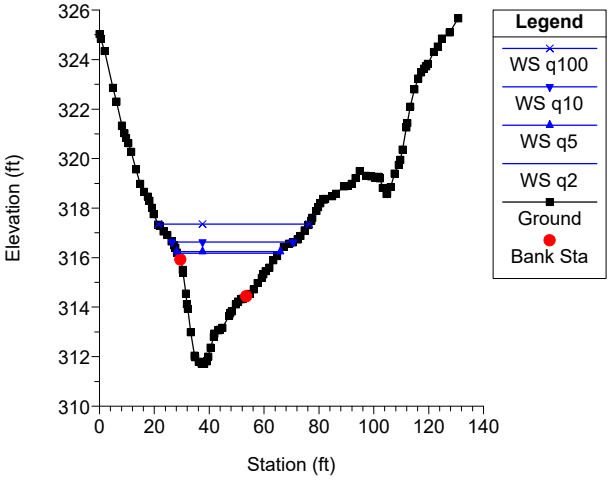

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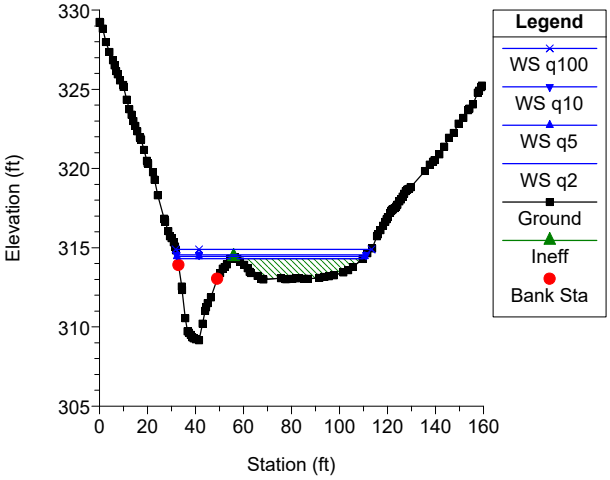

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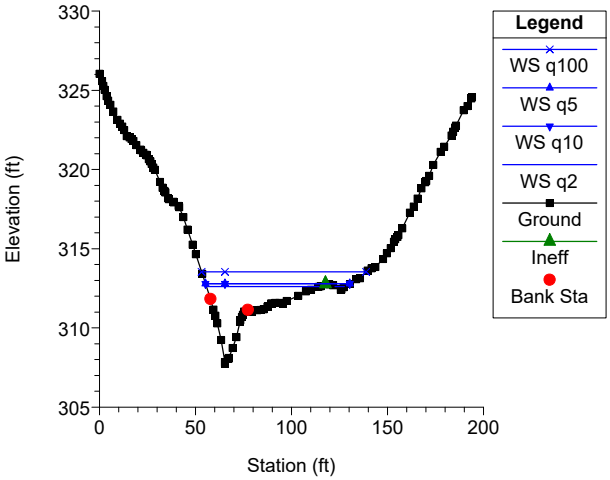

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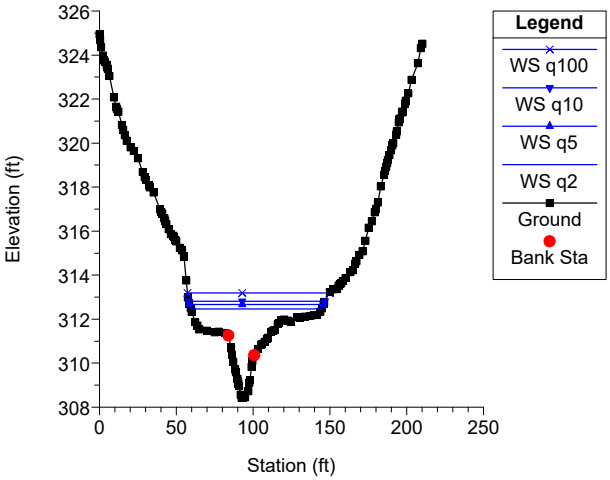

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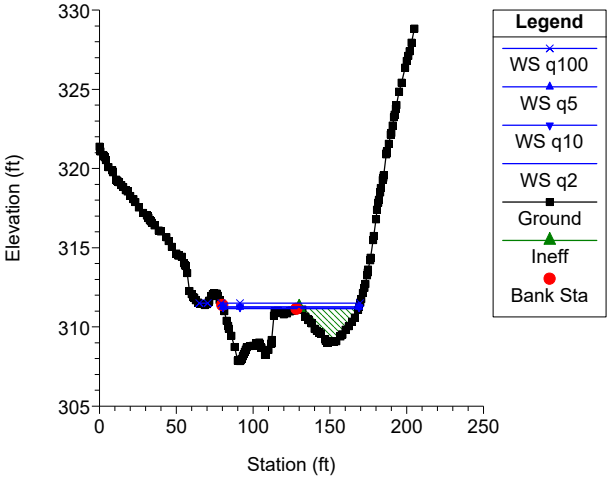

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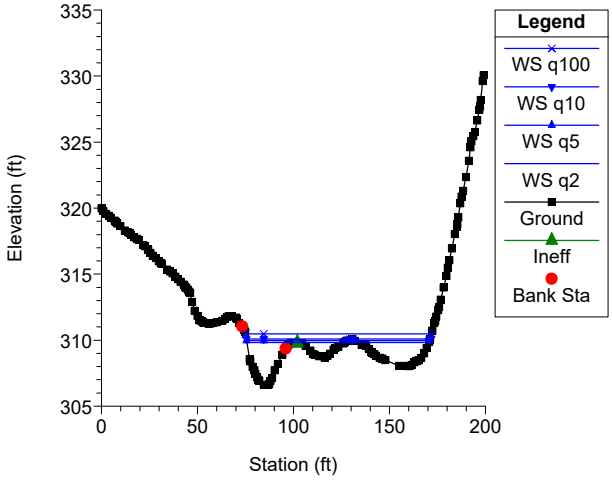

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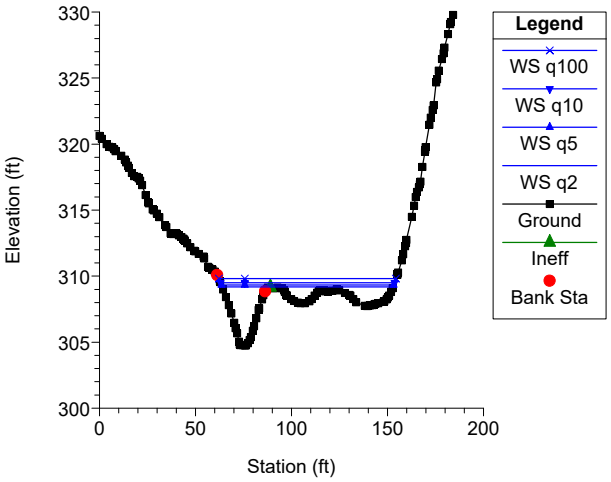

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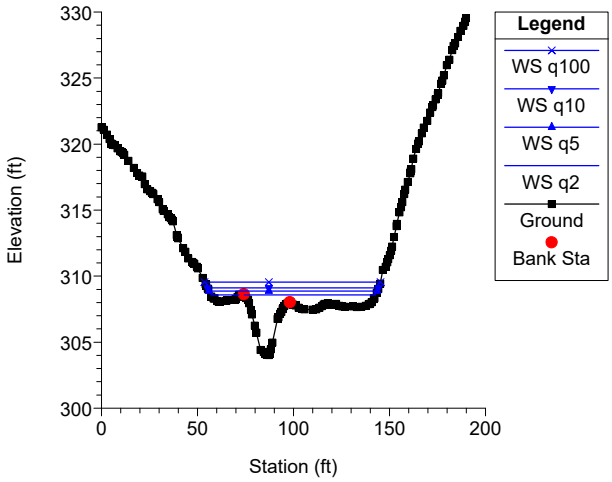

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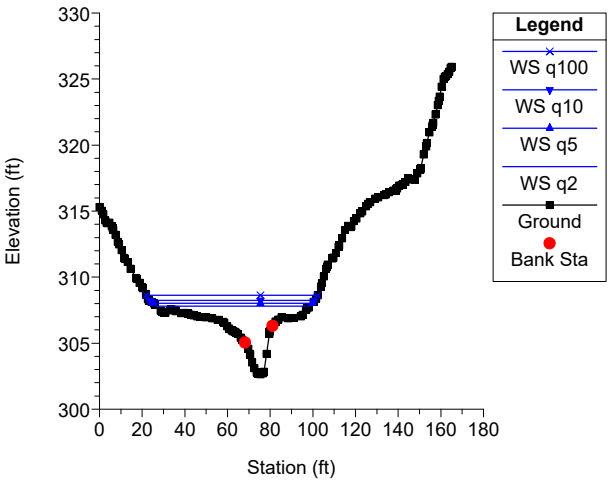

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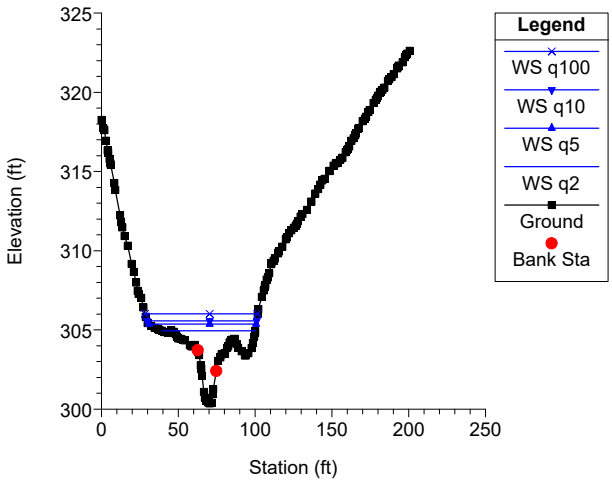

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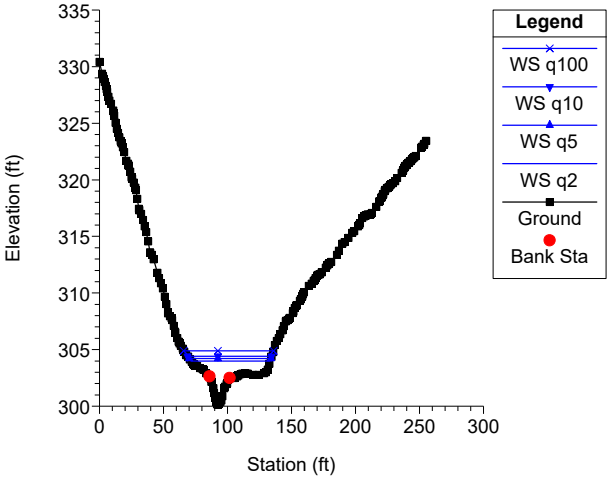

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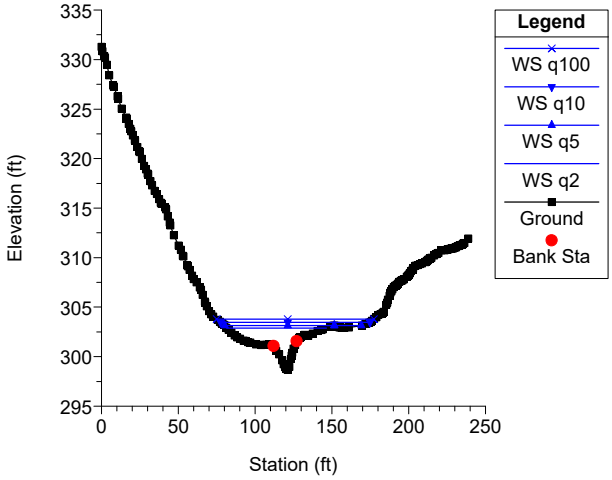

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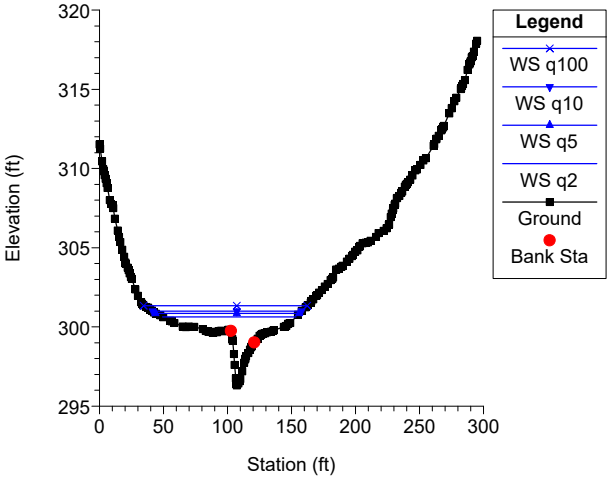

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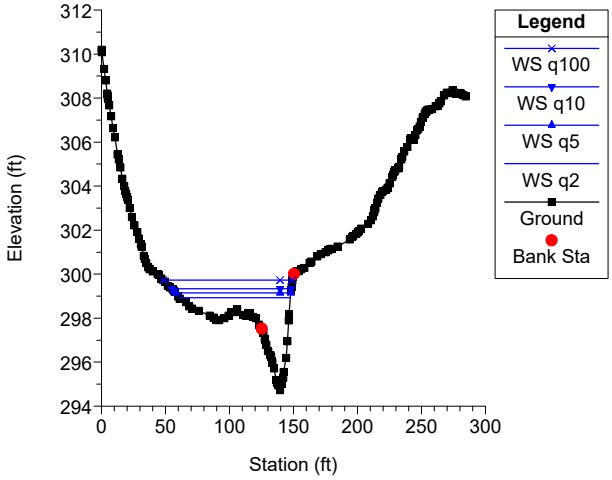

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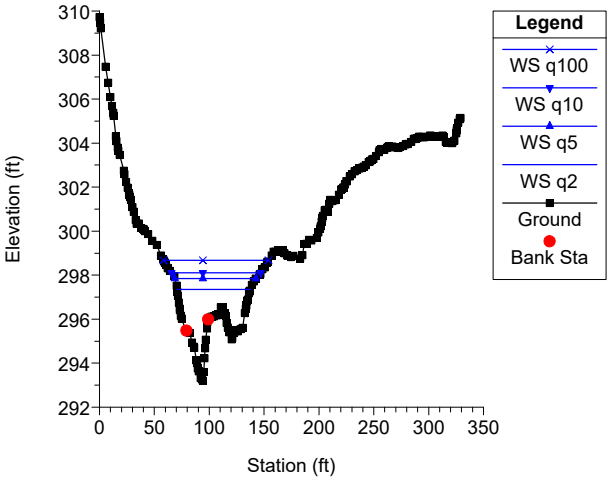

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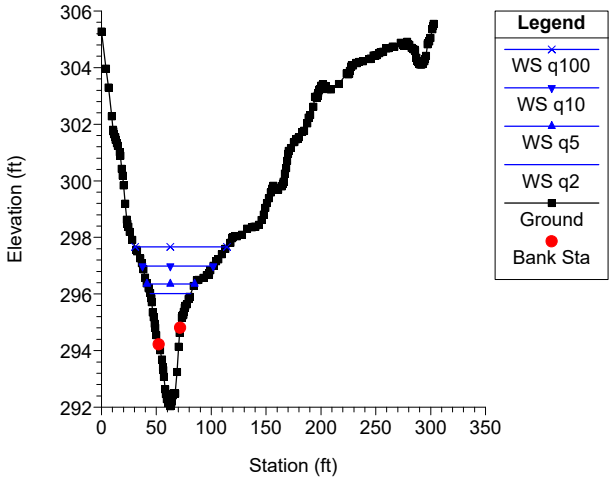

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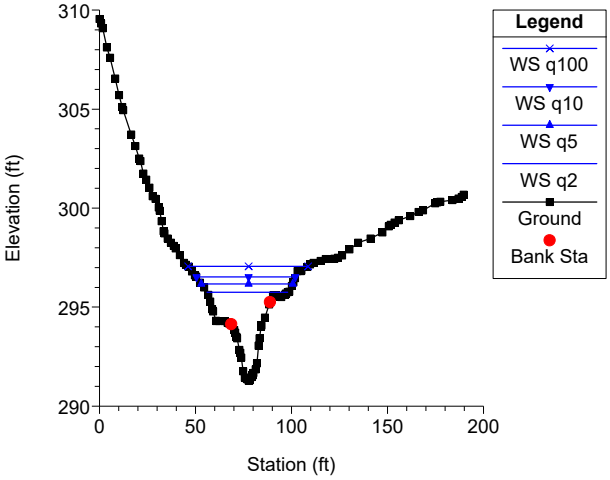

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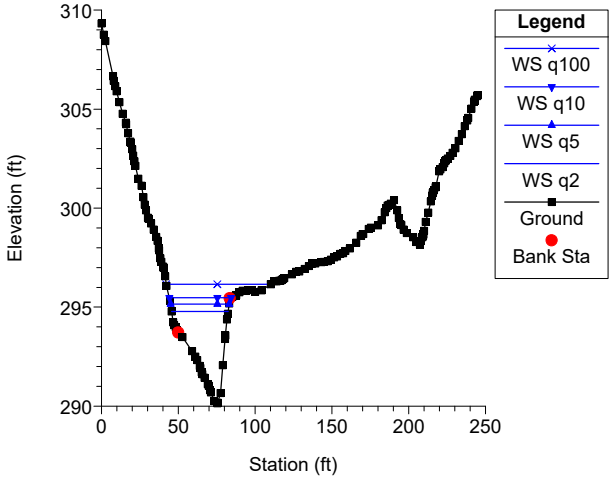

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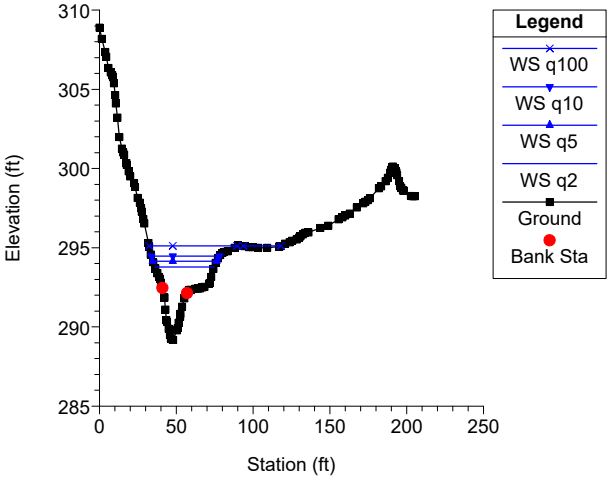

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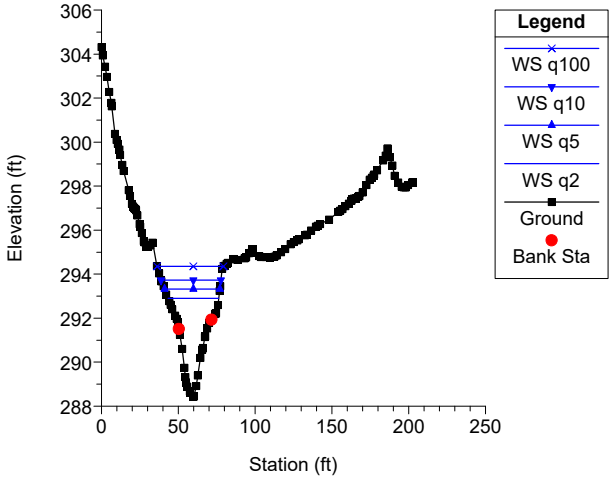

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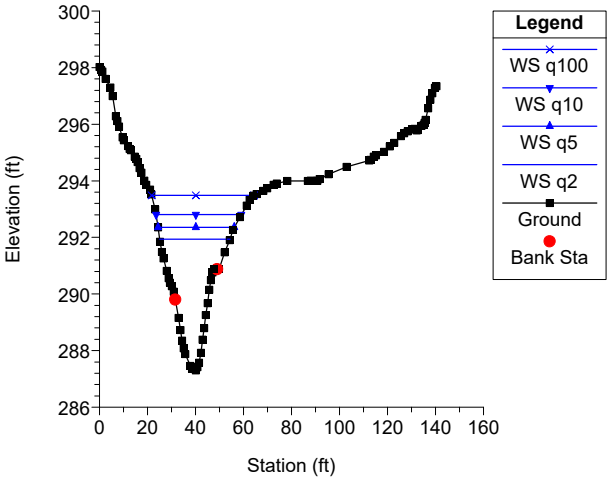

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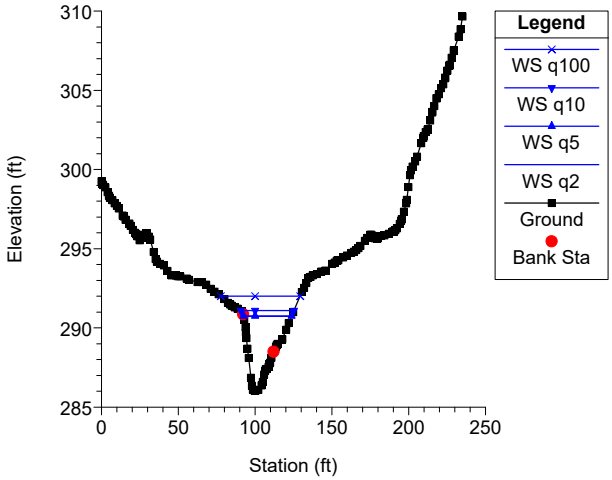

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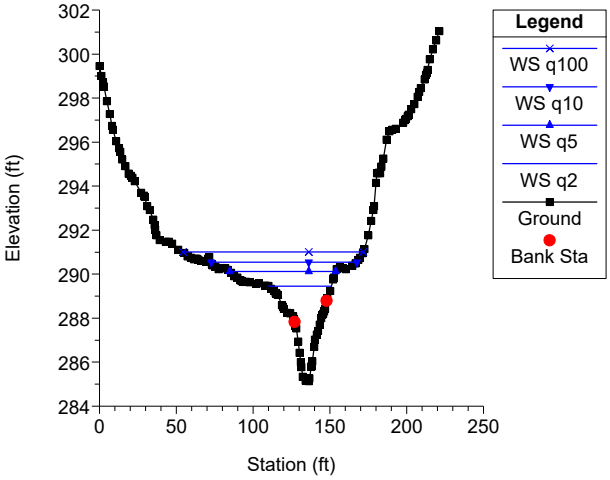

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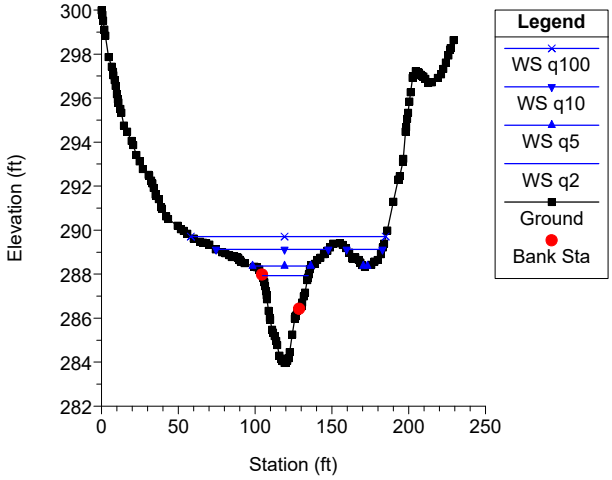

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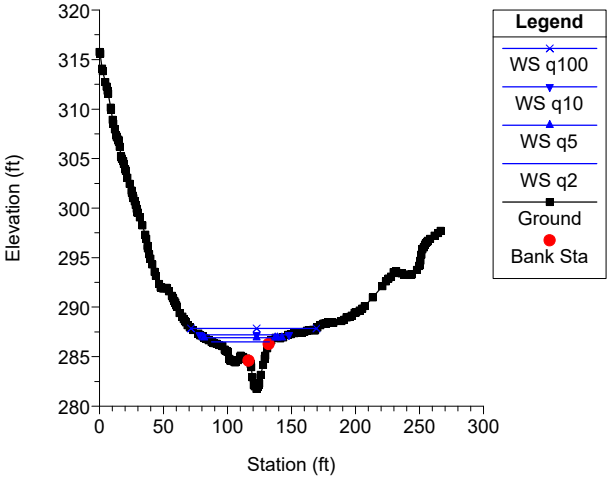

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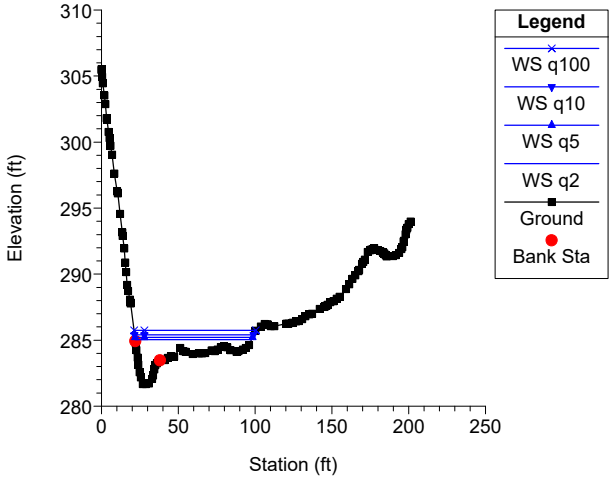

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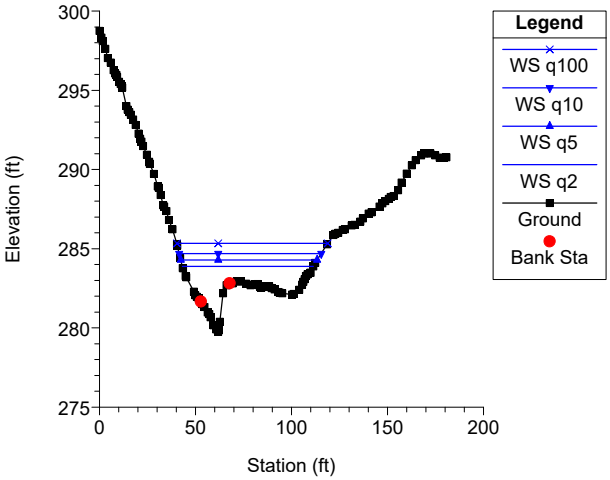

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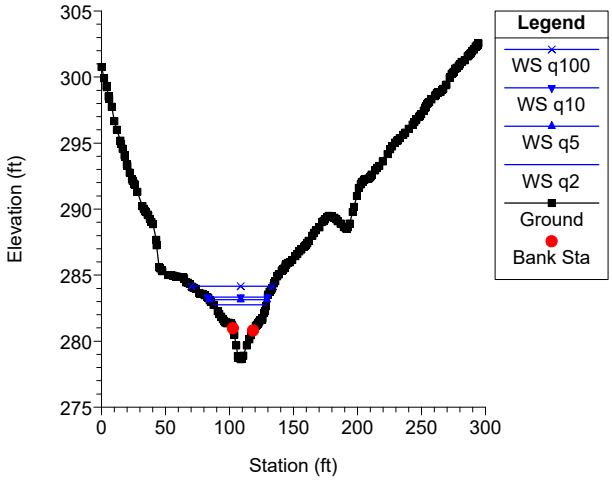

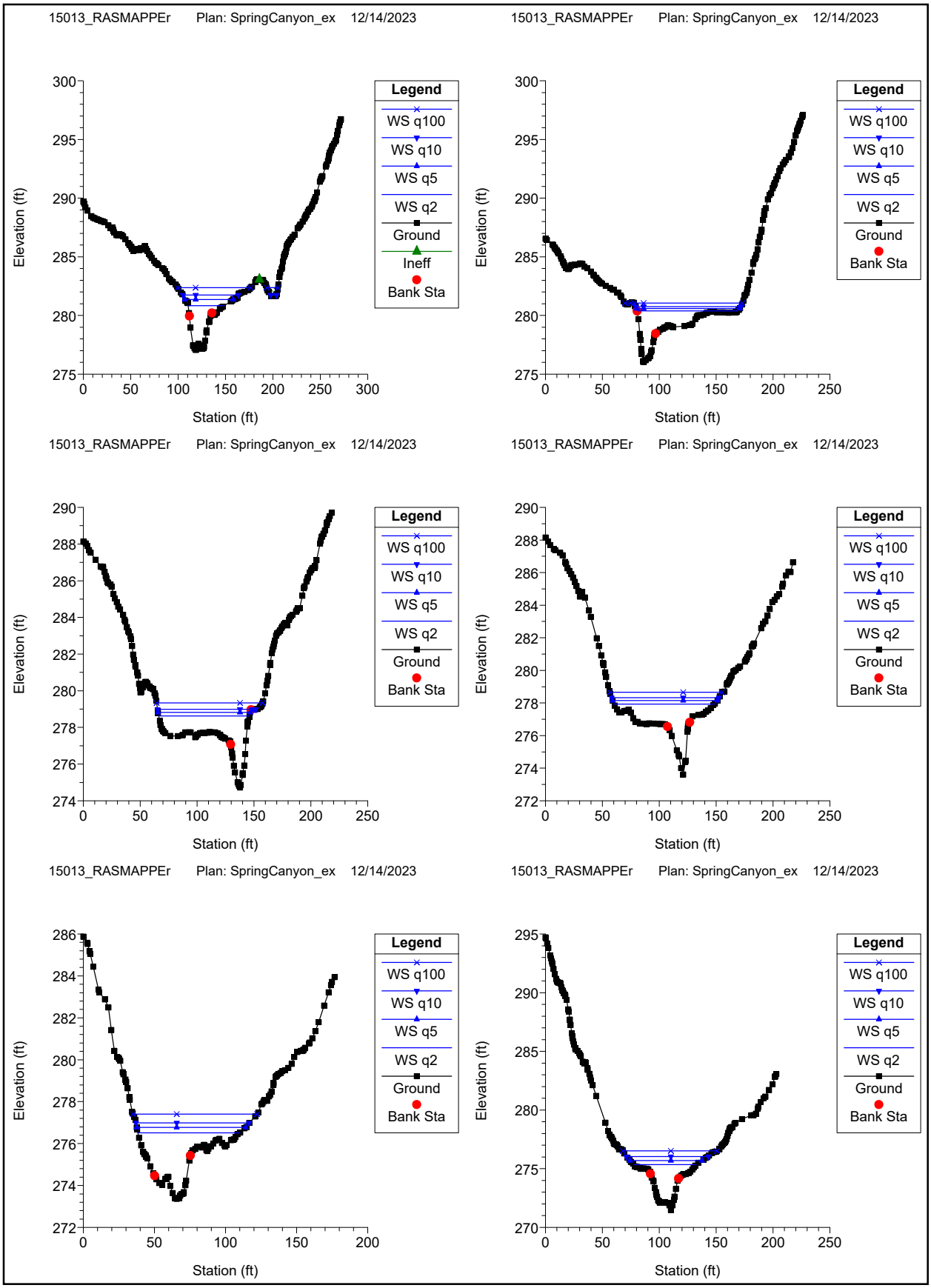
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15013_RASMAPPEr Plan: SpringCanyon_ex 12/14/2023
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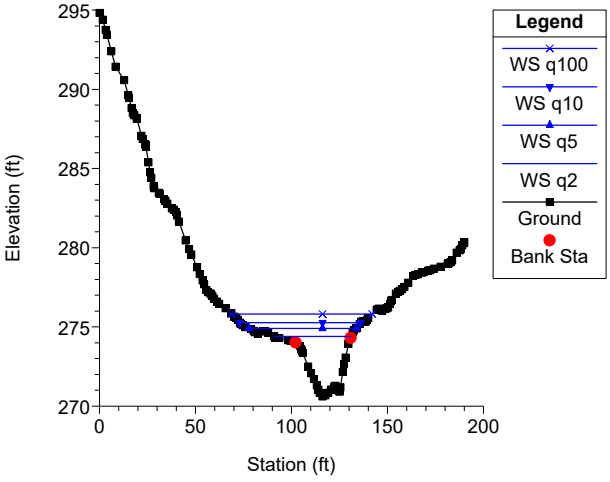

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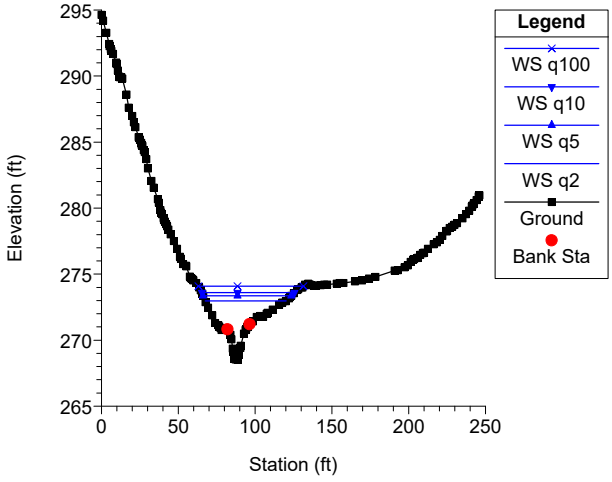

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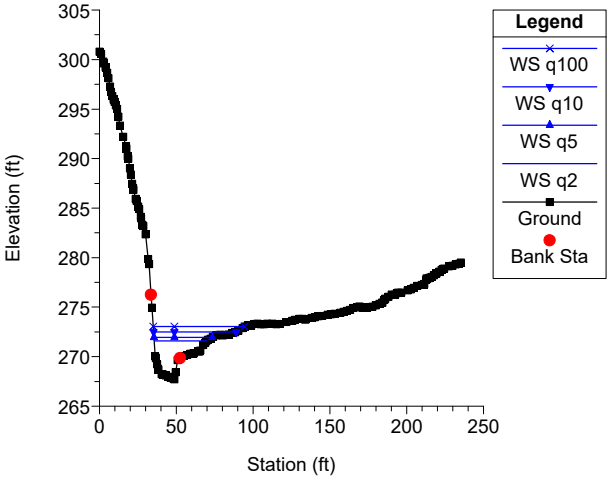

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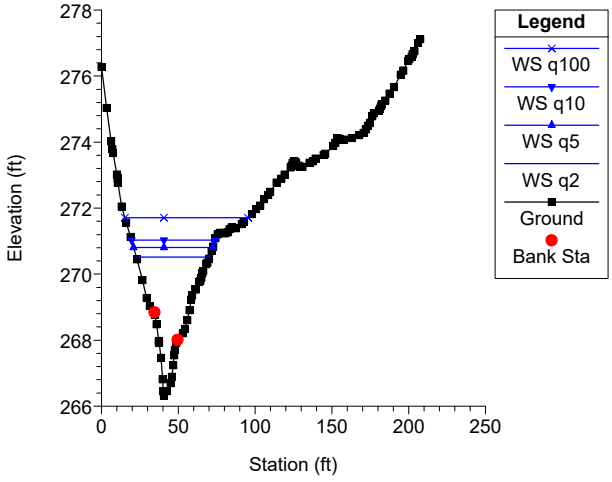

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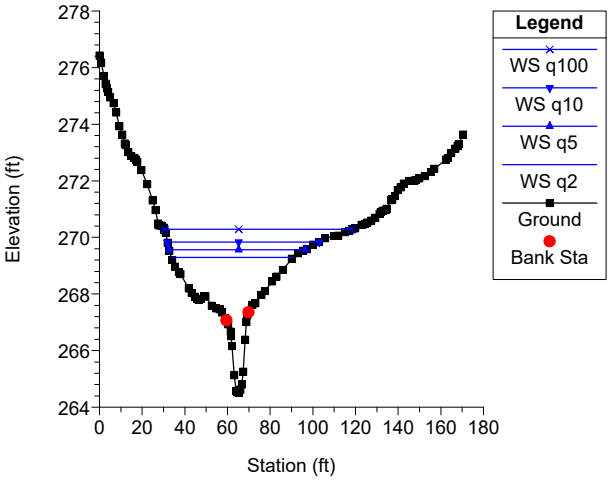

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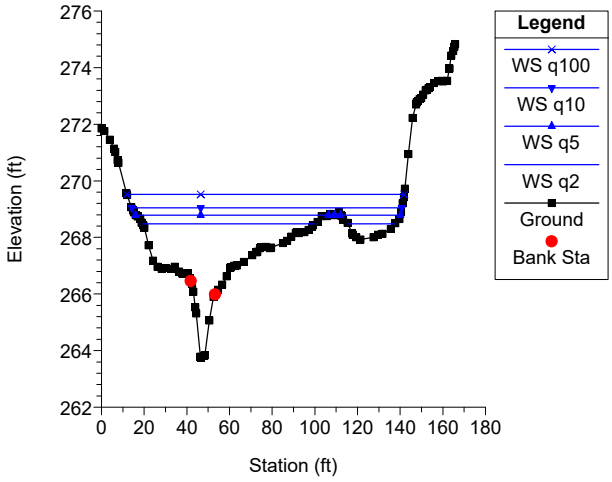

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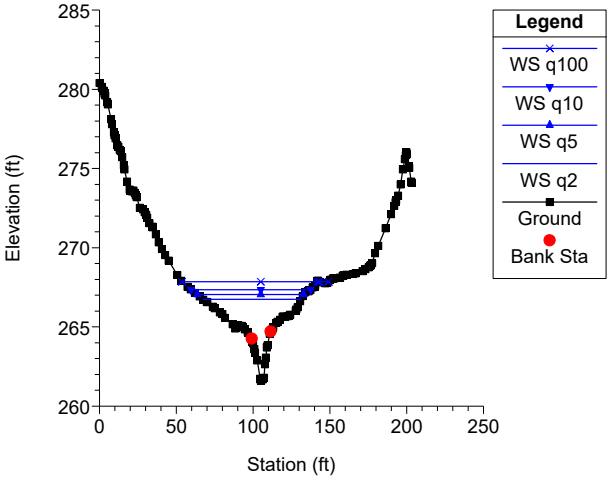

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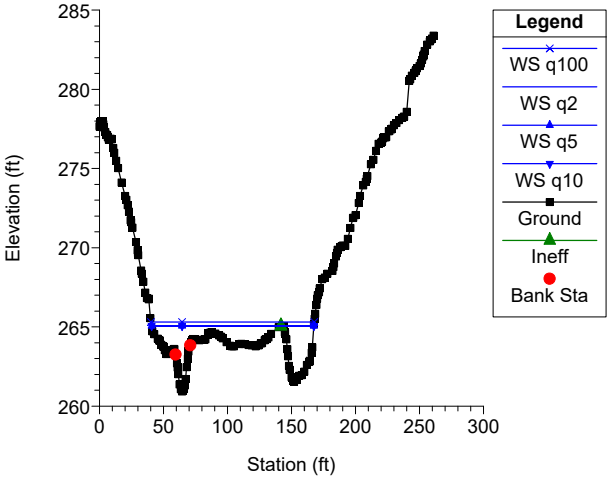

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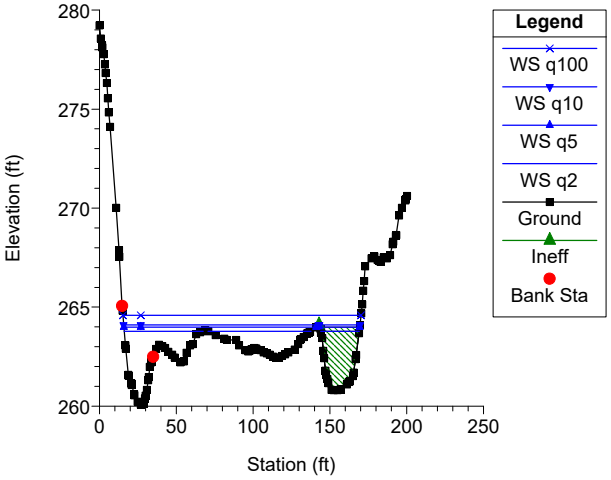

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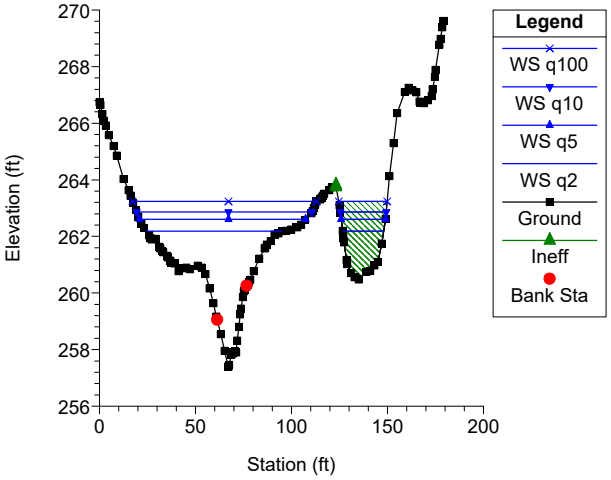

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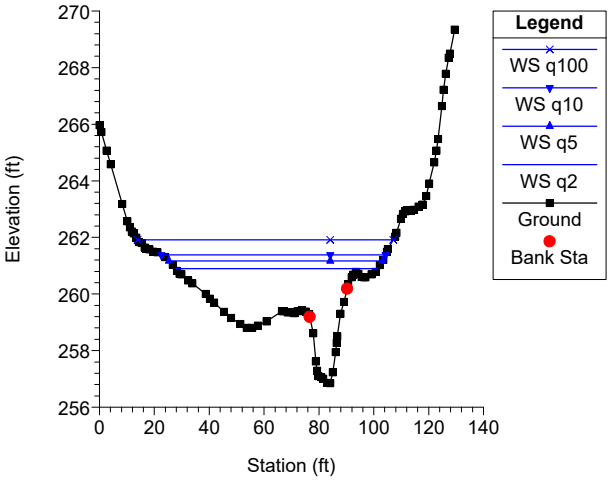

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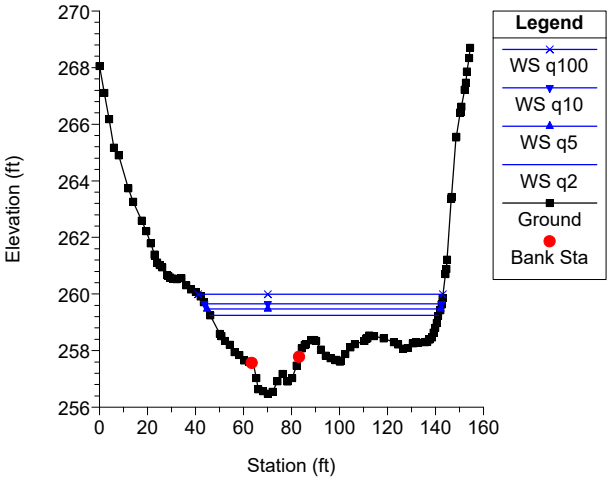

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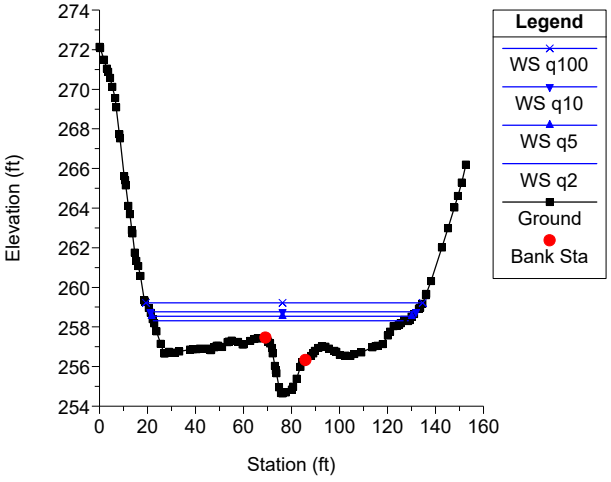

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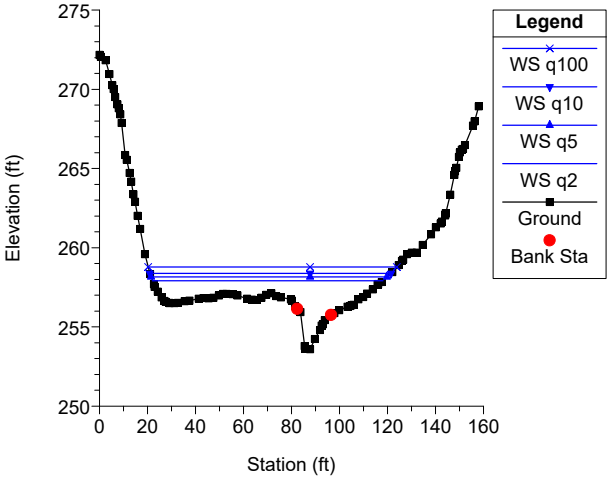

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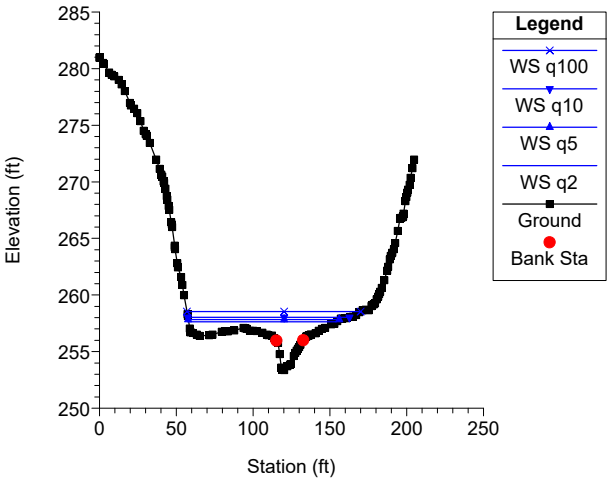

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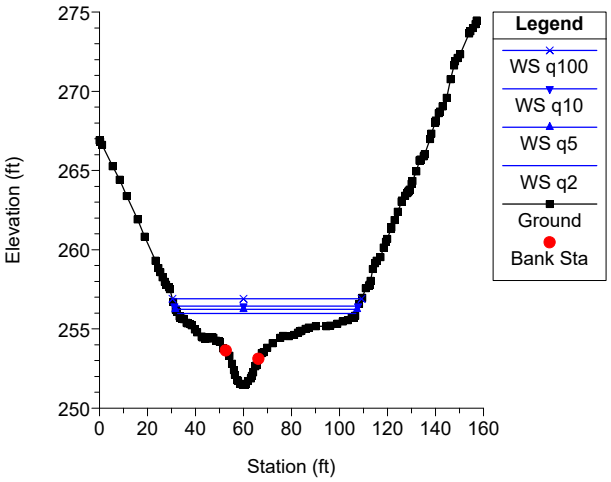

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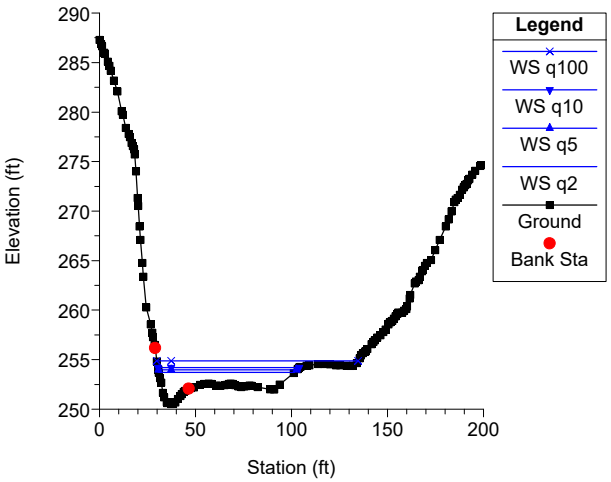

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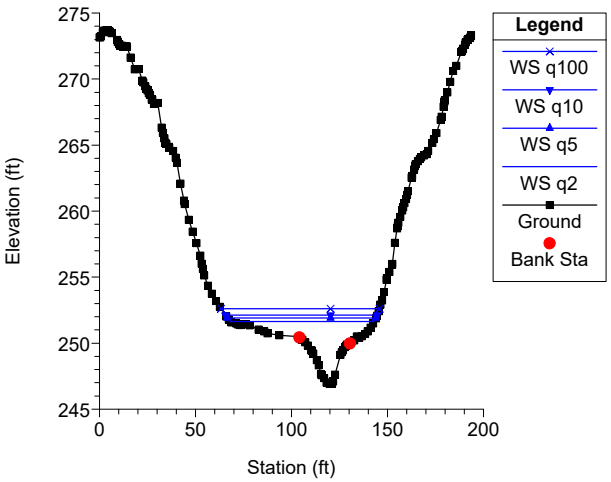

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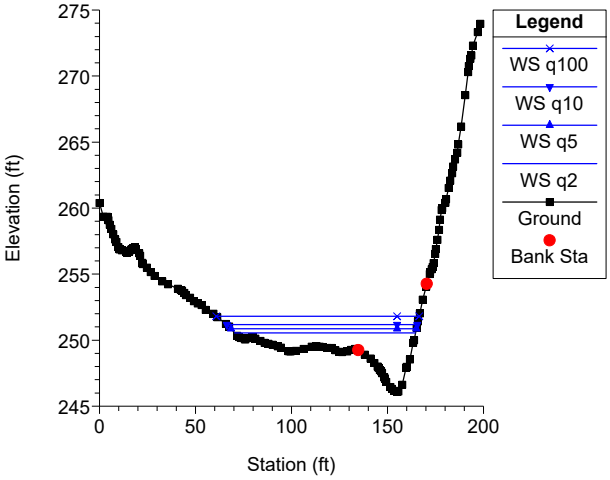

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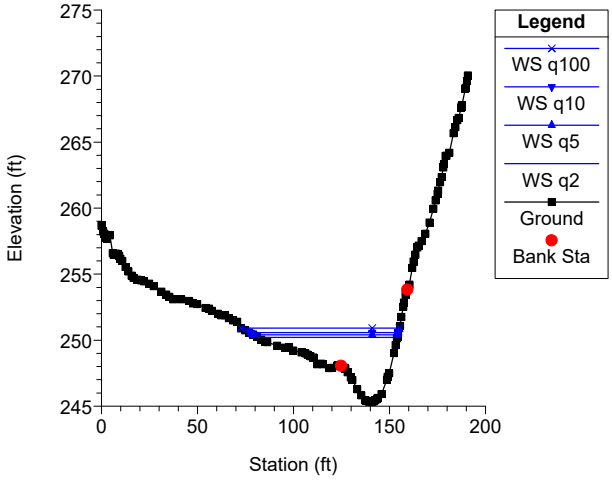

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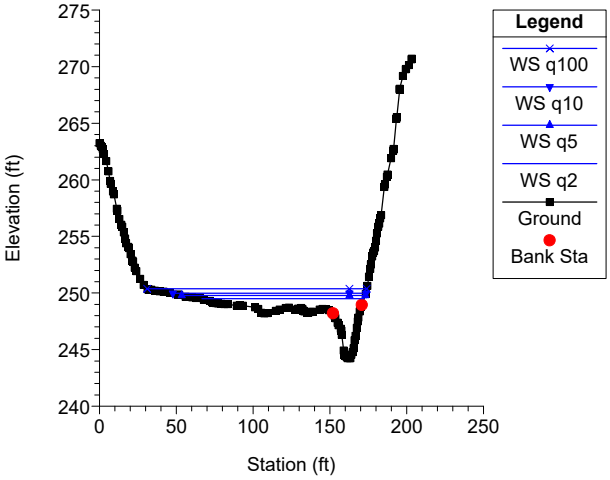

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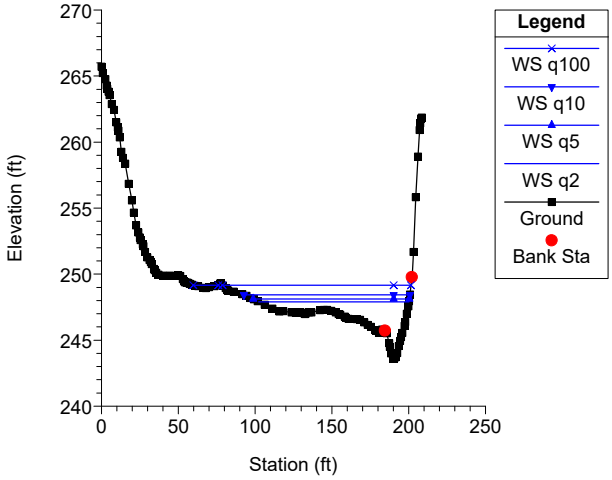

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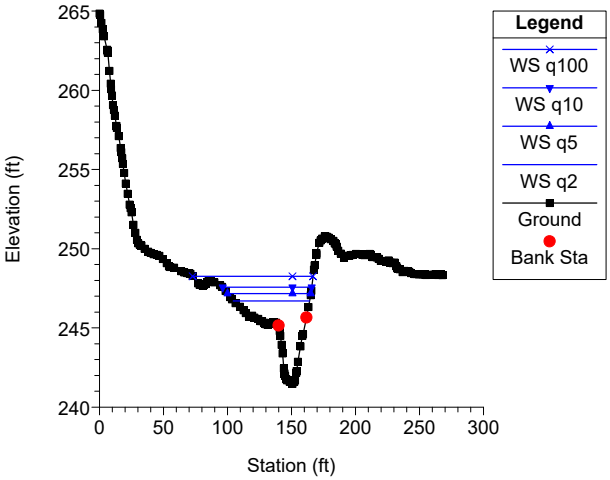

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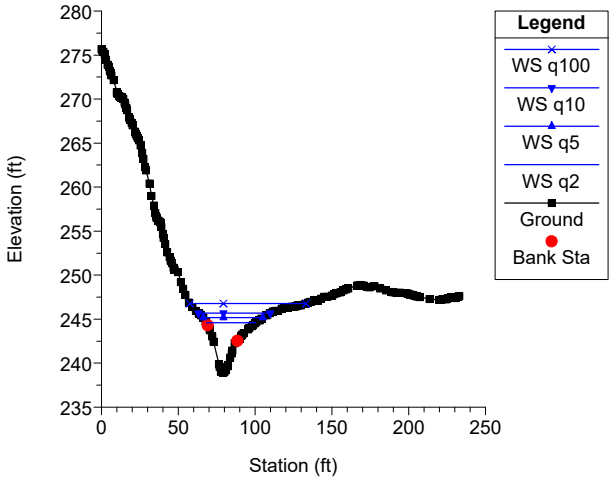

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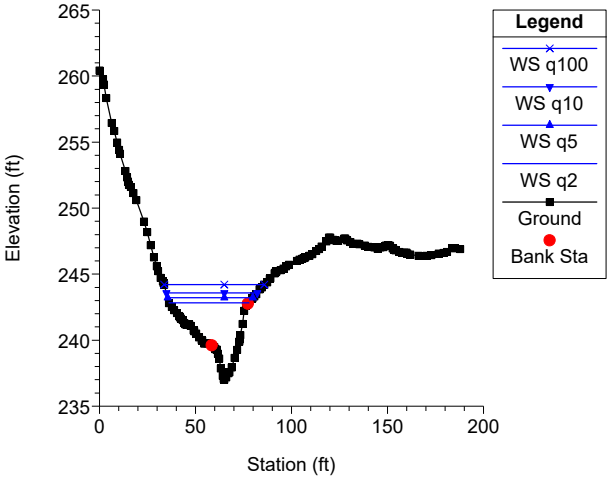

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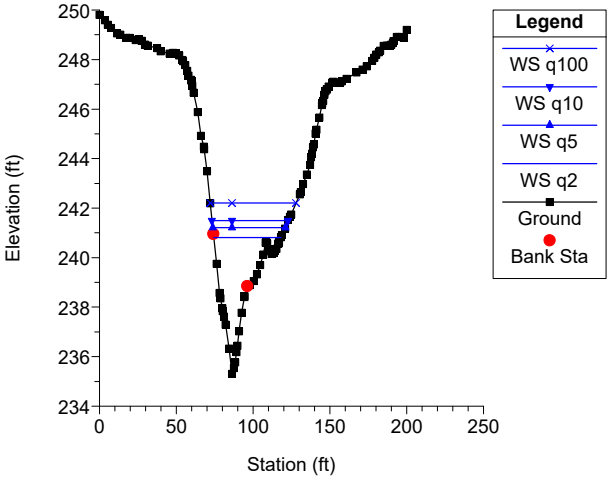

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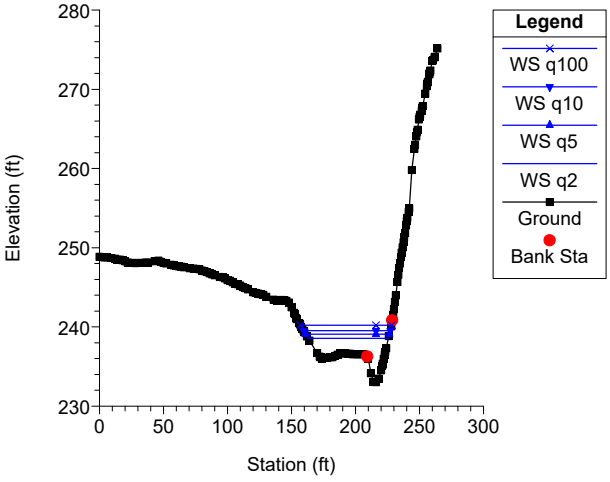

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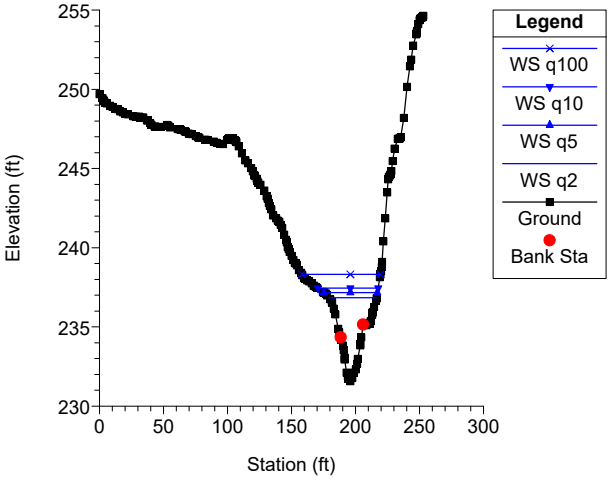

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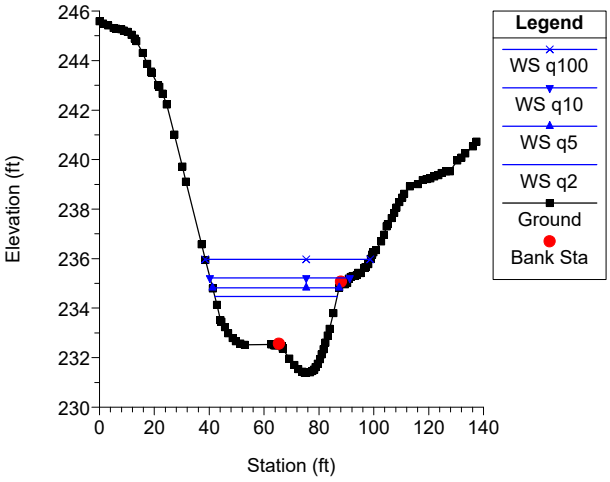

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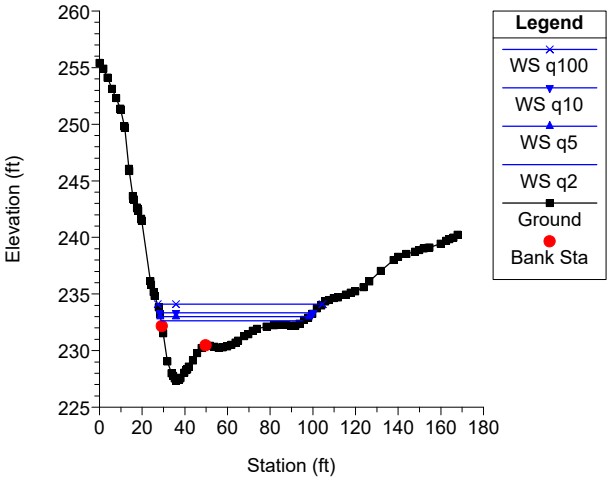

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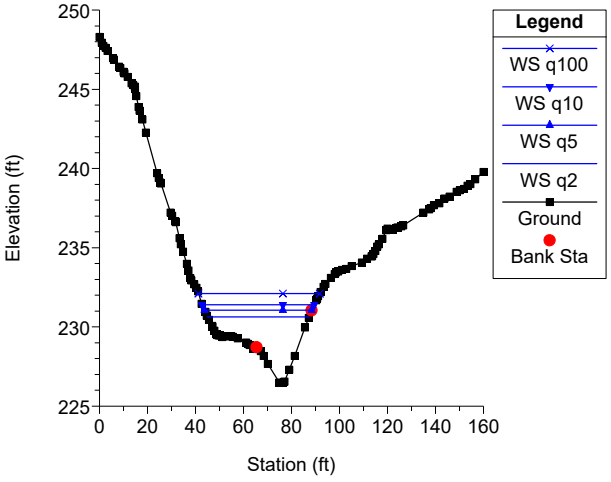

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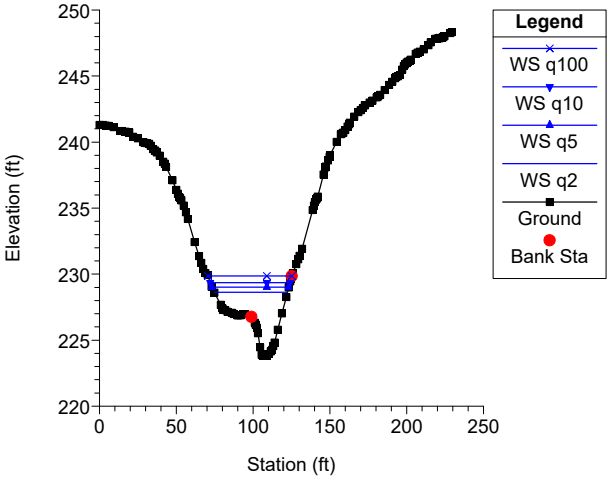

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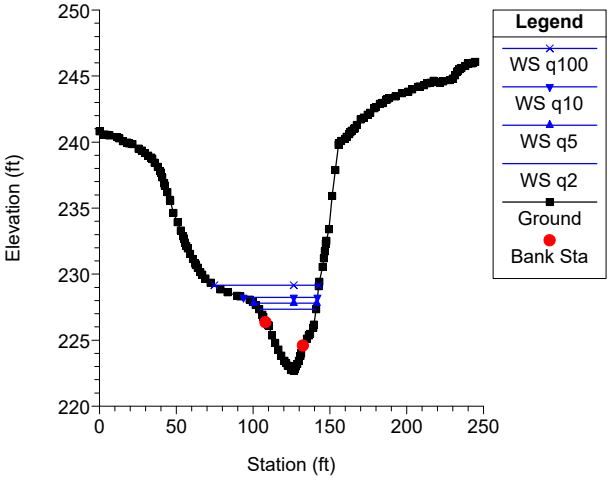

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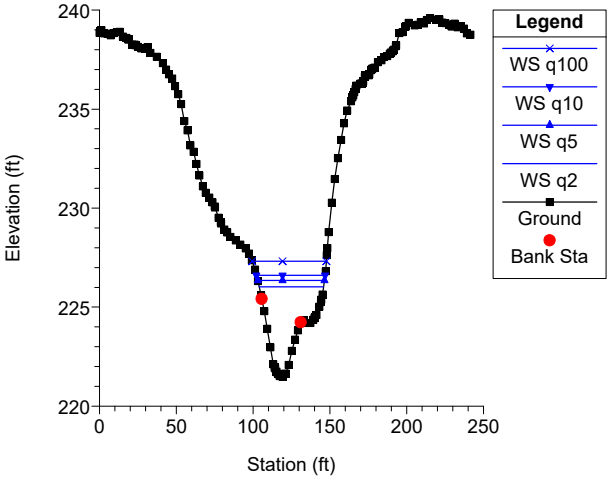

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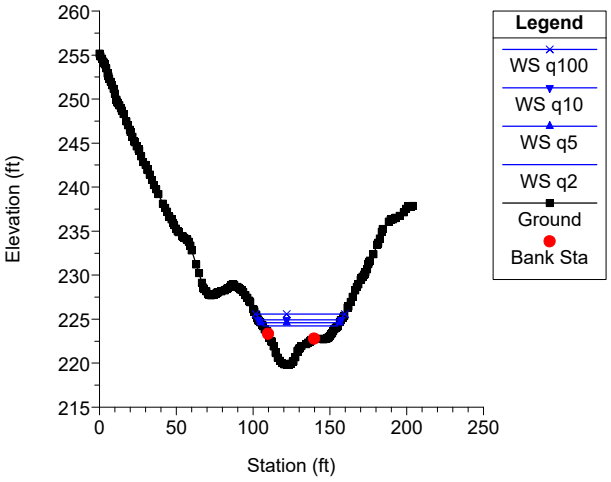

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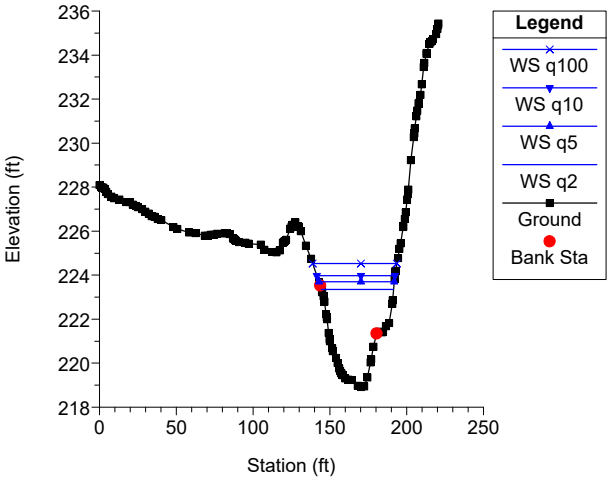

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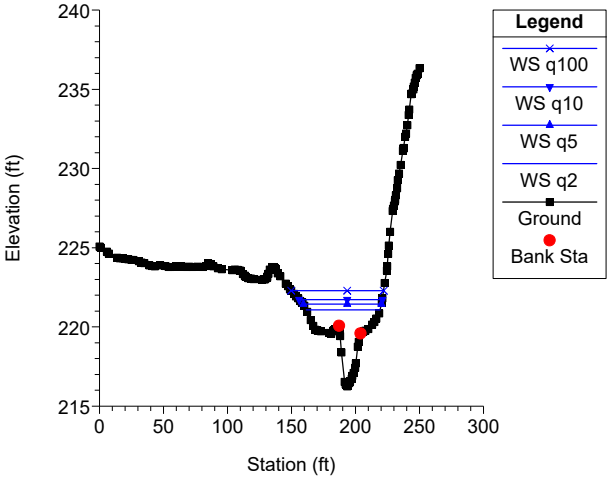

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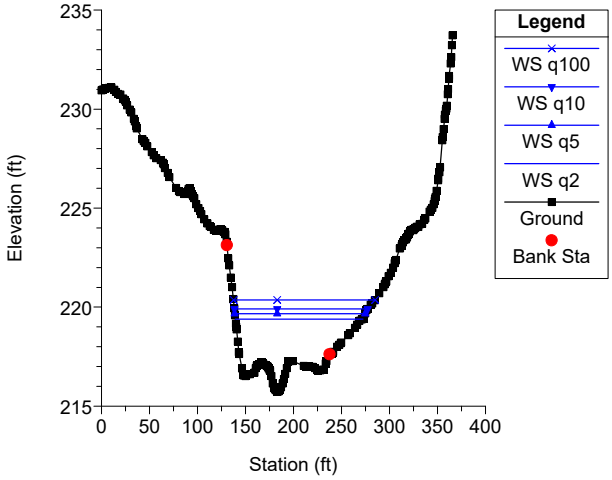

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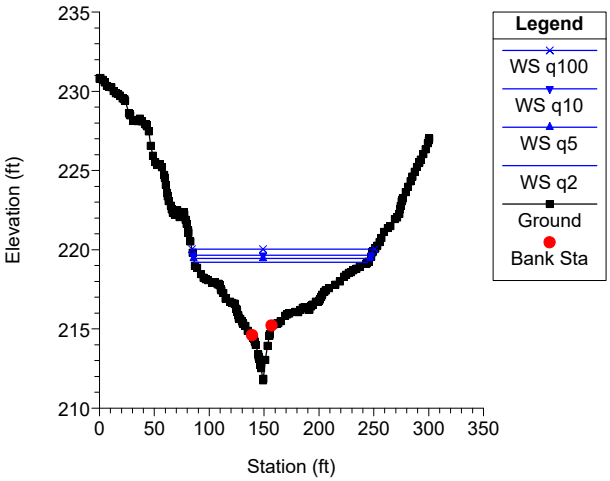

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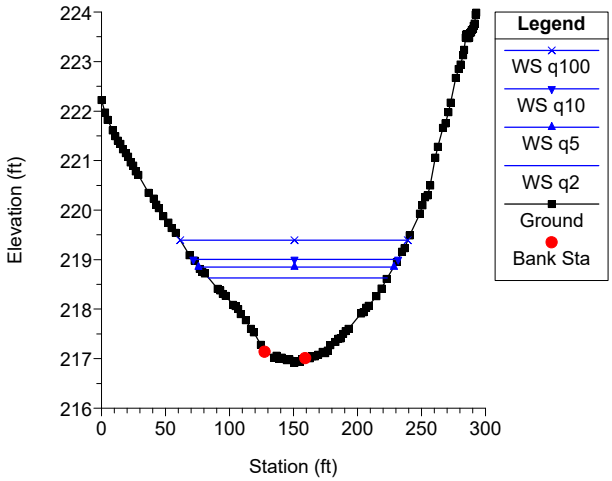

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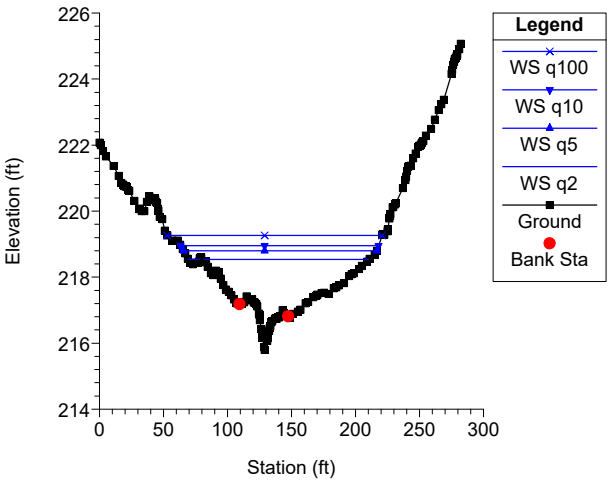

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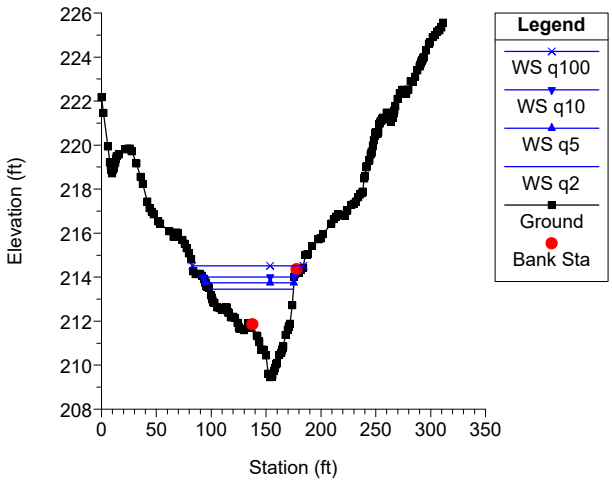

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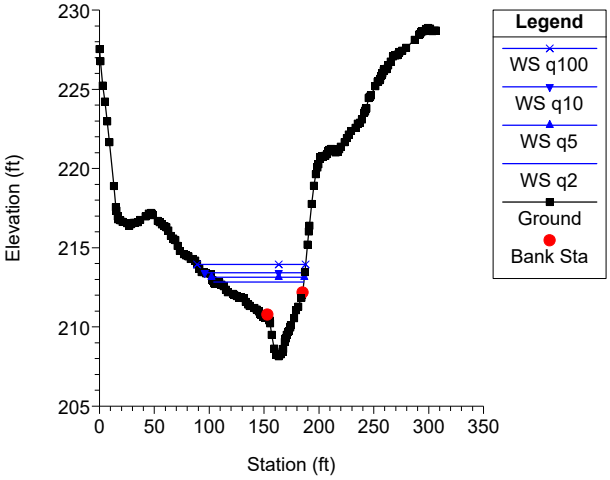

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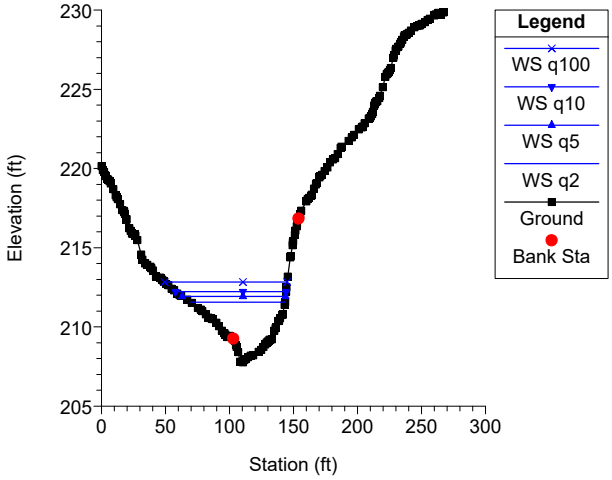

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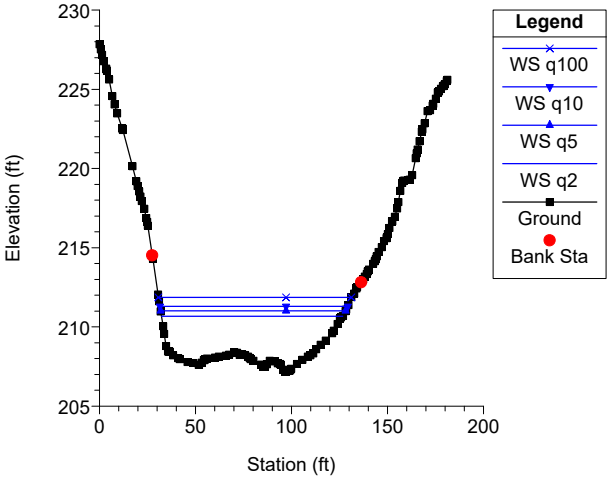

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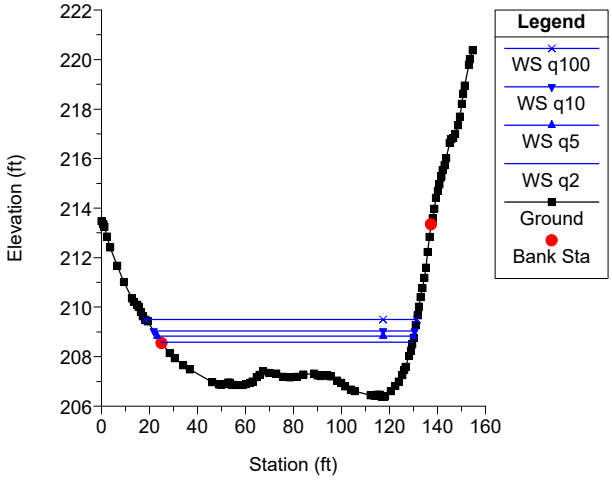

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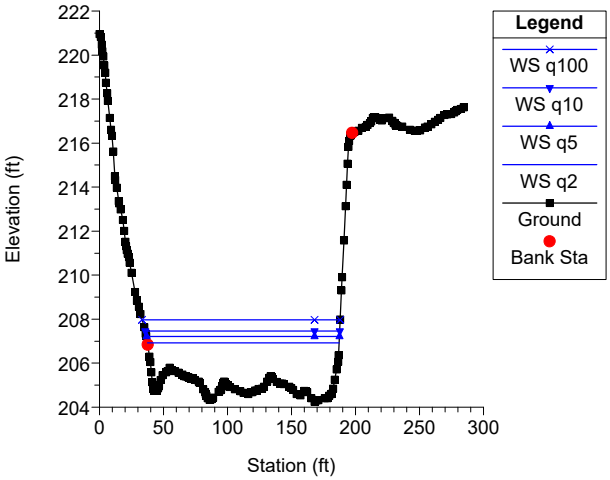

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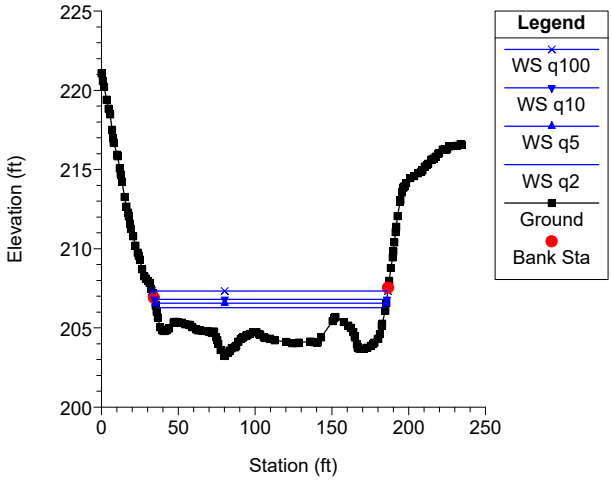

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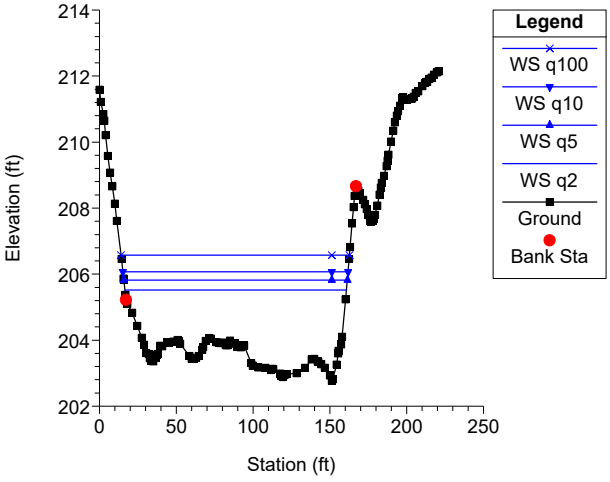

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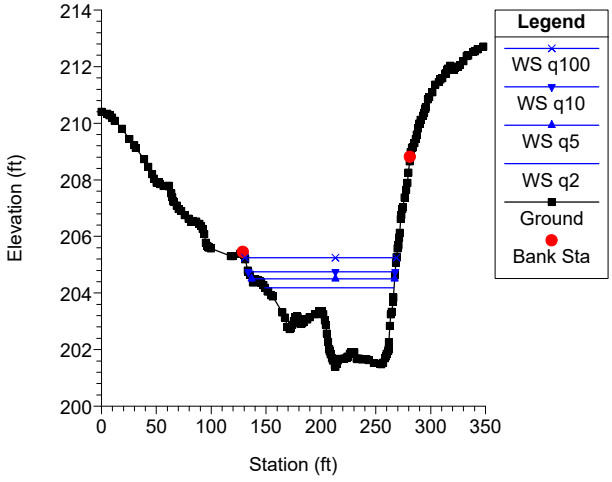

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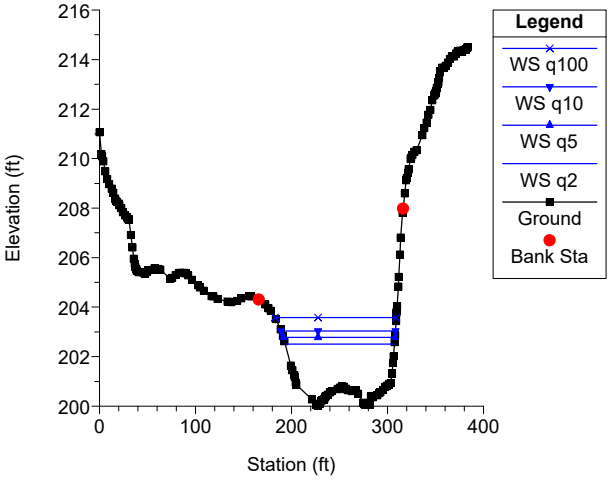

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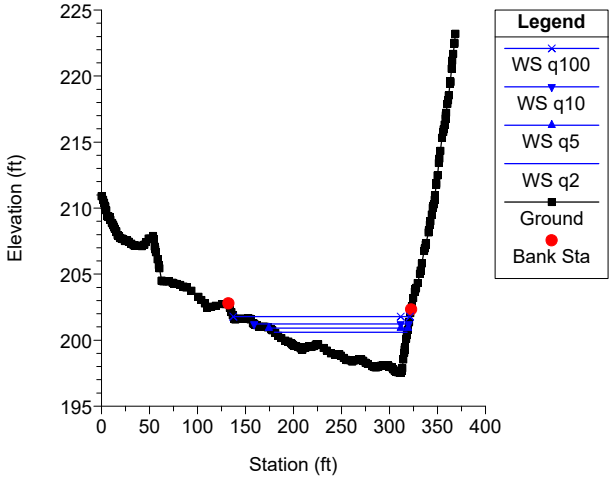

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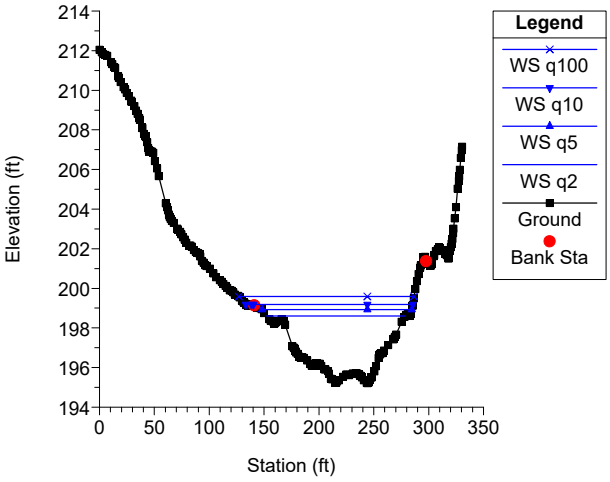

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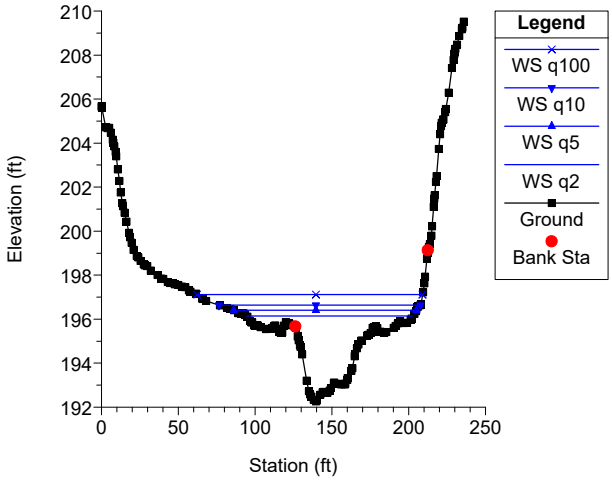

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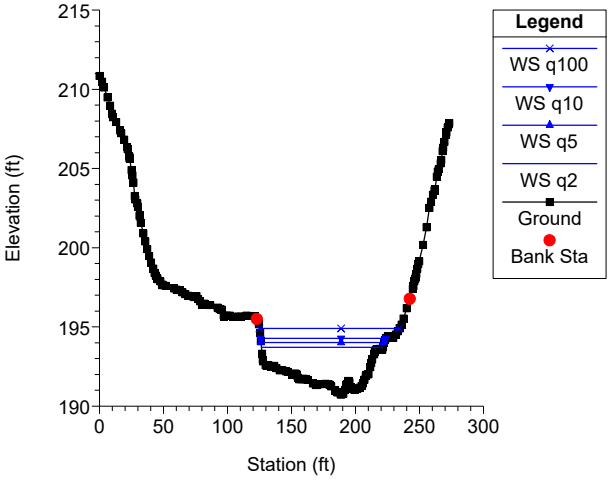

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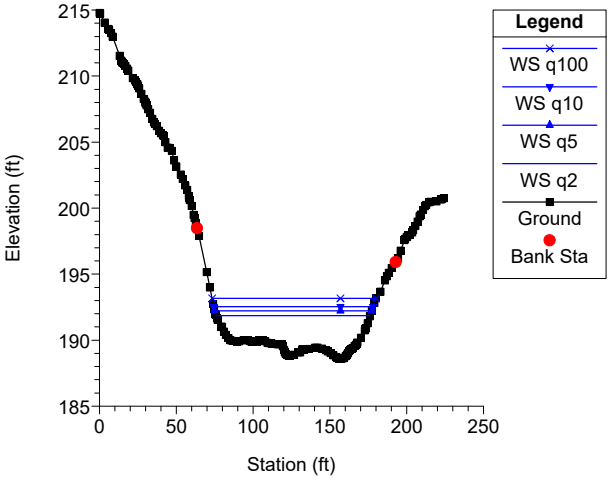

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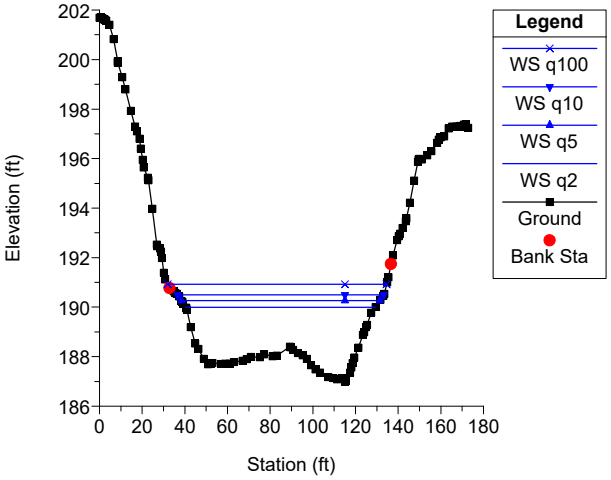

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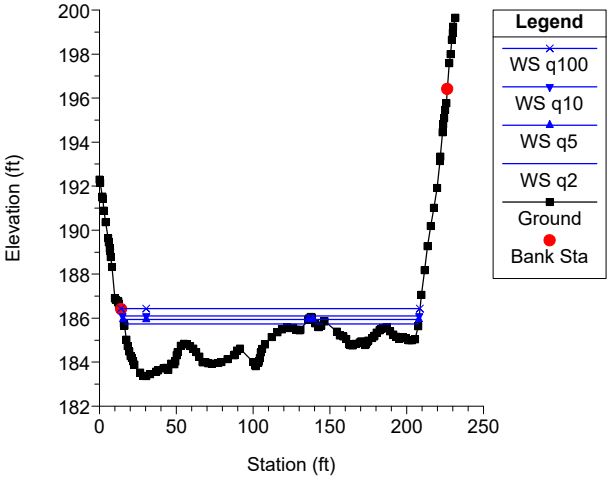

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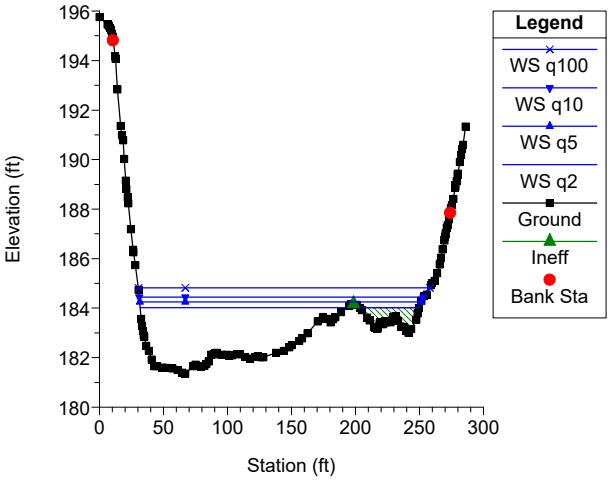

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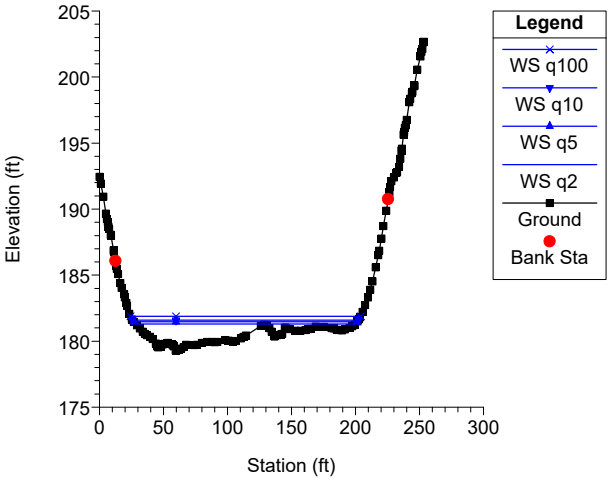

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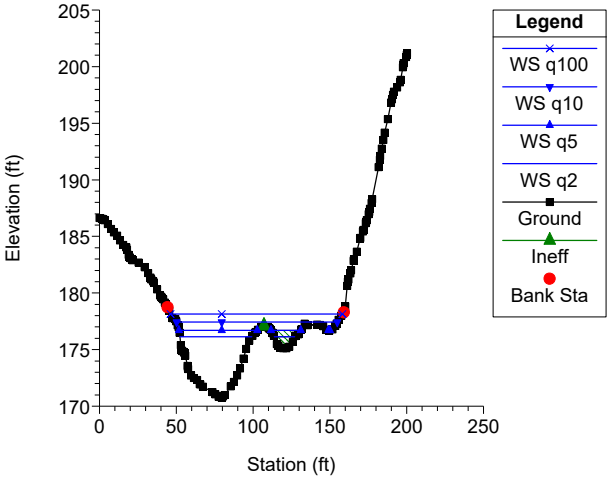

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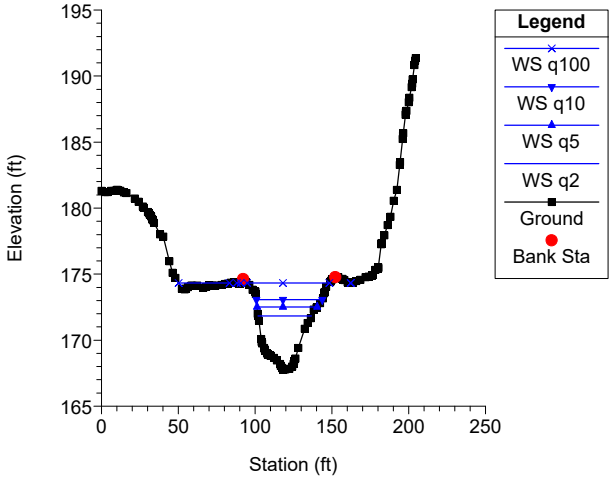

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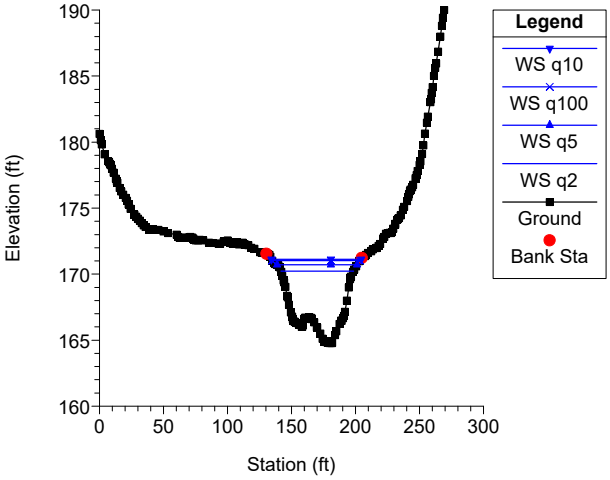

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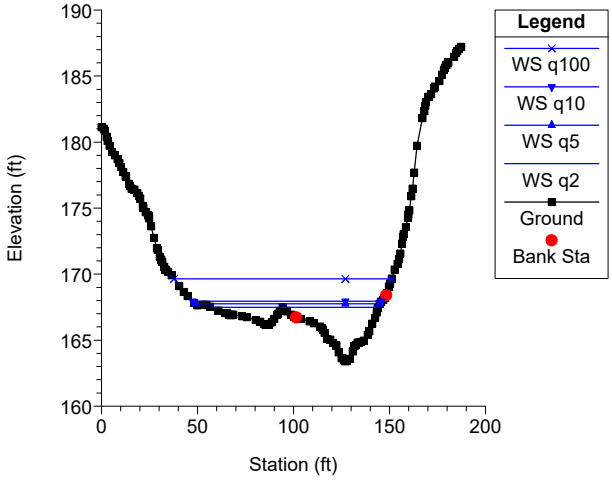

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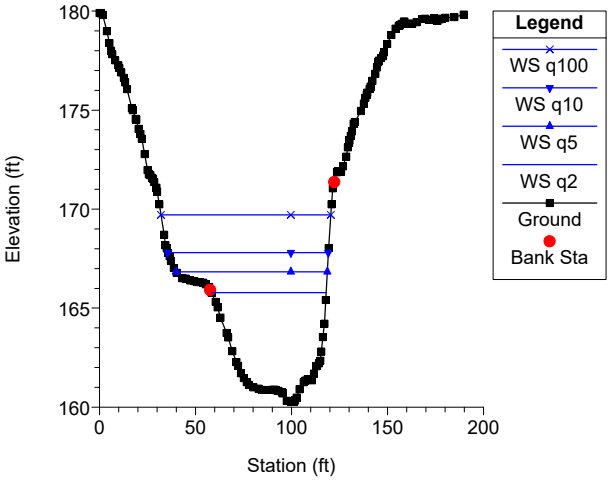

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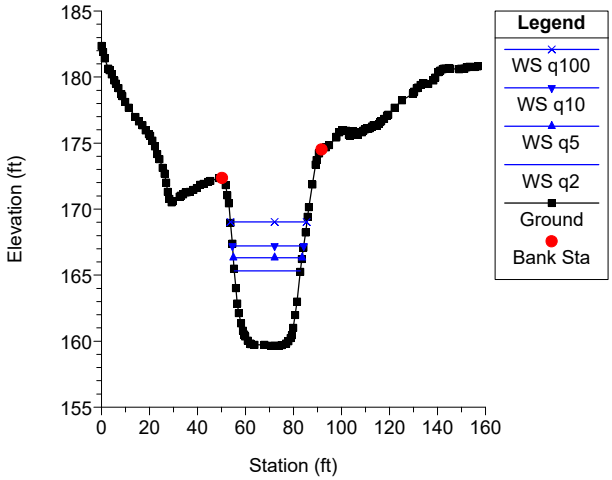

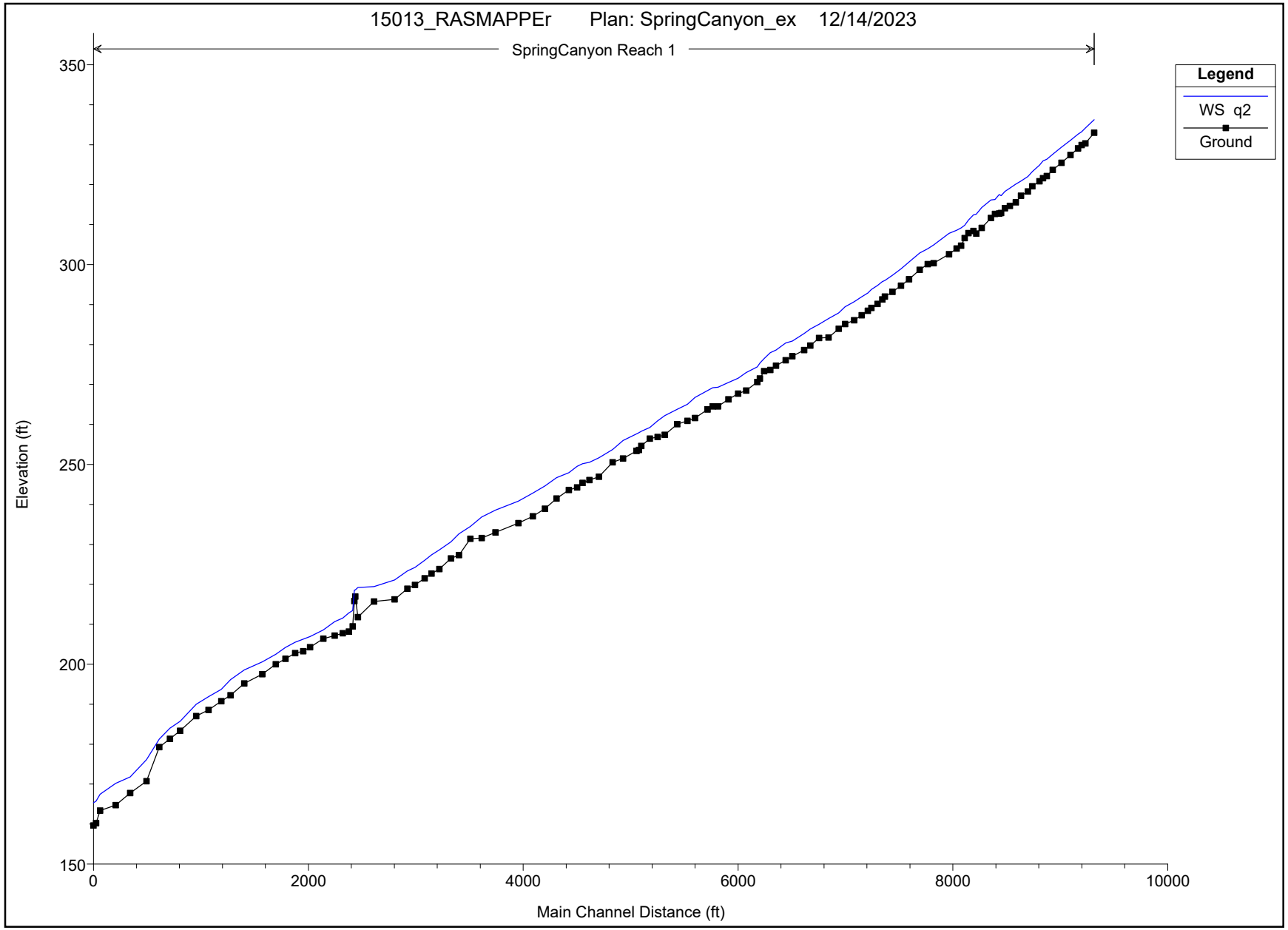
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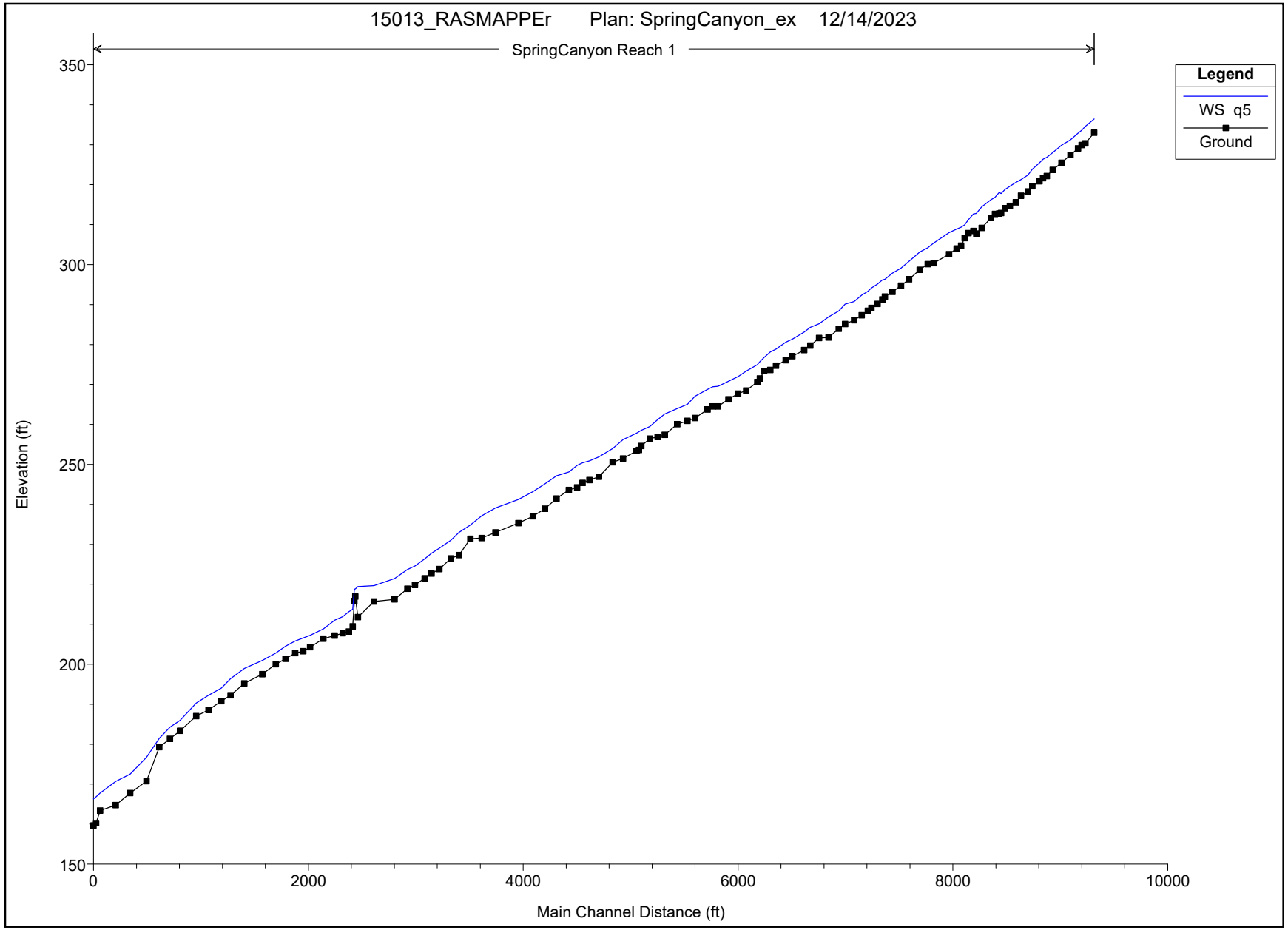
SpringCanyon Reach 1
Legend
WS q2
Ground
Elevation (ft)
350
300
250
200
150
0
2000
4000
6000
8000
10000
Main Channel Distance (ft)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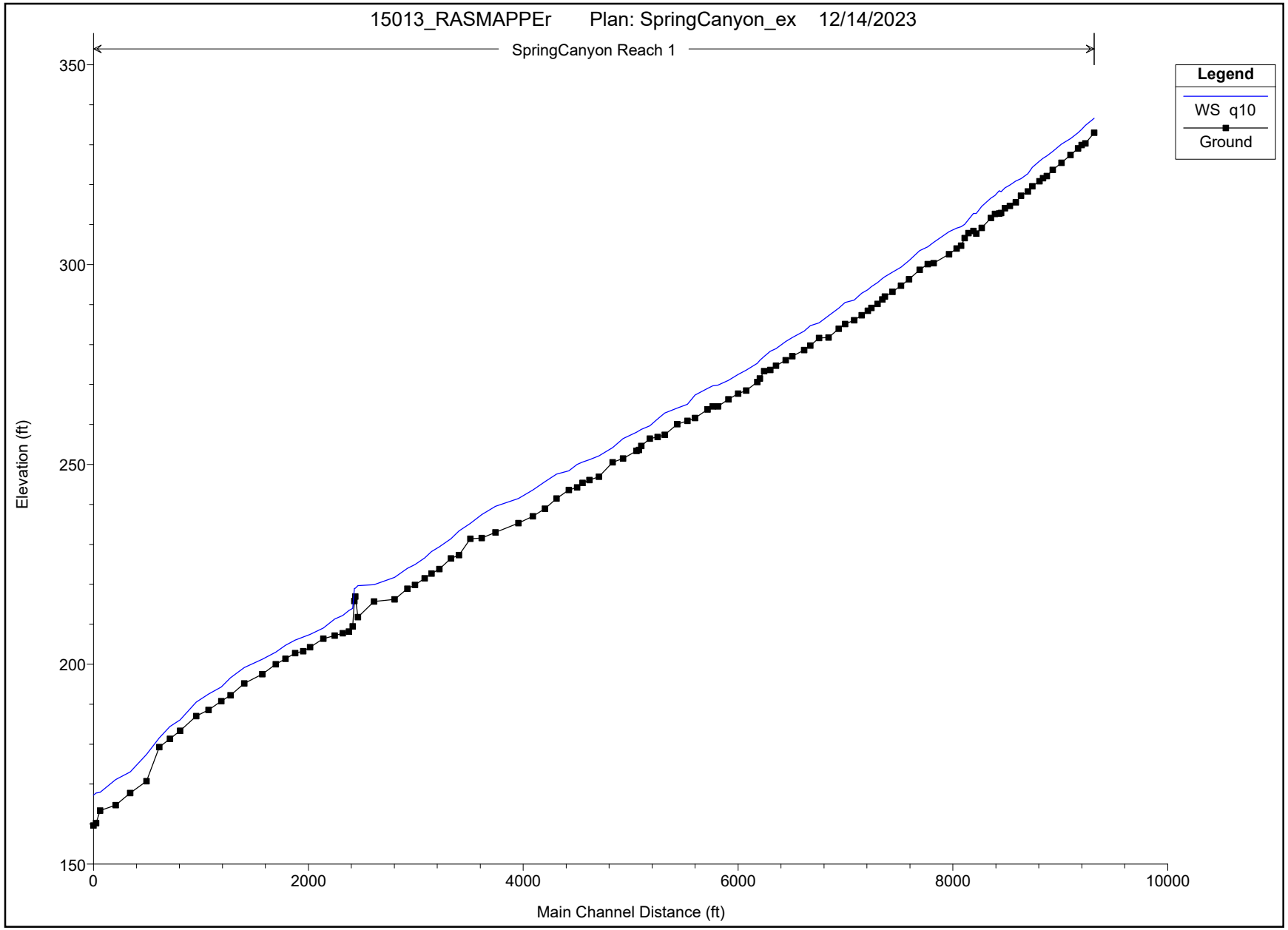
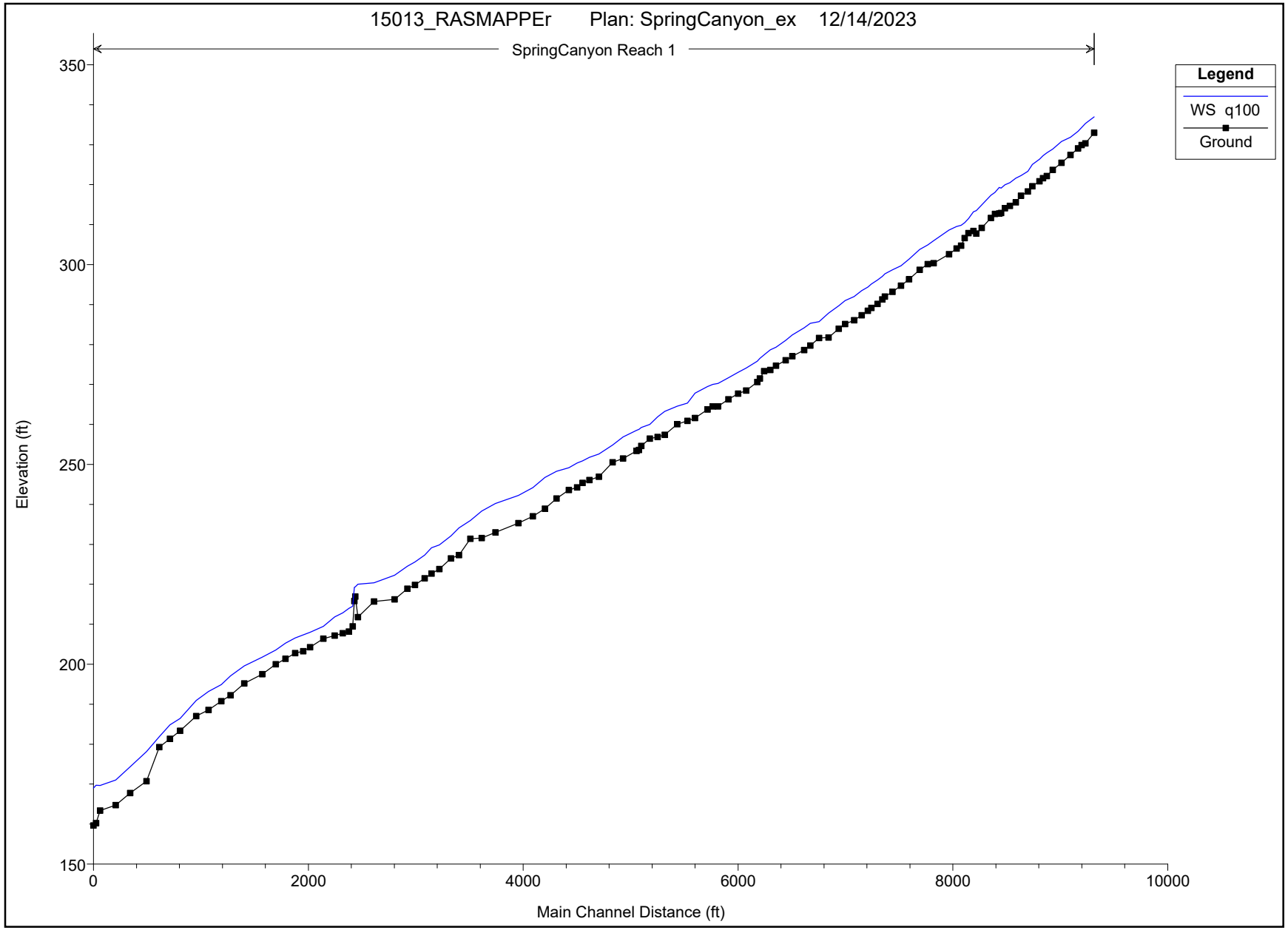
SpringCanyon Reach 1
Legend
WS q5
Ground
Elevation (ft)
350
300
250
200
150
0
2000
4000
6000
8000
10000
Main Channel Distance (ft)


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)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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 3

Geocon Incorporated Summary of Drilling and Groundwater Measurements, Nakano and Southwest Village Wetland Plan Areas, San Diego, California

Project No. 06847-42-08
July 11, 2024

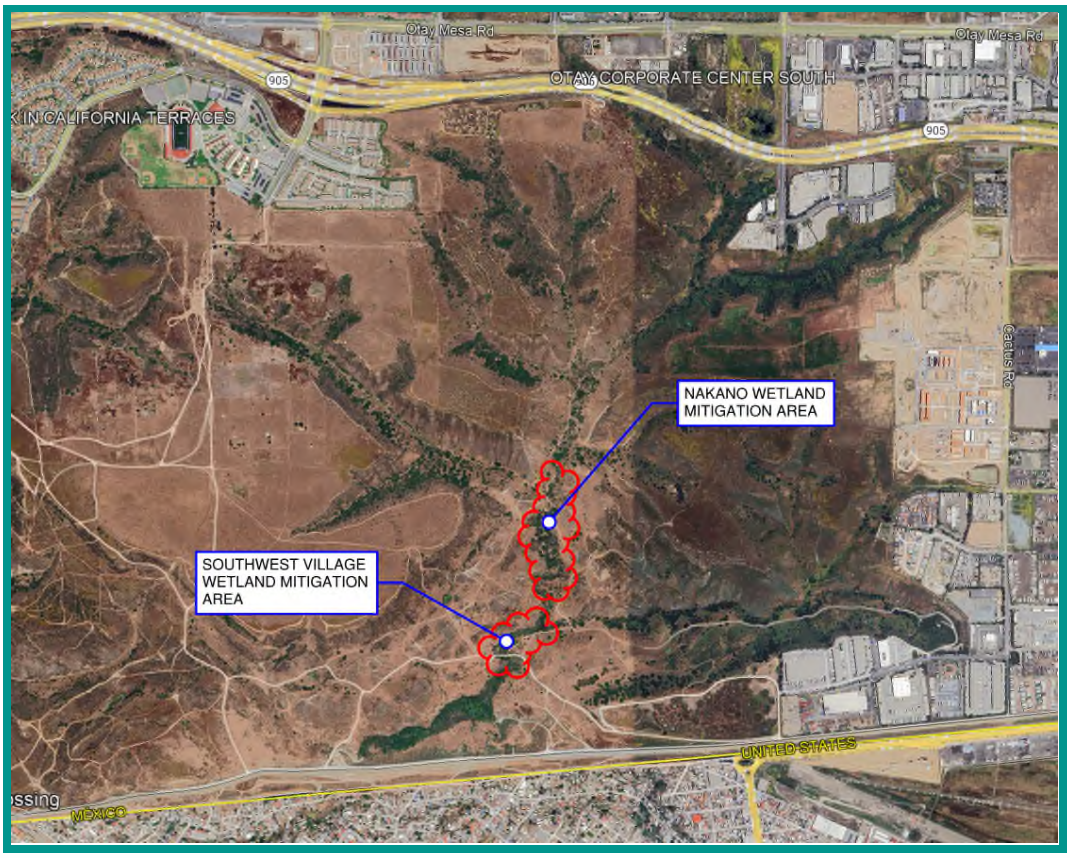
Tri Pointe Homes
13520 Evening Creek Drive North, Suite 300
San Diego, California 92128

Attention: Mr. Allen Kashani

Subject: SUMMARY OF DRILLING AND GROUNDWATER MEASUREMENTS
NAKANO AND SOUTHWEST VILLAGE WETLAND MITIGATION AREAS
SAN DIEGO, CALIFORNIA

Dear Mr. Kashani:

In accordance with your request, we have prepared this letter to summarize drilling and groundwater depth measurements performed for the proposed Nakano and Southwest Village wetland mitigation areas. The approximate locations of the mitigation areas is shown on the Vicinity Map below.



Vicinity Map

Boring locations were determined by Recon Environmental. Boring locations are shown on the Site Plan, Figure 1. Logs of the borings are appended.

Drilling began on June 3, 2024, using a tripod drill rig equipped with 6-inch, solid flight augers. Due to abundant cobble, refusal was encountered at depths between 2 feet and 7.5 feet. We were able to advance one boring to a dept of 15 with the tri-pod rig (Boring B-1)

On June 5 and 6, 2024, we performed drilling with a track-mounted limited access drill rig equipped with an 18-inch auger and core barrel. Borings B-2 through B-5 were drilled using this drill rig. The borings were drilled to depths ranging from 7 feet to 18 feet. Table I summarizes the borings and depths where groundwater was encountered. At B-5 the drill rig had a mechanical breakdown and the boring was terminated at a depth of 7 feet.

Based on the exploratory borings, we found groundwater at depths ranging from approximately 7.5 feet to 15 feet below ground surface. Although we were not able to drill borings in the proposed Southwest Village wetland mitigation area due to sensitive habitat, it is our opinion that the groundwater depth would be similar to what we encountered in the Nakano wetland mitigation area considering their proximity.

Should you have any questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Noel G. Borja
Project Engineer

Rodney C. Mikesell
GE 2533

NGB:RCM:am

Attachments: Figure 1, Site Plan
Logs of Borings, GW-3 and LB-1 through LB-4

(e-mail) Addressee

TABLE I
SUMMARY OF BORINGS AND GROUNDWATER MEASUREMENTS

Boring No.	Total Drill Depth (feet)	Measured Groundwater Depth (feet)
B-1	15	10.8
B-2	11.5	7.5*
B-3	18	15**
B-4	17	10.5*

*Depth measured from creek bottom
**Seepage encountered

NAKANO AND SOUTHWEST VILLAGE WETLAND MITAGATION AREAS SAN DIEGO, CALIFORNIA

0’ 50’ 100’ 150’ 200’

SCALE 1”=100’(on 11x17)

GEOCON LEGEND

B-5 .....APPROX. LOCATION OF EXPLORATORY BORING

THE GEOGRAPHICAL INFORMATION MADE AVAILABLE FOR DISPLAY WAS PROVIDED BY GOOGLE EARTH, SUBJECT TO A LICENSING AGREEMENT. THE INFORMATION IS FOR ILLUSTRATIVE PURPOSES ONLY; IT IS NOT INTENDED FOR CLIENT'S USE OR RELIANCE AND SHALL NOT BE REPRODUCED BY CLIENT. CLIENT SHALL INDEMNIFY, DEFEND AND HOLD HARMLESS GEOCON FROM ANY LIABILITY INCURRED AS A RESULT OF SUCH USE OR RELIANCE BY CLIENT.

BORING LOCATION MAP

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

PROJECT NO. 06847 - 42 - 08
FIGURE 1
DATE 07 - 11 - 2024

Plotted:07/11/2024 12:35PM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\06847-42-08 (Southwest Village Wetlands)\SHEETS\06847-42-08 Boring Location Map.dwg

PROJECT NO. 06847-42-08

BORING B 1

ELEV. (MSL.) **273'** DATE COMPLETED **06/03/2024**

EQUIPMENT **Tripod Drill Rig w/ 6" SFA** BY: **N. BORJA**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**ALLUVIUM (Qal)** Loose, dry to damp, grayish brown to dark brown, Silty, fine to medium SAND			
2								
4				SC	Loose, moist, dark grayish brown, Clayey, fine to medium SAND; few gravel and cobble			
6				CL	Soft to firm, moist, dark brown, Silty CLAY			
8								
10			▼		-Becomes wet			
12				CL	Soft to firm, saturated, light brown, Sandy CLAY			
14								
					BORING TERMINATED AT 15 FEET Groundwater encountered at 10.5 feet Backfilled on 06/03/2024			

Figure A-1,
Log of Boring B 1, Page 1 of 1

06847-42-08.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. 06847-42-08

BORING B 2

ELEV. (MSL.) **271'** DATE COMPLETED **06/05/2024**

EQUIPMENT **LAR w/ 18" Auger** BY: **N. BORJA**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				GP	**ALLUVIUM (Qal)** Loose to medium dense, moist, dark brown, Sandy GRAVEL; some cobble up to 12" in diameter; some silt			
2				CL	Firm, moist, dark brown, Sandy CLAY; some gravel and cobble up to 8" in diameter			
4					-Becomes brown to olive brown			
6				SC	Firm, moist, dark grayish brown, Silty to Sandy CLAY; few gravel and cobble			
8			▼		-Groundwater measured on 06/06/2024			
10								
					BORING TERMINATED AT 11.5 FEET Static groundwater encountered at 7.5 feet Backfilled on 06/05/2024			

Figure A-2,
Log of Boring B 2, Page 1 of 1

06847-42-08.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. 06847-42-08

BORING B 3

ELEV. (MSL.) **270'** DATE COMPLETED **06/06/2024**

EQUIPMENT **LAR w/ 18" Auger** BY: **N. BORJA**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**TOPSOIL** Loose, dry to damp, light grayish brown, Silty, fine to medium SAND; few gravel and cobble up to 6" in diameter			
2				SM	**ALLUVIUM (Qal)** Loose, damp, grayish brown, Silty, fine to medium SAND; trace gravel and cobble			
4					-Becomes dark gray			
6					-Becomes medium dense, brown to grayish brown, fine- to coarse-grained; few mica			
8					-Boulder up to 15" in diameter encountered at 7 feet			
10				SC	**OTAY FORMATION (To)** Medium dense, moist, light grayish brown, Clayey, fine to medium SAND; few gravel and cobble			
12				ML	Stiff, damp light olive brown, Sandy SILT			
14			▽	SM	Medium dense, moist to wet, light olive brown, Silty, fine to coarse SAND; trace gravel -Minor seepage			
16				CL	Stiff, damp, pink to light pink, Silty to Sandy CLAY			
18				ML	Stiff, moist, olive brown, Sandy SILT			
					BORING TERMINATED AT 18 FEET Minor seepage encountered at approx. 15 feet Backfilled on 06/06/2024			

Figure A-3,
Log of Boring B 3, Page 1 of 1

06847-42-08.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ▽ ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. 06847-42-08

BORING B 4

ELEV. (MSL.) **267'** DATE COMPLETED **06/06/2024**

EQUIPMENT **LAR w/ 18" Auger** BY: **N. BORJA**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**ALLUVIUM (Qal)** Loose, dry to damp, light grayish brown, Silty SAND; little gravel and cobble			
2					-Becomes damp, dark brown gray; metal debris encountered			
				CL	Soft to firm, moist, dark brown, Sandy CLAY; some gravel and cobble up to 4" in diameter			
4								
6								
8								
10			▼		-Becomes dark olive brown with gravel and cobble			
12				CL	**OTAY FORMATION (To)** Stiff, moist, grayish brown, Sandy CLAY; trace gravel and cobble			
14				SC	Medium dense, wet, grayish brown, Clayey, fine to medium SAND; trace gravel and cobble -Excavates with caliche staining			
16				ML	Stiff, moist to wet, light grayish brown, Sandy SILT			
					BORING TERMINATED AT 17 FEET Groundwater encountered at 10.5 feet			

Figure A-4,
Log of Boring B 4, Page 1 of 1

06847-42-08.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ▼ ... WATER TABLE OR ▽ ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. 06847-42-08

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 5** ELEV. (MSL.) **266'** DATE COMPLETED **06/06/2024** EQUIPMENT **LAR w/ 18" Auger** BY: **N. BORJA**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**ALLUVIUM (Qal)** Loose, dry to damp, grayish brown to dark grayish brown, Silty, fine to medium SAND; few gravel and cobble up to 4" in diameter			
2								
				SC	Loose, moist, dark brown, Clayey, fine to coarse SAND; some gravel and cobble up to 10" in diameter; some silt			
4					-Difficult drilling due to rock			
6								
					BORING TERMINATED AT 7 FEET Mechanical breakdown on drilling Backfilled on 06/06/2024			

Figure A-5,
Log of Boring B 5, Page 1 of 1

06847-42-08.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

ATTACHMENT 4

Historical Aerial Photographs

Image Source: Historic Aerials, USDA (flown May 1953)

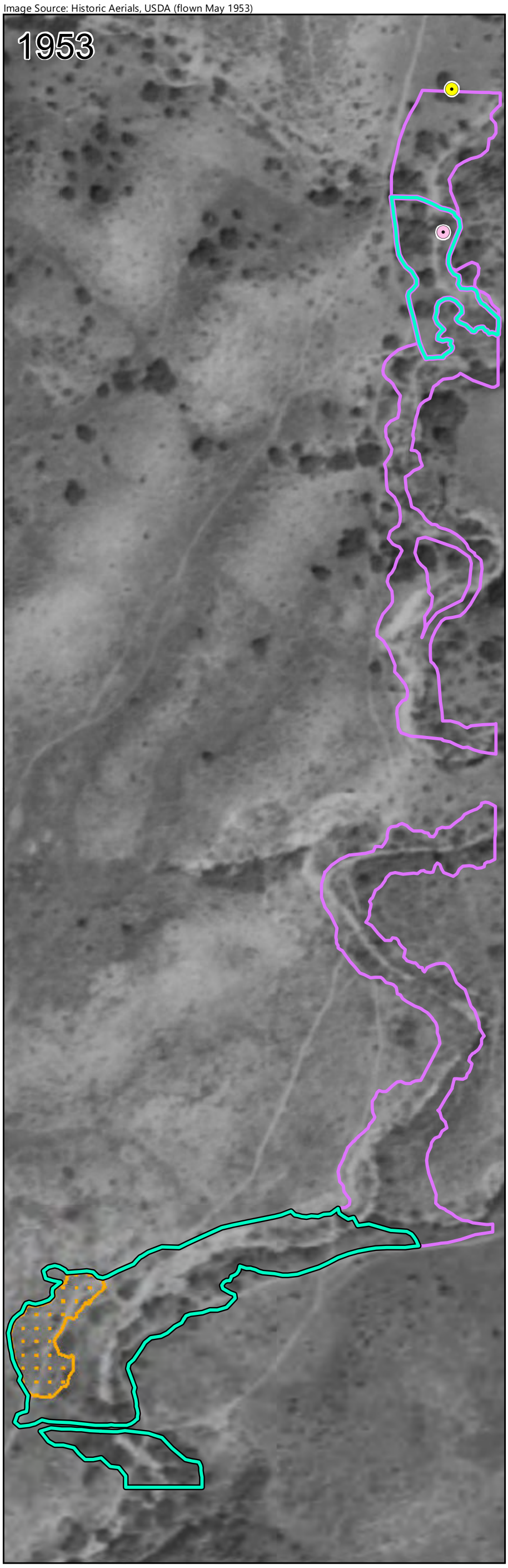
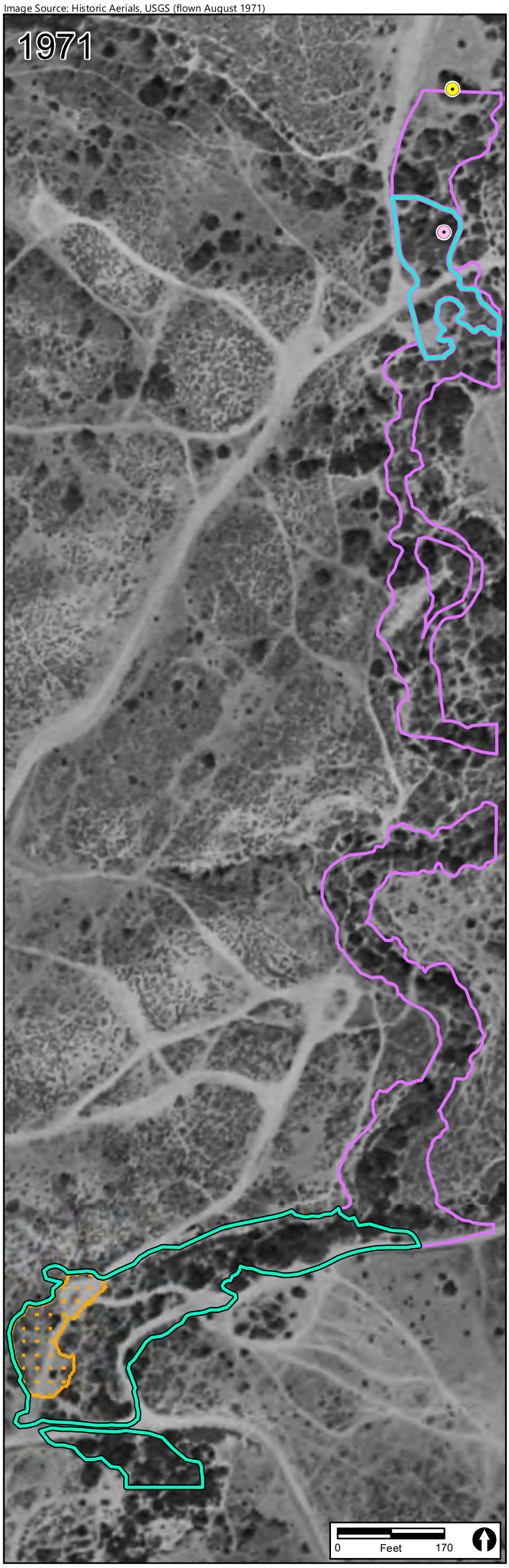


Image Source: Historic Aerials, USGS (flown August 1971)



Southwest Village Wetland Plan Area (2.179 ac)

- Wetland Plan Area (2.179 ac)
- Wetland Creation (Establishment) for Impacts to Non-wetland Waters/Streambed (0.363)

Nakano Wetland Plan Area (3.920 acres)

- Creation (Establishment) Area for Southwest Village to be Implemented Concurrent with Nakano Project (0.458 ac)
- Remaining Nakano Wetland Plan Area (3.462 acres)

- Lemonade Berry (*Rhus integrifolia*)
- Peruvian Pepper Tree (*Schinus molle*)

RECON

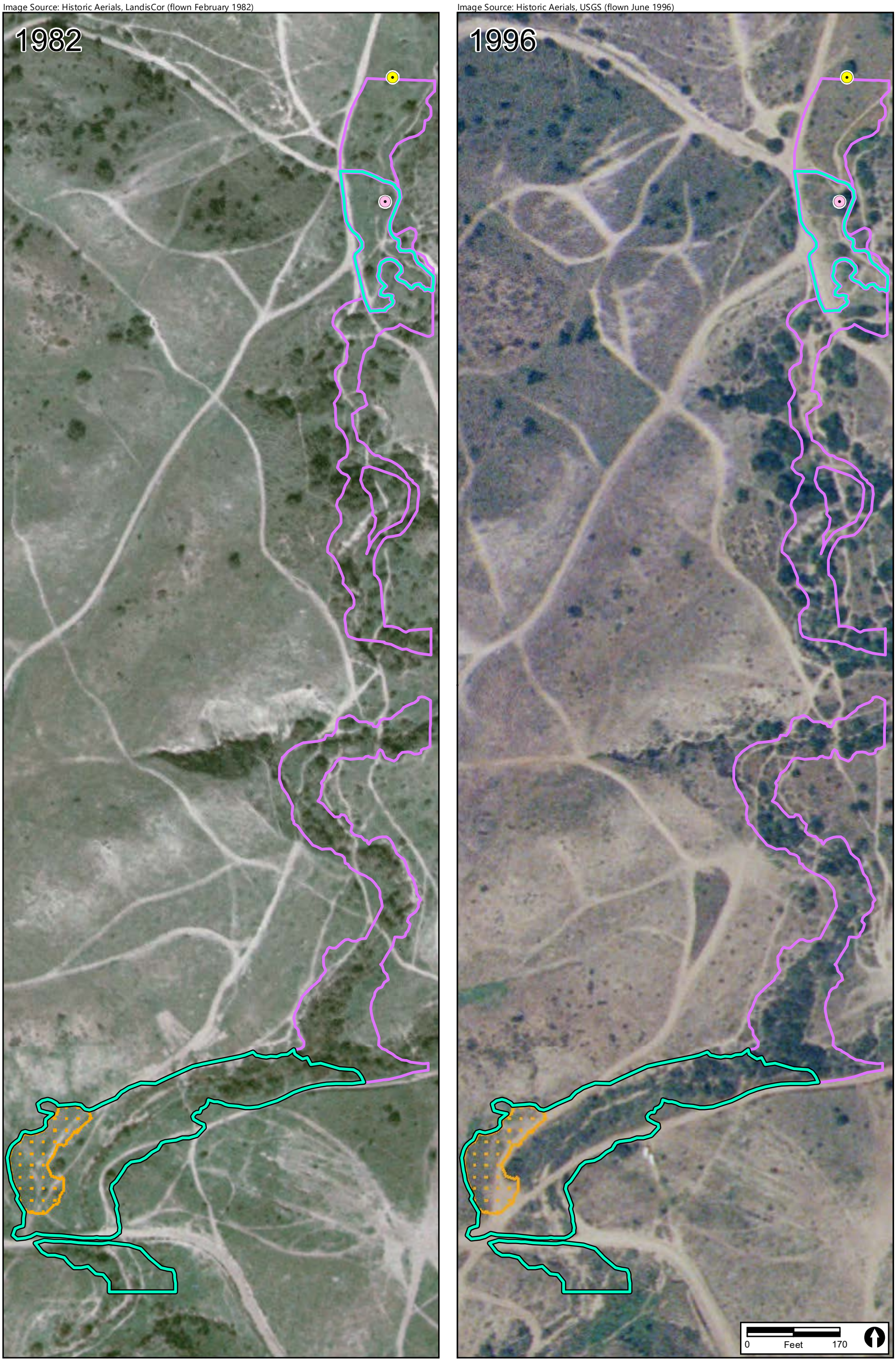
M:\JOBS5\8868\common_gis\Reports\Rest\Wetland_mitPln\2024\Summer\Attach4.1.mxd 08/28/2024 bma

ATTACHMENT 4

Spring Canyon Historical Aerial Photographs

Image Source: Historic Aerials, LandisCor (flown February 1982)

Image Source: Historic Aerials, USGS (flown June 1996)



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RECON

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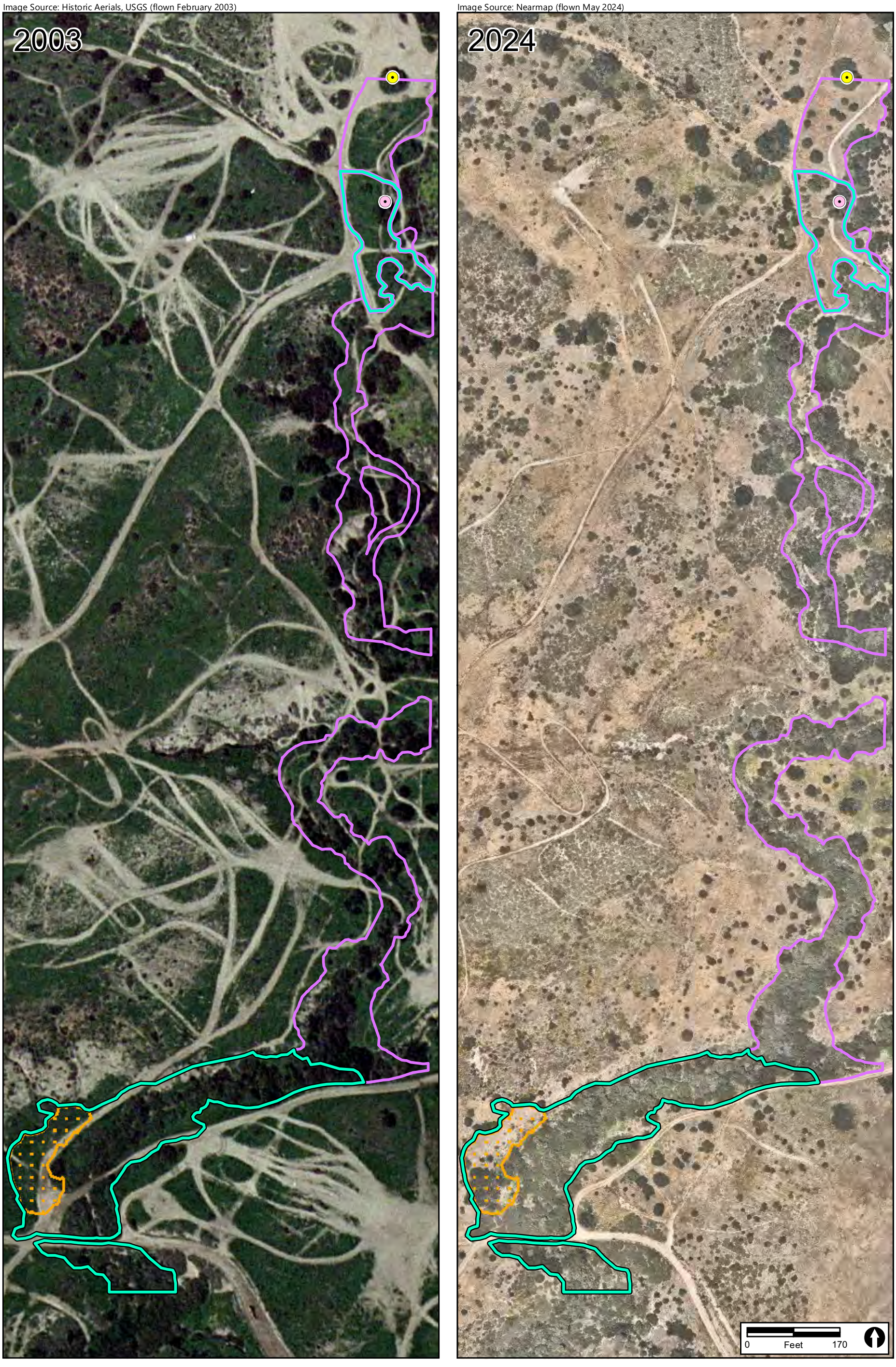
ATTACHMENT 4

Spring Canyon Historical Aerial Photographs

Image Source: Historic Aerials, USGS (flown February 2003)

Image Source: Nearmap (flown May 2024)



Southwest Village Wetland Plan Area (2.179 ac)

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Peruvian Pepper Tree (*Schinus molle*)

RECON

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ATTACHMENT 4

Spring Canyon Historical Aerial Photographs

ATTACHMENT 19

Conservation Easement Deed

9

RECORDING REQUESTED BY
STEWART TITLE

DOC # 2009-0696279

DEC 17, 2009 8:00 AM
OFFICIAL RECORDS
SAN DIEGO COUNTY RECORDER'S OFFICE
DAVID L. BUTLER, COUNTY RECORDER
FEES: 0.00
OC: NA

PAGES: 22

RECORDING REQUESTED BY AND WHEN RECORDED MAIL TO:

State of California
Wildlife Conservation Board
1807 13th Street, Suite 103
Sacramento, CA 95811
order# 01-0246236

FG 22 NF DCWA

Space Above Line for Recorder's Use Only

CONSERVATION EASEMENT DEED

4711

THIS CONSERVATION EASEMENT DEED is made this 12TH day of NOVEMBER, 2009, by The Environmental Trust, Inc., a California nonprofit public benefit corporation ("Grantor"), in favor of THE STATE OF CALIFORNIA ("Grantee"), acting by and through its Department of Fish and Game, a subdivision of the California Resources Agency, with reference to the following facts:

RECITALS

A. Grantor is the sole owner in fee simple of certain real property containing approximately 40 acres, located in the County of San Diego, State of California, designated Assessor's Parcel Number 645-061-02 and more particularly described in Exhibit "A" attached hereto and incorporated herein by this reference (the "Property");

B. The Property possesses wildlife and habitat values (collectively, "conservation values") of great importance to Grantee and the people of the State of California;

C. The Property provides high quality habitat for listed or otherwise sensitive species including coastal California gnatcatcher (*Polioptila californica californica*), northern harrier (*Circus cyaneus*), Cooper's hawk (*Accipiter cooperii*), golden eagle (*Aquila chrysaetos*), burrowing owl (*Athena cunicularia*), rufous-crowned sparrow (*Aimophila ruficeps*), white-tailed kite (*Elanus leucurus*), black-tailed jackrabbit (*Lepus californicus*), western spade-foot toad (*Spea hammondii*), coast barrel cactus (*Verocactus viridescens*), cliff spurge (*Euphorbia misera*), San Diego bur-sage (*Ambrosia chenopodiifolia*),and contains maritime succulent scrub, Diegan coastal sage scrub, coastal sage scrub/chaparral, native grassland, non-native grassland and vernal pool habitats;

However, based on a site visit of the Property by the City of San Diego (City) in October 2009, evidence of illegal dumping and litter was found at the Property. As City is the intended transferee of the Property (see"G" below), Grantor and Grantee agree that: (1) the ground disturbances and illegal dumping and littering at the Property has occurred prior to the City's acceptance of any interest or obligation relating to the property and, therefore (2) upon acceptance of any interest to the Property, the City's maintenance obligations shall be to

"THIS DOCUMENT WAS FILED FOR RECORDING BY STEWART TITLE AS AN ACCOMMODATION ONLY. IT HAS NOT BEEN EXAMINED AS TO ITS EXECUTION OR AS TO ITS EFFECT UPON THE TITLE OR ITS RECORDABILITY."

maintain the Property as set forth in the March 20, 2009, letter from the United States Fish and Wildlife Service and the California Department of Fish and Game see Section "1. Purposes" below;

D. Grantor acquired the Property as mitigation or compensation for certain impacts of the project(s) described in Exhibit "B" attached hereto and incorporated herein by this reference.

E. The Department of Fish and Game ("CDFG") has jurisdiction, pursuant to Fish and Game Code Section 1802, over the conservation, protection, and management of fish, wildlife, native plants and the habitat necessary for biologically sustainable populations of those species, and CDFG is authorized to hold conservation easements for these purposes pursuant to Civil Code Section 815.3, Fish and Game Code Section 1348, and other provisions of California law.

F. This Conservation Easement is a "protective conservation easement" granted pursuant to the Combined Disclosure Statement and Liquidating Plan of Reorganization dated as of December 20, 2005 (the "Plan"), in United States Bankruptcy Court, Southern District of California, Bankruptcy No. 05-12321-LA11, In Re The Environmental Trust, Inc., Debtor.

G. Also pursuant to the Plan, concurrently with this Conservation Easement, Grantor is granting and conveying the Property to the City of San Diego, which will acquire the Property subject to this Conservation Easement. As Section 11 of this Conservation Easement requires, Grantor shall incorporate the terms of this Conservation Easement by reference in the deed(s) or other legal instrument(s) by which Grantor so divests itself of the Property.

COVENANTS, TERMS, CONDITIONS AND RESTRICTIONS

For good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, and pursuant to California law, including Civil Code Section 815, *et seq.*, Grantor hereby voluntarily grants and conveys to Grantee a conservation easement in perpetuity over the Property.

1. Purposes. The purposes of this Conservation Easement are to ensure the Property will be retained forever in its natural condition and to prevent any use of the Property that will impair or interfere with the conservation values of the Property. Grantor intends that this Conservation Easement will confine the use of the Property to such activities that are consistent with those purposes, including, without limitation, those involving the preservation, restoration and enhancement of native species and their habitats.

However, it is specifically agreed by the parties hereto, that, notwithstanding any conflicting provision of this, or any other Conservation Easement affecting the Property, that the March 20, 2009, letter from the United States Fish and Wildlife Service and the California Department of Fish and Game to the City of San Diego, attached hereto as Exhibit "C", and incorporated by reference herein, shall control over any such conflicting provision within the Conservation Easements and govern the City's responsibilities toward the Property.

2. Grantee's Rights. To accomplish the purposes of this Conservation Easement, Grantor hereby grants and conveys the following rights to Grantee: 4713

(a) To preserve and protect the conservation values of the Property;

(b) To enter upon the Property at reasonable times in order to monitor compliance with and otherwise enforce the terms of this Conservation Easement, and for scientific research and interpretive purposes by Grantee or its designees, provided that Grantee shall not unreasonably interfere with Grantor's authorized use and quiet enjoyment of the Property;

(c) To prevent any activity on or use of the Property that is inconsistent with the purposes of this Conservation Easement and to require the restoration of such areas or features of the Property that may be damaged by any act, failure to act, or any use that is inconsistent with the purposes of this Conservation Easement;

(d) All mineral, air and water rights necessary to protect and to sustain the biological resources of the Property; and

(e) All present and future development rights allocated, implied, reserved or inherent in the Property; such rights are hereby terminated and extinguished, and may not be used on or transferred to any portion of the Property, nor any other property adjacent or otherwise.

3. Prohibited Uses. Any activity on or use of the Property inconsistent with the purposes of this Conservation Easement is prohibited. Without limiting the generality of the foregoing, the following uses and activities by Grantor, Grantor's agents, and third parties, are expressly prohibited:

(a) Unseasonal watering; use of fertilizers, pesticides, biocides, herbicides or other agricultural chemicals except as necessary to protect habitat values; weed abatement activities; incompatible fire protection activities; and any and all other activities and uses which may adversely affect the purposes of this Conservation Easement;

(b) Use of off-road vehicles and use of any other motorized vehicles except on existing roadways;

(c) Agricultural activity of any kind, except that grazing is permitted if done in accordance with a CDFG-approved grazing or management plan;

(d) Recreational activities including, but not limited to, horseback riding, biking, hunting or fishing, except as may be specifically permitted under this Conservation Easement or as approved by the Wildlife Agencies.

(e) Commercial or industrial uses;

(f) Any legal or de facto division, subdivision or partitioning of the Property;

(g) Construction, reconstruction or placement of any building, billboard or sign, or any other structure or improvement of any kind;

(h) Depositing or accumulation of soil, trash, ashes, refuse, waste, bio-solids or any other materials;

(i) Planting, introduction or dispersal of non-native or exotic plant or animal species;

(j) Filling, dumping, excavating, draining, dredging, mining, drilling, removing or exploring for or extraction of minerals, loam, soil, sands, gravel, rocks or other material on or below the surface of the Property;

(k) Altering the surface or general topography of the Property, including building of roads;

(l) Removing, destroying, or cutting of native vegetation, except as required by law for (1) fire breaks, (2) maintenance of existing foot trails or roads, or (3) prevention or treatment of disease; and

(m) Manipulating, impounding or altering any natural water course, body of water or water circulation on the Property, and activities or uses detrimental to water quality, including but not limited to degradation or pollution of any surface or sub-surface waters.

4. Grantor's Duties. Grantor shall undertake all reasonable actions to prevent the unlawful entry and trespass by persons whose activities may degrade or harm the conservation values of the Property. In addition, Grantor shall undertake all necessary actions to perfect Grantee's rights under Section 2 of this Conservation Easement, including but not limited to, Grantee's water rights.

5. Reserved Rights. Grantor reserves to itself, and to its personal representatives, heirs, successors, and assigns, all rights accruing from its ownership of the Property, including the right to engage in or to permit or invite others to engage in all uses of the Property that are not expressly prohibited or limited by, and are consistent with the purposes of, this Conservation Easement.

6. Grantee's Remedies. If Grantee determines that a violation of the terms of this Conservation Easement has occurred or is threatened, Grantee shall give written notice to Grantor of such violation and demand in writing the cure of such violation. If Grantor fails to cure the violation within fifteen (15) days after receipt of written notice and demand from Grantee, or if the cure reasonably requires more than fifteen (15) days to complete and Grantor fails to begin the cure within the fifteen (15)-day period or fails to continue diligently to complete the cure, Grantee may bring an action at law or in equity in a court of competent jurisdiction to enforce the terms of this Conservation Easement, to recover any damages to which Grantee may be entitled for violation of the terms of this Conservation Easement or for any injury to the conservation values of the Property, to enjoin the violation, *ex parte* as necessary, by temporary or permanent injunction without the necessity of proving either actual

damages or the inadequacy of otherwise available legal remedies, or for other equitable relief, including, but not limited to, the restoration of the Property to the condition in which it existed prior to any such violation or injury. Without limiting Grantor's liability therefor, Grantee may apply any damages recovered to the cost of undertaking any corrective action on the Property. 4715

If Grantee, in its sole discretion, determines that circumstances require immediate action to prevent or mitigate damage to the conservation values of the Property, Grantee may pursue its remedies under this Section 6 without prior notice to Grantor or without waiting for the period provided for cure to expire. Grantee's rights under this section apply equally to actual or threatened violations of the terms of this Conservation Easement. Grantor agrees that Grantee's remedies at law for any violation of the terms of this Conservation Easement are inadequate and that Grantee shall be entitled to the injunctive relief described in this section, both prohibitive and mandatory, in addition to such other relief to which Grantee may be entitled, including specific performance of the terms of this Conservation Easement, without the necessity of proving either actual damages or the inadequacy of otherwise available legal remedies. Grantee's remedies described in this section shall be cumulative and shall be in addition to all remedies now or hereafter existing at law or in equity, including but not limited to, the remedies set forth in Civil Code Section 815, *et seq.*, inclusive. The failure of Grantee to discover a violation or to take immediate legal action shall not bar Grantee from taking such action at a later time.

If at any time in the future Grantor or any subsequent transferee uses or threatens to use the Property for purposes inconsistent with this Conservation Easement then, notwithstanding Civil Code Section 815.7, the California Attorney General or any entity or individual with a justiciable interest in the preservation of this Conservation Easement has standing as interested parties in any proceeding affecting this Conservation Easement.

6.1. Costs of Enforcement. Any costs incurred by Grantee, where Grantee is the prevailing party, in enforcing the terms of this Conservation Easement against Grantor, including, but not limited to, costs of suit and attorneys' and experts' fees, and any costs of restoration necessitated by Grantor's negligence or breach of this Conservation Easement shall be borne by Grantor.

6.2. Grantee's Discretion. Enforcement of the terms of this Conservation Easement by Grantee shall be at the discretion of Grantee, and any forbearance by Grantee to exercise its rights under this Conservation Easement in the event of any breach of any term of this Conservation Easement shall not be deemed or construed to be a waiver by Grantee of such term or of any subsequent breach of the same or any other term of this Conservation Easement or of any of Grantee's rights under this Conservation Easement. No delay or omission by Grantee in the exercise of any right or remedy shall impair such right or remedy or be construed as a waiver.

6.3. Acts Beyond Grantor's Control. Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor for any injury to or change in the Property resulting from (i) any natural cause beyond Grantor's control, including, without limitation, fire not caused by Grantor, flood, storm, and earth movement, or any prudent action taken by Grantor under emergency conditions to prevent,

abate, or mitigate significant injury to the Property resulting from such causes; or (ii) acts by Grantee, Grantee's agents or its employees.

6.4. Department of Fish and Game Right of Enforcement. All rights and remedies conveyed to Grantee under this Conservation Easement Deed shall extend to and are enforceable by CDFG. These rights are in addition to, and do not limit, the rights of enforcement under any permit or agreement described in Exhibit "B".

7. Fence Installation and maintenance. The requirement for fencing will be in accordance with the guidelines identified in the City of San Diego's Multiple Species Conservation Plan (MSCP), Subarea Plan Section 4.1., and will continue for the life of the easement. Fencing will be used to achieve conservation goals, for example, to direct wildlife to appropriate corridor crossings, to direct public access to appropriate locations and to provide added protection of sensitive species or habitats (e.g. vernal pools).

8. Access. This Conservation Easement does not convey a general right of access to the public.

9. Costs and Liabilities. Grantor retains all responsibilities and shall bear all costs and liabilities of any kind related to the ownership, operation, upkeep, and maintenance of the Property. Grantor agrees that Grantee shall have no duty or responsibility for the operation, upkeep or maintenance of the Property, the monitoring of hazardous conditions thereon, or the protection of Grantor, the public or any third parties from risks relating to conditions on the Property. Grantor remains solely responsible for obtaining any applicable governmental permits and approvals for any activity or use permitted by this Conservation Easement Deed, and any activity or use shall be undertaken in accordance with all applicable federal, state, local and administrative agency statutes, ordinances, rules, regulations, orders and requirements.

9.1. Taxes; No Liens. Grantor shall pay before delinquency all taxes, assessments, fees, and charges of whatever description levied on or assessed against the Property by competent authority (collectively "taxes"), including any taxes imposed upon, or incurred as a result of, this Conservation Easement, and shall furnish Grantee with satisfactory evidence of payment upon request. Grantor shall keep the Property free from any liens, including those arising out of any obligations incurred by Grantor for any labor or materials furnished or alleged to have been furnished to or for Grantor at or for use on the Property.

9.2. Hold Harmless. Grantor shall hold harmless, protect and indemnify Grantee and its directors, officers, employees, agents, contractors, and representatives and the heirs, personal representatives, successors and assigns of each of them (each an "Indemnified Party" and, collectively, "Indemnified Parties") from and against any and all liabilities, penalties, costs, losses, damages, expenses (including, without limitation, reasonable attorneys' fees and experts' fees), causes of action, claims, demands, orders, liens or judgments (each a "Claim" and, collectively, "Claims"), arising from or in any way connected with: (1) injury to or the death of any person, or physical damage to any

property, resulting from any act, omission, condition, or other matter related to or occurring on or about the Property, regardless of cause, unless due solely to the negligence of Grantee or any of its employees; (2) the obligations specified in Sections 4, 9, and 9.1; and (3) the existence or administration of this Conservation Easement. If any action or proceeding is brought against any of the Indemnified Parties by reason of any such Claim, Grantor shall, at the election of and upon written notice from Grantee, defend such action or proceeding by counsel reasonably acceptable to the Indemnified Party or reimburse Grantee for all charges incurred for services of the Attorney General in defending the action or proceeding.

9.3. Extinguishment. If circumstances arise in the future that render the purposes of this Conservation Easement impossible to accomplish, this Conservation Easement can only be terminated or extinguished, in whole or in part, by judicial proceedings in a court of competent jurisdiction.

9.4. Condemnation. This Conservation Easement is a "wildlife conservation easement" acquired by a State agency, the condemnation of which is prohibited except as provided in Fish and Game Code Section 1348.3.

10. Transfer of Easement. This Conservation Easement is transferable by Grantee, but Grantee may assign this Conservation Easement only to an entity or organization authorized to acquire and hold conservation easements pursuant to Civil Code Section 815.3 (or any successor provision then applicable) or the laws of the United States and Government Code Section 65965. Grantee shall require the assignee to record the assignment in the county where the Property is located.

11. Transfer of Property. Grantor agrees to incorporate the terms of this Conservation Easement by reference in any deed or other legal instrument by which Grantor divests itself of any interest in all or any portion of the Property, including, without limitation, a leasehold interest. Grantor further agrees to give written notice to Grantee of the intent to transfer any interest at least thirty (30) days prior to the date of such transfer. Grantee shall have the right to prevent subsequent transfers in which prospective subsequent claimants or transferees are not given notice of the covenants, terms, conditions and restrictions of this Conservation Easement. The failure of Grantor or Grantee to perform any act provided in this section shall not impair the validity of this Conservation Easement or limit its enforceability in any way.

12. Notices. Any notice, demand, request, consent, approval, or communication that either party desires or is required to give to the other shall be in writing and be served personally or sent by recognized overnight courier that guarantees next-day delivery or by first class mail, postage fully prepaid, addressed as follows:

To Grantor:	The Environmental Trust Inc. P.O. Box 3107 La Mesa, CA 91944-4317 Attn: Brad Thornburgh
With a copy to:	The City of San Diego San Diego Real Estate Assets Department 1200 Third Ave., Ste. 1700 San Diego, CA 92101 Attn: Asset Manager
To Grantee:	Department of Fish and Game South Coast Regional Office 4949 Viewridge Avenue San Diego, CA 92123 Attn: Regional Manager
With a copy to:	Department of Fish and Game Office of the General Counsel 1416 Ninth Street, 12th Floor Sacramento, California 95814-2090 Attn: General Counsel

or to such other address as either party shall designate by written notice to the other. Notice shall be deemed effective upon delivery in the case of personal delivery or delivery by overnight courier or, in the case of delivery by first class mail, five (5) days after deposit into the United States mail.

13. Amendment. This Conservation Easement may be amended by Grantor and Grantee only by mutual written agreement. Any such amendment shall be consistent with the purposes of this Conservation Easement and California law governing conservation easements and shall not affect its perpetual duration. Any such amendment shall be recorded in the official records of San Diego County, State of California.

14. General Provisions.

(a) Controlling Law. The interpretation and performance of this Conservation Easement shall be governed by the laws of the State of California, disregarding the conflicts of law principles of such state.

(b) Liberal Construction. Despite any general rule of construction to the contrary, this Conservation Easement shall be liberally construed to affect the purposes of this Conservation Easement and the policy and purpose of Civil Code Section 815, *et seq.* If any provision in this instrument is found to be ambiguous, an interpretation consistent with the purposes of this Conservation Easement that would render the provision valid shall be favored over any interpretation that would render it invalid.

(c) Severability. If a court of competent jurisdiction voids or invalidates on its face any provision of this Conservation Easement Deed, such action shall not affect the remainder of this Conservation Easement Deed. If a court of competent jurisdiction voids or invalidates the application of any provision of this Conservation Easement Deed to a person or circumstance, such action shall not affect the application of the provision to other persons or circumstances.

(d) Entire Agreement. This instrument sets forth the entire agreement of the parties with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings, or agreements relating to the Conservation Easement. No alteration or variation of this instrument shall be valid or binding unless contained in an amendment in accordance with Section 13.

(e) No Forfeiture. Nothing contained herein will result in a forfeiture or reversion of Grantor's title in any respect.

(f) Successors. The covenants, terms, conditions, and restrictions of this Conservation Easement Deed shall be binding upon, and inure to the benefit of, the parties hereto and their respective personal representatives, heirs, successors, and assigns and shall constitute a servitude running in perpetuity with the Property.

(g) Termination of Rights and Obligations. A party's rights and obligations under this Conservation Easement terminate upon transfer of the party's interest in the Conservation Easement or Property, except that liability for acts or omissions occurring prior to transfer shall survive transfer.

(h) Captions. The captions in this instrument have been inserted solely for convenience of reference and are not a part of this instrument and shall have no effect upon its construction or interpretation.

(i) No Hazardous Materials Liability. Grantor represents and warrants that it has no knowledge or notice of any Hazardous Materials (defined below) or underground storage tanks existing, generated, treated, stored, used, released, disposed of, deposited or abandoned in, on, under, or from the Property, or transported to or from or affecting the Property. Without limiting the obligations of Grantor under Section 9.2, Grantor hereby releases and agrees to indemnify, protect and hold harmless the Indemnified Parties (defined in Section 9.2) from and against any and all Claims (defined in Section 9.2) arising from or connected with any Hazardous Materials or underground storage tanks present, alleged to be present, or otherwise associated with the Property at

any time, except any Hazardous Materials placed, disposed or released by Grantee, its employees or agents. This release and indemnification includes, without limitation, Claims for (i) injury to or death of any person or physical damage to any property; and (ii) the violation or alleged violation of, or other failure to comply with, any Environmental Laws (defined below). If any action or proceeding is brought against any of the Indemnified Parties by reason of any such Claim, Grantor shall, at the election of and upon written notice from Grantee, defend such action or proceeding by counsel reasonably acceptable to the Indemnified Party or reimburse Grantee for all charges incurred for services of the Attorney General in defending the action or proceeding.

Despite any contrary provision of this Conservation Easement Deed, the parties do not intend this Conservation Easement to be, and this Conservation Easement shall not be, construed such that it creates in or gives to Grantee any of the following:

(1) The obligations or liability of an "owner" or "operator," as those terms are defined and used in Environmental Laws (defined below), including, without limitation, the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (42 U.S.C. Section 9601 *et seq.*; hereinafter, "CERCLA"); or

(2) The obligations or liabilities of a person described in 42 U.S.C. Section 9607(a)(3) or (4); or

(3) The obligations of a responsible person under any applicable Environmental Laws; or

(4) The right to investigate and remediate any Hazardous Materials associated with the Property; or

(5) Any control over Grantor's ability to investigate, remove, remediate or otherwise clean up any Hazardous Materials associated with the Property.

The term "Hazardous Materials" includes, without limitation, (a) material that is flammable, explosive or radioactive; (b) petroleum products, including by-products and fractions thereof; and (c) hazardous materials, hazardous wastes, hazardous or toxic substances, or related materials defined in CERCLA, the Resource Conservation and Recovery Act of 1976 (42 U.S.C. Section 6901 *et seq.*; hereinafter "RCRA"); the Hazardous Materials Transportation Act (49 U.S.C. Section 6901 *et seq.*; hereinafter "HTA"); the Hazardous Waste Control Law (California Health & Safety Code Section 25100 *et seq.*; hereinafter "HCL"); the Carpenter-Presley-Tanner Hazardous Substance Account Act (California Health & Safety Code Section 25300 *et seq.*; hereinafter "HSA"), and in the regulations adopted and publications promulgated pursuant to them, or any other applicable Environmental Laws now in effect or enacted after the date of this Conservation Easement Deed.

The term "Environmental Laws" includes, without limitation, CERCLA, RCRA, HTA, HCL, HSA, and any other federal, state, local or administrative agency statute, ordinance, rule, regulation, order or requirement relating to pollution, protection of human health or safety, the environment or Hazardous Materials. Grantor represents, warrants and covenants to Grantee that activities upon and use of the Property by Grantor, its agents, employees, invitees and contractors will comply with all Environmental Laws.

(j) Warranty. Grantor represents and warrants that there are no outstanding mortgages, liens, encumbrances or other interests in the Property (including, without limitation, mineral interests) which have not been expressly subordinated to this Conservation Easement Deed, and that the Property is not subject to any other conservation easement.

(k) Additional Easements. Grantor shall not grant any additional easements, rights of way or other interests in the Property (other than a security interest that is subordinate to this Conservation Easement Deed), or grant or otherwise abandon or relinquish any water agreement relating to the Property, without first obtaining the written consent of Grantee. Grantee may withhold such consent if it determines that the proposed interest or transfer is inconsistent with the purposes of this Conservation Easement or will impair or interfere with the conservation values of the Property. This Section 14(k) shall not prohibit transfer of a fee or leasehold interest in the Property that is subject to this Conservation Easement Deed and complies with Section 11.

(l) Recording. Grantee shall record this Conservation Easement Deed in the Official Records of San Diego County, California, and may re-record it at any time as Grantee deems necessary to preserve its rights in this Conservation Easement.

IN WITNESS WHEREOF Grantor has executed this Conservation Easement Deed the day and year first above written.

The Environmental Trust, Inc., a California nonprofit public benefit corporation

By: Brad T. Thornburgh

Name: BRAD T. THORNBURGH

Title: PRESIDENT

Date: NOVEMBER 12, 2009

State of California
Department of Fish and Game

By: _____

Name: _____

Title: _____

Date: _____

City of San Diego

By: _____

Name: James F. Barwick

Title: Director, Real Estate Assets

Date: 10/28/09

STATE OF CALIFORNIA)
)
COUNTY OF SAN DIEGO)

On November 12, 2009, before me, B. Maureen White, a Notary Public, personally appeared Brad T. Thornburgh, who proved to me on the basis of satisfactory evidence to be the person~~(s)~~ whose name~~(s)~~ is~~/are~~ subscribed to the within instrument and acknowledged to me that he~~/she/they~~ executed the same in his~~/her/their~~ authorized capacity~~(ies)~~, and that by his~~/her/their~~ signature~~(s)~~ on the instrument the person~~(s)~~, or the entity upon behalf of which the person~~(s)~~ acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

B Maureen White (Seal)
Signature

MGC1 B. MAUREEN WHITE COMM. # 1853446 NOTARY PUBLIC - CALIFORNIA SAN DIEGO COUNTY COMM. EXPIRES JULY 6, 2013 MGC1

EXHIBIT A

LEGAL DESCRIPTION
WEST OTAY MESA B PARCEL

THE LAND REFERRED TO HEREIN IS SITUATED IN THE STATE OF CALIFORNIA, COUNTY OF SAN DIEGO AND IS DESCRIBED AS FOLLOWS:

THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 31, TOWNSHIP 18 SOUTH, RANGE 1 WEST, SAN BERNARDINO BASE & MERIDIAN, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO OFFICIAL PLAT THEREOF.

THE ABOVE DESCRIBED LAND IS CONVEYED AND ACCEPTED SUBJECT TO THE EXPRESSED CONDITION THAT THE HEREIN DESCRIBED LAND SHALL NOT AT ANY TIME BE USED FOR ANY OTHER PURPOSE OTHER THAN NATURAL, UNDEVELOPED AND UNIMPROVED OPEN SPACE. THIS CONDITION EXPRESSLY PROHIBITS THE GRANTEE, ITS SUCCESSOR AND ASSIGNS FROM ANY EXCAVATION, CHANGING OF THE GRADE, PLACEMENT OR MAINTENANCE OF ANY STRUCTURES, CONSTRUCTION OF ANY ROADS OR PAVING OF ANY EASEMENTS, UNLESS APPROVED AND CONSENTED TO BY THE GRANTOR, ITS SUCCESSORS AND ASSIGNS. IN ADDITION ANY USES OF THE HEREIN DESCRIBED PROPERTY IN VIOLATION OF ANY FEDERAL, STATE OR LOCAL ENVIRONMENTAL LAWS OR STATUTES SHALL BE PROHIBITED. IN THE EVENT OF ANY VIOLATION OF THE ABOVE CONDITIONS, THIS CONVEYANCE SHALL BE NULL AND VOID, AND THE TITLE TO THE PREMISES HEREIN CONVEYED SHALL REVERT TO THE GRANTOR, AND SAID GRANTOR, ITS LEGAL REPRESENTATIVES OR ASSIGNS, SHALL HAVE THE IMMEDIATE RIGHT TO RE-ENTER AND POSSESS SAID PREMISES AND HOLD THE SAME FOREVER.

ALSO EXCEPTING AND RESERVING UNTO THE GRANTOR, ITS SUCCESSORS AND ASSIGNS, ALL OIL, GAS, AND OTHER HYDROCARBON GASES, OR GASEOUS SUBSTANCES, ALL OTHER MINERALS OF WHATEVER NATURE, WITHOUT REGARD TO SIMILARITY TO THE ABOVE MENTIONED SUBSTANCES AND ALL SUBSTANCES THAT MAY BE PRODUCED THEREWITH FROM THE PROPERTY.

ALSO EXCEPTING AND RESERVING UNTO THE GRANTOR, ITS SUCCESSORS AND ASSIGNS ALL OIL GEOTHERMAL RESOURCES, EMBRACING INDIGENOUS STEAM, HOT WATER AND HOT BRINES; STEAM AND OTHER GASES, HOT WATER AND WATER BRINE RESULTING FROM WATER, GAS OR OTHER FLUIDS ARTIFICIALLY INTRODUCED INTO SUBSURFACE FORMATIONS, HEAT OR OTHER ASSOCIATED ENERGY FOUND BENEATH THE SURFACE OF THE EARTH

AND BYPRODUCTS OF ANY OF THE FOREGOING SUCH AS MINERALS (EXCLUSIVE OF OIL OR HYDROCARBON GAS THAT CAN BE SEPARATELY PRODUCED) WHICH ARE FOUND IN SOLUTION OR ASSOCIATION WITH OR DERIVED FROM ANY OF THE FOREGOING.

ALSO EXCEPTING AND RESERVING UNTO THE GRANTOR, ITS SUCCESSORS AND ASSIGNS ALL WATER RIGHTS, AND RIPARIAN RIGHTS, IF ANY, APPURTENANT TO SAID PROPERTY.

ALSO EXCEPTING AND RESERVING UNTO THE GRANTOR, ITS SUCCESSORS AND ASSIGNS THE SOLE AND EXCLUSIVE RIGHT FROM TIME TO TIME TO BORE OR DRILL AND MAINTAIN WELLS AND OTHER WORKS IN, TO, AND THROUGH THE PROPERTY AND ANY ADJOINING STREETS, ROADS AND HIGHWAYS BELOW A DEPTH OF FIVE HUNDRED (500) FEET BELOW THE SURFACE THEREOF FOR THE PURPOSE OF EXPLORING FOR AND PRODUCING ENERGY RESOURCES; AND THE RIGHT TO PRODUCE, INJECT, STORE AND REMOVE FROM AND THROUGH SAID BORES, WALLS OR WORKS, OIL, GAS, WATER AND OTHER SUBSTANCES OR WHATEVER NATURE; AND THE RIGHT TO PERFORM BELOW SAID DEPTH ANY AND ALL OPERATIONS DEEMED BY GRANTOR NECESSARY OR CONVENIENT FOR THE EXERCISE OF SUCH RIGHTS, WITH INTERFERING IN ANY MANNER WITH THE SURFACE OR SUBSURFACE USAGE OF THE PROPERTY ABOVE A DEPTH OF FIVE HUNDRED (500) FEET AND WITHOUT CAUSING SUBSIDENCE OR REMOVAL OF SUBJACENT OR LATERAL SUPPORT.

PROVIDED, HOWEVER, SAID RESERVATIONS HEREINABOVE BY THE GRANTOR DO NOT INCLUDE AND DO NOT EXCEPT OR RESERVE TO SAID GRANTOR ANY RIGHT OF SAID GRANTOR TO USE THE SURFACE OF SAID PROPERTY OR THE FIRST FIVE HUNDRED (500) FEET BELOW SAID SURFACE OR TO CONDUCT ANY OPERATIONS THEREON OR THEREIN. UNLESS HEREINAFTER SPECIFICALLY EXCEPTED AND RESERVED.

EXHIBIT B

Olympia & Chase LLC industrial development project located in the City of San Diego, County of San Diego, State of California, pursuant to the Mitigated Negative Declaration ("MND") DEP No. 96-7509, certified by the City of San Diego for the Rancho Bernardo Industrial Park Lot 12 project (SCH No. 1997031081), and the Mitigation Plan created thereunder.

Lankford & Associates Inc. scientific research building project located in the City of San Diego, County of San Diego, State of California, pursuant to the Environmental Impact Report ("EIR") LDR No. 96-7765, certified by the City of San Diego for the La Jolla Pines Technology Center Lot 7A project (SCH No. 1990101049), dated March 29, 1990, and the Mitigation Plan created thereunder.

San Dieguito Union High School District new school project located in the City of San Diego, County of San Diego, State of California, pursuant to the Notice of Determination ("NOD"), certified by the City of San Diego for the Carmel Valley Junior High/Middle School project (SCH No.1998109538), dated February 19, 1998 and the Mitigation Plan created thereunder.

Fenton Western Properties residential, commercial, and recreational development project located in the City of San Diego, County of San Diego, State of California, pursuant to Final EIR, DEP No. 96-9004, certified by the City of San Diego for the Mission City project (SCH No. 1996111039), dated February 6, 1998 and the Mitigation Plan created thereunder.

Kavanagh Associates scientific research building project located in the City of San Diego, County of San Diego, State of California, pursuant to the Draft EIR, LDR 96-7986, certified by the City of San Diego for the Burnham Institute project in the Torrey Pines Science Center (SCH No.1988062210), and the Mitigation Plan created thereunder.

Southland Corporation convenience market store project located in the City of San Diego, County of San Diego, State of California, pursuant to the MND DEP 96-7731, certified by the City of San Diego for 7-11 store on La Media Road and Otay Mesa Road in the Otay Mesa Community, and the Mitigation Plan created thereunder.

Sorrento Sand Company Inc. single family residence project located in the City of San Diego, County of San Diego, State of California, pursuant to the MND DEP 94-0277, certified by the City of San Diego for the Torrey View Estate residence at 4049 Arroyo Sorrento Road in Carmel Valley (SCH No. 1995121023), dated January 10, 1996, and the Mitigation Plan created thereunder.

Granum Partners industrial park project located in the City of San Diego, County of San Diego, State of California, pursuant to the MND RPO 96-7648, certified by the City of San Diego for the Rancho Bernardo Industrial Park North, Lot 11, project, and the Mitigation Plan created thereunder.

Johnson Communities road construction project located in the City of San Diego, County of San Diego, State of California, pursuant to the Findings to the Master EIR RPO 96-7286,

certified by the City of San Diego for the Del Mar Mesa Road & Deer Canyon Sewer project in Carmel Valley (SCH No.1999071127), and the Mitigation Plan created thereunder.

Torrey Pines Homebuilding Company, LLC residential development project located in the City of San Diego, County of San Diego, State of California, pursuant to the Draft EIR LDR No. 96-7573, certified by the City of San Diego as an amendment to the Carmel Valley Neighborhood and Precise Plan (SCH No. 1997111053), and the Mitigation Plan created thereunder.

Silver Oaks Estates LLC residential development project located in the City of San Diego, County of San Diego, State of California, pursuant to the a Master Environmental Impact Report ("MEIR") for the North City Future Urbanizing Area MEIR LDR No. 95-0353, and Findings to the EIR 95-0353 LDR 99-0023, certified by the City of San Diego for the Silver Oaks Estates project (SCH No. 1993071097)), and the Mitigation Plan created thereunder.

Gary and Leslie Schotz single family residence project located in the City of San Diego, County of San Diego, State of California, pursuant to the Findings to the EIR 95-0353, LDR 99-1350, certified by the City of San Diego for the Schotz project (SCH No. 1993071097), and the Mitigation Plan created thereunder.

TMW Real Investments Inc. residential development project located in the City of San Diego, County of San Diego, State of California, pursuant to the MND LDR 99-0125, certified by the City of San Diego for the Clairemont Gardens subdivision project (SCH No. 2000121073), and the Mitigation Plan created thereunder.

University of San Diego parking structure project located in the City of San Diego, County of San Diego, State of California, pursuant to the MND LDR No. 41-0092, certified by the City of San Diego for the University of San Diego campus four storey parking structure project (SCH No. 2001111127), and the Mitigation Plan created thereunder.

Seabreeze Properties, LLC residential development project in the City of San Diego, County of San Diego, State of California, pursuant to the MND LDR No. 42-0211, certified by the City of San Diego for Old El Camino Real project (SCH No. 2002111050), and the Mitigation Plan created thereunder.

EXHIBIT C

March 20, 2009, Letter to City of San Diego from the U. S. Fish and Wildlife Service and the California Department of Fish and Game

U. S. Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road, Suite 101
Carlsbad, California 92011
(760) 431-9440
FAX (760) 431-9618

California Department of Fish and Game
South Coast Region
4949 Viewridge Avenue
San Diego, California 92123
(858) 467-4201
FAX (858) 467-4299

In Reply Refer To:
FWS/CDFG-09B0260-09TA0747

Mr. Chris Zirkle
Deputy Director - Open Space Division
San Diego Park and Recreation Department
City of San Diego
1250 6th Avenue - Mail Station 804A
San Diego, California 92101

MAR 2 0 2009

Subject: City of San Diego Acceptance of The Environmental Trust (TET) Properties

Dear Mr. Zirkle:

This joint letter from the California Department of Fish and Game (Department) and the U.S. Fish and Wildlife Service (Service) (herein referred to collectively as the Wildlife Agencies) is in response to the concerns you have raised regarding the degree to which the TET properties must be "managed" if accepted by the City. The City of San Diego has agreed to accept 14 TET parcels in fee title and/or via a conservation easement, with the goal of managing them in accordance with the City's Multiple Species Conservation Program (MSCP) (see enclosed Table 1).

The Wildlife Agencies acknowledge the current bankruptcy plan under which the City would be accepting the properties, concur that the City is not required to fulfill any mitigation obligations on these lands, and accept that some management actions will be deferred until additional funding sources are identified to allow for increased levels of management and/or stewardship. The bankruptcy settlement requires the remaining TET funds to be spent on stewardship/ management activities on the subject properties to the extent the funds allow but does not require the new land owner to expend additional funds on the property beyond what is allocated through the bankruptcy settlement. However, the City's MSCP permit does require lands that are included in the preserve to be managed in accordance with the City's adopted MSCP and any area specific management directives (ASMDs) that have been developed for that area. Many of the TET properties to be transferred to the City include lands used to fulfill MSCP conservation obligations (*e.g.*, core resource areas, wildlife corridors, etc.), including vernal pool habitat that supports the federally listed San Diego fairy shrimp (*Branchinecta sandiegonensis*), San Diego button celery (*Eryngium aristulatum var. parishii*), San Diego mesa mint (*Pogogyne abramsii*), and spreading navarretia (*Navarretia fossalis*). Therefore, it is important to conserve these lands and manage them consistent with MSCP.

TAKE PRIDE IN AMERICA

Under the TET bankruptcy settlement, limited funds are available for basic stewardship (*e.g.*, fencing, signage, etc.) and management (repairs, surveys, restoration, etc.) on each property. The Wildlife Agencies understand that the remaining funds allocated to specific TET properties are unlikely to be sufficient to bring their stewardship/management to MSCP standards at this time. Thus, any TET properties that cannot be managed with the remaining funds in accordance with the City's MSCP and any applicable ASMDs should not be "counted" towards fulfilling the MSCP conservation obligations or included in the preserve and shown as "conserved" in the City's annual report until they can be managed to MSCP standards.

The Wildlife Agencies acknowledge this constraint and recommend that the remaining TET funds be applied to stewardship/management activities on those transferred properties in greatest need, with the balance of funding needed for such activities on all TET transferred lands coming from annual budgeting under the City's MSCP, or through various grant opportunities, until such time as a reliable regional or other funding source is identified. As one example, at present, there may not be sufficient funds to provide fencing around the properties as is currently called for in the property transfer/easement language. Additionally, spending money on fencing may not be prudent relative to other management needs. As always, the Wildlife Agencies are available to assist the City in any prioritization needed to maximize the expenditure of remaining funds for land stewardship/management on the TET transferred properties.

The Wildlife Agencies appreciate the City's efforts and collaboration on resolving the issues surrounding the TET properties and the City's willingness to accept these properties. We also look forward to assisting you in identifying funding opportunities to manage these lands to MSCP standards. If you have any questions regarding this letter, please contact Susan Wynn of the Service at (760) 431-9440 ext 216 or David Mayer at of the Department at (858) 467-4234.

Sincerely,

Karen A. Goebel
Assistant Field Supervisor
U.S. Fish and Wildlife Service

Stephen M. Juarez
Environmental Program Manager
California Department of Fish and Game

Enclosure

Enclosure

TABLE 1: TET PARCELS TRANSFERRED TO CITY OF SAN DIEGO

TET ID	NAME	FEE TITLE TO GO TO	CONSERVATION EASEMENT TO	APNS
2	Black Mountain Vernal Pools North	Friends of Los Peñasquitos	City of San Diego	306-250-15 306-250-16
3	Black Mountain Vernal Pools South	Friends of Los Peñasquitos	City of San Diego	306-250-17 306-250-18 306-250-31
12	Del Mar Mesa	City of San Diego (ptn)	CDFG	306-050-29
20	K-Mart Vernal Pools	City of San Diego	CDFG	645-074-08 645-074-18 645-075-09
25	McMillin Vernal Pools	City of San Diego	CDFG	645-075-08
29	Newport 5	City of San Diego	CDFG	631-041-10
33	Otay 15	City of San Diego	CDFG	667-040-05
41	San Pasqual	City of San Diego	CDFG	276-010-03
47	Spring Canyon	City of San Diego	CDFG	645-102-01 645-102-02 645-102-03 645-102-11
52	Torrey Highlands	Friends of Los Peñasquitos	City of San Diego	306-330-03 306-340-66 306-041-33
55	West Otay Mesa A	Unknown fate	Unknown fate	645-061-01
56	West Otay Mesa B	City of San Diego	CDFG	645-061-02
57	West Otay Mesa C	City of San Diego	CDFG	645-060-07
58	Wruck Canyon	City of San Diego	CDFG	667-050-06 667-050-66 667-050-07
65	Robinhood III	Stays with owner	Unknown	646-111-30
76	East Elliot 13	City of San Diego	Unknown	366-070-37

The Environmental Trust Bankruptcy
(West Otay Mesa B project – APN 645-061-02)
San Diego County

CERTIFICATE OF ACCEPTANCE

THIS IS TO CERTIFY that the interest in real property conveyed by the conservation easement deed, dated November 12, 2009 from The Environmental Trust to the STATE OF CALIFORNIA, is hereby accepted by the undersigned officer on behalf of the State of California, pursuant to authority conferred by authorization of the Wildlife Conservation Board, Department of Fish and Game, Natural Resources Agency, State of California, adopted on November 20, 2008. and the grantee consents to the recordation thereof by its duly authorized officer.

STATE OF CALIFORNIA
Resources Agency
Department of Fish and Game

By: _____
John P. Donnelly
Executive Director
Wildlife Conservation Board

Date: 12/1/09

I hereby certify that all conditions for exemption have been complied with and this document is exempt from Department of General Services approval.

WILDLIFE CONSERVATION BOARD

By: _____
(authorized signatory)