

Western Riverside County - MSHCP DBESP
Temescal Valley Commerce Center Project Site
Unincorporated Riverside County, California

FINAL REPORT



HANS 190024, APN 283-160-046 & 283-190-044, GEO 00200040, CUP 20044

Prepared for:

Dawson Canyon, LLC
11777 San Vicente Blvd. #780
Los Angeles, CA 90049
Contact: Matt Englhard, (949) 842-3074

Prepared by:

Cadre Environmental
701 Palomar Airport Road, Suite 300
Carlsbad, CA 92011
Contact: Ruben Ramirez, (949) 300-0212

March 2024

TABLE OF CONTENTS		PAGE
1.	EXECUTIVE SUMMARY	1
2.	INTRODUCTION	4
2.1	Project Area	4
2.2	Project Description	4
2.3	Existing Conditions	7
3.	RIPARIAN, RIVERINE, VERNAL POOL MITIGATION (SECTION 6.1.2)	9
3.1	Methods	9
3.2	Results/Impacts	20
3.3	Mitigation and Equivalency	29
3.3.1	Direct Effects	34
3.3.2	Indirect Effects	35
4.	NARROW ENDEMIC PLANT SPECIES MITIGATION (SECTION 6.1.3)	41
4.1	Methods	42
4.2	Results/Impacts	42
4.3	Mitigation and Equivalency	47
4.3.1	Direct Effects	47
4.3.2	Indirect Effects	47
5.	CRITERIA AREA SPECIES MITIGATION (SECTION 6.3.2)	47
5.1	Criteria Area Species Survey Area – Plants	48
5.1.1	Methods	48
5.1.2	Results/Impacts	49
5.1.3	Mitigation and Equivalency	51
5.2	Criteria Area Species Survey Area – Burrowing Owl	51
5.2.1	Methods	51
5.2.2	Results/Impacts	53
5.2.3	Mitigation and Equivalency	53
5.3	Criteria Area Species Survey Area – Mammals	54
5.3.1	Methods	54
5.3.2	Results/Impacts	54
5.3.3	Mitigation and Equivalency	54
5.4	Criteria Area Species Survey Area – Amphibians	54
5.4.1	Methods	54
5.4.2	Results/Impacts	54
6.	REFERENCES	55

LIST OF FIGURES

	PAGE
1 – Regional Location Map	10
2 – Project Site Map	11
3 – MSHCP Criteria Area and Relationship Map	12
4 – Vegetation Communities Map	13
5 – Current Project Site Photographs	14
6 – Current Project Site Photographs	15
7 – Current Project Site Photographs	16
8 – Current Project Site Photographs	17
9 – Current Project Site Photographs	18
10 – Soils Association Map	19
11 – MSHCP Section 6.1.2 Riparian/Riverine Map	26
12 – MSHCP Section 6.1.2 Riparian/Riverine Impact Map	27
13 – Detailed Temescal Wash Impact Map	37
14 – Temescal Wash Conservation & Mitigation Area Map	38
15 – Temescal Wash Conservation & Mitigation Area Vegetation Map	39

LIST OF TABLES

	PAGE
1 – MSHCP Section 6.1.2 Resources Impacts and Mitigation Acreages	3
2 – Vegetation Communities Acreage	7
3 – MSHCP Section 6.1.2 Riparian/Riverine Resources	25
4 – MSHCP Section 6.1.2 Riparian/Riverine Resources Impacts	28
5 – Potential MSHCP Narrow Endemic Plant Assessment	45
6 – Potential MSHCP Criteria Area Plant Assessment	49

Appendix A Glenn Lukos Associates. 2023. Jurisdictional Delineation of the Corona Clay Project Site, an Approximate 46.18-Acre Property Located in the City of Corona Sphere of Influence, Riverside County, California (Updated October, 2023)

Appendix B Hydraulic Analysis Report for Temescal Valley Commerce Center (Rick Engineering 2021)

1. EXECUTIVE SUMMARY

The proposed Temescal Valley Commerce Center project will require that the reach of Coldwater Canyon Wash located adjacent to Temescal and Dawson Canyon Roads be redirected to an alignment in the eastern region of the Project Site. Coldwater Canyon Wash possesses both Western Riverside County Multiple Species Habitat Conservation Plan “MSHCP” Section 6.1.2 Riverine and Riparian resources. A 180-foot wide, 5.70-acre drainage easement will be granted to the County of Riverside within the eastern region of the Project Site within the new Channel Alignment.

Permanent direct onsite/offsite impacts to 2.574-acres (0.09-acre riparian, 2.484-acre riverine) and temporary onsite/offsite impacts to 0.67-acre (0.19-acre riparian, 0.48-acre riverine) of MSHCP Section 6.1.2 Riparian/Riverine resources (3.244-acres total) will occur as a result of project implementation (GLA 2023, Appendix A).

The Project would also require that the reach of Coldwater Canyon Wash located adjacent to Temescal and Dawson Canyon Roads be redirected to an alignment in the eastern region of the Project Site. A 180-foot wide, 5.70-acre drainage easement will be granted to the County of Riverside. As a result of the realignment, 0.31-acre of indirect offsite impacts will occur to the downstream reach of Coldwater Canyon Wash due to reduction in stream discharge.

To meet the criteria of a biologically equivalent or superior alternative, the applicant will offset permanent impacts to 2.574-acres (0.09-acre riparian, 2.484-acre riverine) and temporary onsite/offsite impacts to 0.67-acre (0.19-acre riparian, 0.48-acre riverine) of MSHCP Section 6.1.2 riparian and riverine resources (3.244-acres total) as follows.

1. Mitigation for permanent impacts to 2.56-acres of MSHCP Section 6.1.2 riparian and riverine habitat within Coldwater Canyon Wash, Temescal Wash (excluding Riverine – Riversidean Alluvial Fan Sage Scrub (RAFSS) and Riparian Willow Forest; refer to 3 and 4 below for impacts and mitigation for these vegetation types) and Drainage A would be mitigated through a combination of credits from the Riverpark Mitigation Bank and with habitat rehabilitation in the Temescal Wash Conservation and Mitigation Area. Specifically, mitigation for permanent impacts to 0.08 acres of riparian and 2.47 acres of riverine would include 2.55-acres of reestablishment and 2.55-acres of rehabilitation credits from the Riverpark Mitigation Bank for a ratio of 2:1, totaling 5.10-acres. Additionally, impacts to 0.01-acre of riverine habitat would be mitigated with rehabilitation of RAFSS habitats within the Temescal Wash Conservation and Mitigation Area at a ratio of 2:1, totaling 0.02-acre.
2. Mitigation for temporary impacts to 0.56-acre of MSHCP Section 6.1.2 riparian and riverine habitat within Temescal Wash would be mitigated through a combination of credits from the Riverpark Mitigation Bank and with habitat rehabilitation in the Temescal Wash Conservation and Mitigation Area. Specifically, mitigation for temporary impacts to 0.13-acre of riparian and 0.12-acre of riverine habitat would include 0.25-acre of reestablishment and 0.25-acre of rehabilitation credits from the Riverpark Mitigation Bank for a ratio of 2:1, totaling 0.50-acre. Additionally, impacts to 0.31-acre of riverine habitat would be mitigated with rehabilitation of

RAFSS habitats within the Temescal Wash Conservation and Mitigation Area for a ratio of 2:1, totaling 0.62-acre.

3. Mitigation for offsite temporary (0.05-acre) and permanent (0.004-acre) impacts to RAFSS Section 6.1.2 riverine within Temescal Wash as a result of the proposed realignment of Coldwater Canyon Wash will be mitigated at a ratio of 4:1 (0.22-acre) through the rehabilitation of RAFSS in the Temescal Wash Conservation and Mitigation Area.
4. Mitigation for temporary (0.06-acre) and permanent (0.01-acre) impacts to Section 6.1.2 riparian black willow within Temescal Wash as a result of the proposed realignment of Coldwater Canyon Wash will be mitigated at a ratio of 4:1 totaling 0.28-acre of mitigation through a combination of credits from the Riverpark Mitigation Bank and habitat rehabilitation in the Temescal Wash Conservation and Mitigation Area. Specifically, mitigation would include 0.07-acre of reestablishment and 0.07-acre of rehabilitation credits from the Riverpark Mitigation Bank as well as 0.14-acre of rehabilitation of willow habitat within the Temescal Wash Conservation and Mitigation Area.

To meet the criteria of a biologically equivalent or superior alternative, the applicant will offset indirect impacts to 0.31-acre of Coldwater Canyon Wash as follows:

5. Indirect impacts to the offsite, downstream Coldwater Canyon Wash, due to reduction in stream discharge associated with realignment of Coldwater Canyon Wash accounting for 0.31-acre will be mitigated through 0.31-acre of reestablishment and 0.31-acre of rehabilitation credits from the Riverpark Mitigation Bank for a ratio of 2:1, totaling 0.62-acre.

To meet the criteria of a biologically equivalent or superior alternative, the applicant will offset 0.07-acre of permanent and 0.08-acre temporary (0.15-acre total) MSHCP Section 6.1.2 riparian resource impacts to least Bell's vireo habitat as follows:

6. Permanent and temporary impacts to 0.15-acre of riparian habitat (0.07 acre of willow and 0.08 acre of cottonwood) occupied or representing suitable habitat for the least Bell's vireo within Temescal Wash will be subject to rehabilitation of 0.28-acre of black willow, and 0.16-acre cottonwood (0.44-acre total) resulting in a 2:1 replacement of cottonwood and a 4:1 replacement of black willow constituting Section 6.1.2 riparian habitat within the Temescal Wash Conservation and Mitigation Area.

Table 1.
MSHCP Section 6.1.2 Resources Impacts and Mitigation Acreages

Impact Type/mitigation ratio	Temporary Impacts			Permanent Impacts		
	Temporary Impact (Acres)	Riverpark Mitigation Credits (Acres)	Temescal Wash Conservation and Mitigation Area (Acres/Type)	Permanent Impact (Acres)	Riverpark Mitigation Credits (Acres)	Temescal Wash Conservation and Mitigation Area (Acres/Type)
Coldwater Creek						
Riverine (2:1)	0	0	0	2.24	4.48	0
Riparian (2:1)	0	0	0	0.02	0.04	0
Downstream Indirect (2:1)	0	0	0	0.31	0.62	0
Total	0	0	0	2.57	5.14	0
Temescal Wash						
Riverine (2:1)*	0.43	0.24	0.62 RAFSS	0.23	0.44	0.02
Riverine RAFSS (4:1)	0.05	0	0.20 RAFSS	0.004	0	0.02 RAFSS
Riparian Willow (4:1)	0.06	0.10	0.14 Willow	0.01	0.04	0
Riparian cottonwood (2:1)	0.03	0.06	0	0.06	0.12	0
Riparian Mule Fat scrub (2:1)	0.08	0.16	0	0	0	0
Elderberry (2:1)	0.02	0.04	0	0	0	0
Total	0.67	0.60	0.96	0.304	0.60	0.04
Drainage A						
Riverine Ephemeral (2:1)	0	0	0	0.01	0.02	0
Total	0	0	0	0.01	0.02	0
LBV Riparian Habitat in Temescal Wash						
Willow Forest (4:1)	0.06	0	0.24 Willow	0.01	0	0.04 Willow
Cottonwood (2:1)	0.02	0	0.04 Cottonwood	0.06	0	0.12 Cottonwood
Total	0.08	0	0.28	0.07	0	0.16
Grand Total	0.75	0.60	1.24	2.954	5.76	0.20

GLA 2023, * the riverine vegetation (excluding RAFSS) depicted on the vegetation map have been combined in the table for purposes of calculating impacts and mitigation.

2. INTRODUCTION

This document presents the results of a Determination of Biologically Equivalent or Superior Preservation (DBESP) analysis conducted by Cadre Environmental for the Temescal Valley Commerce Center Project Site as required under Section 6.1.2, *Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools*, of the Western Riverside County MSHCP (MSHCP 2004).

2.1 Project Area

The 46.18-acre (26.10-acre offsite) Project Site (72.28-acres total), is located within Assessor's Parcel Number (APN) 283-160-046 and 283-190-044. Offsite impact areas associated with realigning Coldwater Canyon Wash and road improvements to Temescal and Dawson Canyon Roads are located partially within existing Right-of-Ways (ROWs) and portions/completely within APNs 283-160-009, 283-170-015, 283-190-013, 283-200-008, 283-160-030, 283-160-035, 283-160-041, 283-160-045, 283-170-012, 283-170-013, 283-170-021, 283-190-014, 283-190-025, 283-190-024, 283-190-045, and 283-200-009. The Project Site is located within United States Geological Survey (USGS) 7.5' Series Lake Mathews Quadrangle, Riverside County, Township 3 South, Range 6 West, Section 34. Specifically, the Project Site is located south and southeast of Dawson Canyon Road (Temescal Wash) and east of Temescal Canyon Road (Coldwater Canyon Wash) as shown in Figure 1, *Regional Location Map*, and Figure 2, *Project Site Map*.

The Project Site is located within the MSHCP Temescal Canyon Plan Area, Subunit 3 – Temescal Wash West and Proposed Extension of Existing Core 2. The Project Site is also located partially within MSHCP Criteria Areas 3035 and 3036, Cell Group F, as shown in Figure 3, *MSHCP Criteria Area and Relationship Map*. All 1.52 acres of the Project Site located within Temescal Wash will be dedicated as conservation land as detailed in HANS 190024 (Riverside County EPD 2020). The project applicant will also provide the Regional Conservation Authority (RCA) with fee title/ownership and management responsibilities for the 5.87-acre Temescal Wash Conservation and Mitigation Area that extends immediately east of the 1.52-acre MSHCP Proposed Conservation Area and is located partially within APN 283-190-024.

The County of Riverside will condition the project to convey the proposed conservation areas to the RCA prior to any project ground disturbance. Specifically, the 5.87-acre Temescal Wash Conservation and Mitigation Area will be donated to the RCA in fee title following completion of the restoration program as determined by the RCA, Wildlife Agencies (CDFW and USFWS), and any other water-regulating entities (e.g., Regional Water Quality Control Board).

2.2 Project Description

The Temescal Valley Commerce Center Project would construct and operate a seven (7) building business park that would total approximately 633,607 square feet (s.f.) and include associated improvements (e.g., parking areas, landscaping, walls/fences, utility infrastructure). As previously stated, the Project would require that the reach of Coldwater Canyon Wash located adjacent to Temescal and Dawson Canyon Roads be

redirected to an alignment in the eastern region of the Project Site. A 180-foot wide, 5.70-acre drainage easement will be granted to the County of Riverside. The proposed channel will be natural-bottom and outfall to Temescal Wash. The Riverside County Flood Control and Water Conservation District will maintain the channel and therefore, no habitat restoration activities are proposed. The proposed confluence with Temescal Wash is currently a relatively undisturbed channel that will exhibit limited impacts associated with installation of an outfall for the relocated Coldwater Creek Channel. The area where Coldwater Creek will discharge to the site includes a well-defined low-flow channel and a terrace which is well above the low-flow channel, with a steep slope to the top of the Temescal Wash Bank. The low-flow channel is unvegetated with an algal mat and areas with adjacent mule fat scrub and Goodding's black willow forest. Terraces above the low flow channel support areas of sparse alluvial scrub. As stated by Glenn Lukos Associates:

"The proposed Temescal Business Park proposes to realign Coldwater Canyon Creek to its approximate historic location. The realignment would result in shifting the confluence approximately 1,000 feet upstream from the current discharge location. The realignment will result in potential impacts to riparian habitat within the 1,000-foot segment of Temescal Wash due to increased flows, and potential impacts to Coldwater Canyon Creek downstream of the site due to reduction of flows where an approximately 650-foot segment of Coldwater Canyon Creek, accounting for approximately 0.31 acre would exhibit reduced flows. With the proposed realignment of Coldwater Canyon Creek, the total flow rate within Temescal Wash would be increased for the 1,000-foot reach between the proposed confluence and the existing confluence. This increase in flow also would result in an increase to water surface elevations and velocities. The increase in water surface elevations would range from 0.4 feet to 0.9 feet between the existing confluence location and the existing Dawson Canyon Road Bridge, 0.9 feet to 1.2 feet upstream of the bridge to the proposed confluence location, and transitioning from 0.5-foot increase to 0.0-foot increase upstream of the proposed confluence (with no measurable increase approximately 0.4 mile upstream of the proposed confluence). The increase in velocity would be approximately 0.5 feet per second (fps) in the reach from the existing confluence location to the proposed confluence location. The area associated with the outfall that would discharge to Temescal Wash from the realigned Coldwater Canyon Creek supports riparian habitat, which extends immediately downstream consisting of black willow forest, mulefat scrub and alluvial scrub [see the attached Exhibit 5 from the application submitted to California Department of Fish and Wildlife]. Below this area, there are no areas consisting of riparian alliances with a mix of coastal sage scrub species, limited amounts of scalebroom and mulefat. Furthermore, the low-flow channel does not support vegetation. The species adjacent to the low-flow channel are commonly found in alluvial scrub that is highly adapted to high energy flows and the increase in velocities by 0.5 feet per second and depths ranging from 0.4 to 0.9 feet would not result in significant impacts to the vegetation. Coldwater Canyon Creek was realigned in the late 1960's or early 1970's with the construction of the concrete pipe manufacturing facility that previously occupied the Project site. The path of the creek was shifted from the approximate center of the site to the western edge of the site parallel to Temescal Canyon Road and much of the drainage adjacent to the site has been channelized through the installation of rip rap to maintain the drainage in its current channel." (Glenn Lukos Associates 2021b)

Following preparation of the above-referenced report and discussed below, the project engineer determined that due to the increased flow rates, bank stabilization for a segment of the western bank of Temescal Wash as well as armoring of the existing supports for the Dawson Canyon Bridge where it crosses Temescal Wash would be required as detailed in Appendix B - Hydraulic Analysis Report for Temescal Valley Commerce Center (Rick Engineering 2021).

Road Impacts in Temescal Wash - As a result of the Temescal Valley Commerce Center development, roadway improvements to Dawson Canyon Road including bank stabilization within Temescal Wash are required. Specifically, a portion of the southern Temescal Wash slope will be reestablished as a 2:1 grade and lined with rock slope protection above and below ground to prevent additional failure of the slope.

Outfall Structure Impacts in Temescal Wash - Coldwater Creek Wash is being relocated from downstream of Dawson Canyon Road Bridge to upstream as a result of the Temescal Valley Commerce Center development. The channel will outfall into Temescal Wash and will cross under Dawson Canyon Road through a dual arch culvert. Within Temescal Wash there will be rip rap within the river to provide protection from the flows of the channel and dissipate energy of the runoff to nonerosive velocities. To allow for maintenance access of this area, a maintenance access ramp will be constructed off of Dawson Canyon Road south.

All future maintenance activities proposed within the rock slope sections of Temescal Wash related to Dawson Canyon Road bank stabilization and outfall structure resulting from the realignment of Coldwater Creek Wash have been identified, illustrated and analyzed as permanent impacts. Access related to future maintenance activities of these features will occur from Temescal Canyon Road and will not impact the natural hydrology or natural vegetation communities present within Temescal Wash including regions proposed for dedication as conservation land.

Bridge Repair Impacts in Temescal Wash - As a result of the Coldwater Creek Wash Channel being realigned from downstream of the existing Dawson Canyon Road Bridge to upstream, a structural/scour assessment was performed of the existing bridge to evaluate the need to provide improvements to protect the bridge due to the increase in stormwater runoff entering Temescal Wash. Based on the structural/scour assessment, rip rap is recommended to be placed in Temescal Wash to protect the bridge piers due to a projected increase in scour. There is existing rip rap present within Temescal Wash under the bridge and within the jurisdictional limits that will be added to improve the protection being provided and to fill in where rock may have moved. Additional rip rap will be added between the bridge piers where no rock is currently present, but this is located outside of jurisdictional limits and where there is little vegetation currently present.

Where Temescal Wash flows under the Dawson Canyon Bridge at the northernmost end of the Project site, the OHWM narrows. Of the four piers that support Dawson Canyon Bridge, the two inner piers are within Corps jurisdictional limits, while the two outer piers are on upland terraces outside of Corps jurisdiction – Appendix A Exhibit 2 (GLA 2022) Where Temescal Wash flows under the Dawson Canyon Bridge at the northernmost end of the Project site, the width of CDFW & MSHCP Section 6.1.2 jurisdiction narrows. Of the four piers that support Dawson Canyon Bridge, the two inner piers are within CDFW

& MSHCP Section 6.1.2 jurisdictional limits, while the two outer piers are on upland terraces outside of CDFW & MSHCP Section 6.1.2 jurisdiction. Appendix A Exhibit 2 (GLA 2023)

No fuel modification zones or weed abatement measures are required and therefore would not result in direct impacts to the proposed MSHCP Conservation Areas.

2.3 Existing Conditions

This document presents the results of a habitat assessment conducted on May 21st, 2019, September 14th, 2020 and January 2022 by Cadre Environmental, formal jurisdictional delineation conducted by Glenn Lukos Associates in October/November 2020, January 2022 and habitat assessment/focused surveys for sensitive plants conducted by Glenn Lukos Associates in 2019, 2020, 2022 (Cadre Environmental 2020a, Glenn Lukos Associates 2020a, 2021a).

The majority of the Project Site is flat and disturbed as a result of historic impacts associated with the operation of a concrete pipe manufacturing facility. The Project Site is also bisected by Temescal Wash in the extreme northern corner and Coldwater Canyon Wash along the western boundary. Remnant patches of Riversidean alluvial fan sage scrub, Riversidean sage scrub, and ornamental habitats persist as summarized in Table 2, *Vegetation Communities Acreages*, and illustrated in Figure 4, *Vegetation Communities Map* and Figures 5 to 9, *Current Project Site Photographs*.

Table 2.
Vegetation Communities Acreages

*Vegetation Type	Acres (onsite)	Acres (offsite)	Acres (total)
Disturbed/Developed	37.41	20.08	57.49
Disturbed Riversidean Sage Scrub	2.87	1.80	4.67
Riversidean Alluvial Fan Sage Scrub	0.64	0.08	0.72
Disturbed Riversidean Alluvial Fan Sage Scrub	2.23	0.48	2.71
Ornamental & Native Trees	1.31	2.88	4.19
Coldwater Canyon Wash	1.18	0.41	1.59
Temescal Wash	0.54	0.13	0.67
Black Willow Forest	0.00	0.07	0.07
Cottonwood	0.00	0.10	0.10
Mule Fat Scrub	0.00	0.07	0.07
TOTALS	46.18	26.10	72.28

*Source: Cadre Environmental 2022 GLA 2022a.

The Soil Survey of Western Riverside Area has the following soils mapped within the boundary of the Project Site as shown on Figure 10, *Soils Association Map*:

- AIC – Arbuckle gravelly loam, 2 to 9 percent slopes, dry, MRLA 19
- TeG – Terrace escarpments.
- GdC – Garretson gravelly very fine sandy loam, 2 to 8 percent slopes.
- CmC – Cortina cobbly loamy sand, 2 to 8 percent slopes

- CnC - Cortina gravelly coarse sandy loam, 2 to 8 percent slopes
- CIC – Cortina gravelly loamy sand, 2 to 8 percent slopes
- RuF – Rough broken land
- SgC – San Emigdio loam, 2 to 8 percent slopes

Vegetation Communities

Disturbed/Developed

The majority of the Project Site is dominated by heavily disturbed and altered soils generally devoid of vegetation. Species documented within this habitat type include stinknet (*Oncosiphon piluliferum*), black mustard (*Brassica nigra*), totalote (*Centaurea melitensis*), red-stemmed filaree (*Erodium cicutarium*), white-stemmed filaree (*Erodium moschatum*), prickly lettuce (*Lactuca serriola*), Russian thistle (*Salsola tragus*), foxtail chess (*Bromus madritensis* ssp. *rubens*), mule fat (*Baccharis salicifolia*), Boccone's sand spurry (*Spergularia bocconi*), poverty weed (*Iva axillaris*), common knotweed (*Polygonum arenastrum*), and salt heliotrope (*Heliotropium curassavicum*).

Developed regions include the paved portions of Temescal and Dawson Canyon Roads. The man-made detention basin and culvert was documented within the disturbed habitat in the northwest corner of the Project Site is generally devoid of vegetation. A single red willow (*Salix laevigata*) tree is located north of the basin.

Disturbed Riversidean Sage Scrub

Disturbed Riversidean sage scrub occurs along the northern and adjacent to the western Project Site boundary. Common species documented within this habitat type include brittlebush (*Encelia farinosa*), California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), annual sunflower (*Helianthus annuus*) yellow sweetclover (*Melilotus officinalis*), caterpillar phacelia (*Phacelia cicutaria*), common sand aster (*Corethrogyne filaginifolia*), deerweed (*Acmispon glaber*), telegraph weed (*Heterotheca grandiflora*), clustered tarweed (*Deinandra fasciculata*) prickly sow thistle (*Sonchus asper*), horehound (*Marrubium vulgare*), Italian thistle (*Carduus pycnocephalus*), and pineapple weed (*Matricaria discoidea*).

Riversidean Alluvial Fan Sage Scrub

Riversidean alluvial fan sage scrub including disturbed patches equally dominated by ruderal species is present within and adjacent to Temescal Wash and Coldwater Canyon Wash. Species documented within these vegetation communities include scale broom (*Lepidospartum squamatum*), California buckwheat, mugwort (*Artemisia douglasiana*), tarragon (*Artemisia dracunculus*), western lavender (*Verbena lasiostachys*), coyote brush (*Baccharis pilularis*), sweetbush (*Bebbia juncea*), coast goldenbush (*Isocoma menziesii*), and California brickellbush (*Brickellia californica*).

Ornamental & Native Trees

Eucalyptus (*Eucalyptus globulus*) woodland habitat and four (4) native western sycamore (*Platanus racemosa*) trees were documented within the Project Site along the western boundary primarily adjacent to Coldwater Canyon Wash.

Black Willow Forest, Cottonwood and Mule Fat Scrub

The offsite impact area located within Temescal Wash black willow forest, cottonwood trees and a patch of mule fat scrub. Species documented within these regions include black willow (*Salix gooddingii*), mule fat and Fremont's cottonwood trees (*Populus fremontii*).

Representative distribution and photographs of these habitat types are illustrated in Figure 4, *Vegetation Communities Map* and Figures 5 to 9, *Current Project Site Photographs*.

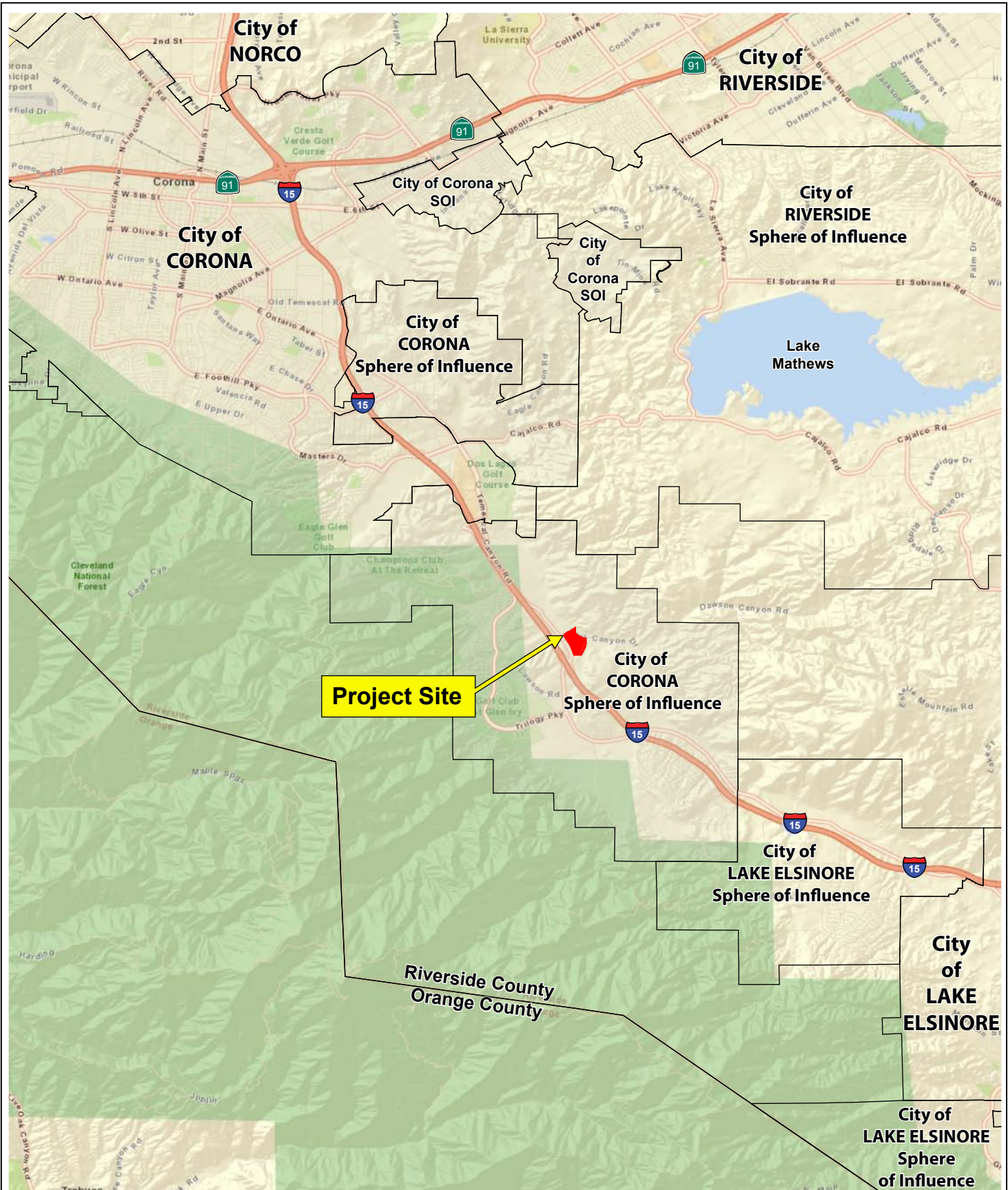
General Wildlife

General wildlife species documented on site include but are not limited to red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), rock dove (*Columba livia*), American kestrel (*Falco sparverius*), northern mockingbird (*Mimus polyglottos*), Anna's hummingbird (*Calypte anna*), mourning dove (*Zenaida macroura*), western kingbird (*Tyrannus verticalis*), black phoebe (*Sayornis nigricans*), Say's phoebe (*Sayornis saya*), cliff swallow (*Petrochelidon pyrrhonota*), American crow (*Corvus brachyrhynchos*), wrentit (*Chamaea fasciata*), greater roadrunner (*Geococcyx californianus*), California towhee (*Pipilo crissalis*), European starling (*Sturnus vulgaris*), house finch (*Haemorhous mexicanus*), house sparrow (*Passer domesticus*), desert cottontail rabbit (*Sylvilagus audubonii*), and coachwhip (*Masticophis flagellum*).

3. RIPARIAN, RIVERINE, VERNAL POOL MITIGATION (SECTION 6.1.2)

3.1 Methods

A formal jurisdictional delineation and MSHCP Section 6.1.2 assessment was conducted by Glenn Lukos Associates in October, November 2020 and January 2022 (Glenn Lukos Associates 2020a). The delineation determined the boundaries or absence of potential wetland and non-wetland waters of the United States subject to the regulatory jurisdiction of the U.S. Army Corps of Engineers (USACE) pursuant to Clean Water Act (CWA) Section 404; wetland and non-wetland waters of the State subject to the regulatory jurisdiction of the Regional Water Quality Control Board pursuant to CWA Section 401 and State Porter-Cologne Water Quality Control Act (Porter-Cologne); streambed and riparian habitat subject to the regulatory jurisdiction of the CDFW pursuant Sections 1600 *et seq.* of the California Fish and Game Code (CDFG Code); and Riparian/Riverine Areas and Vernal Pools defined in Section 6.1.2 of the Western Riverside County MSHCP.



Project Site APNs: 283160046 and 283-190-044

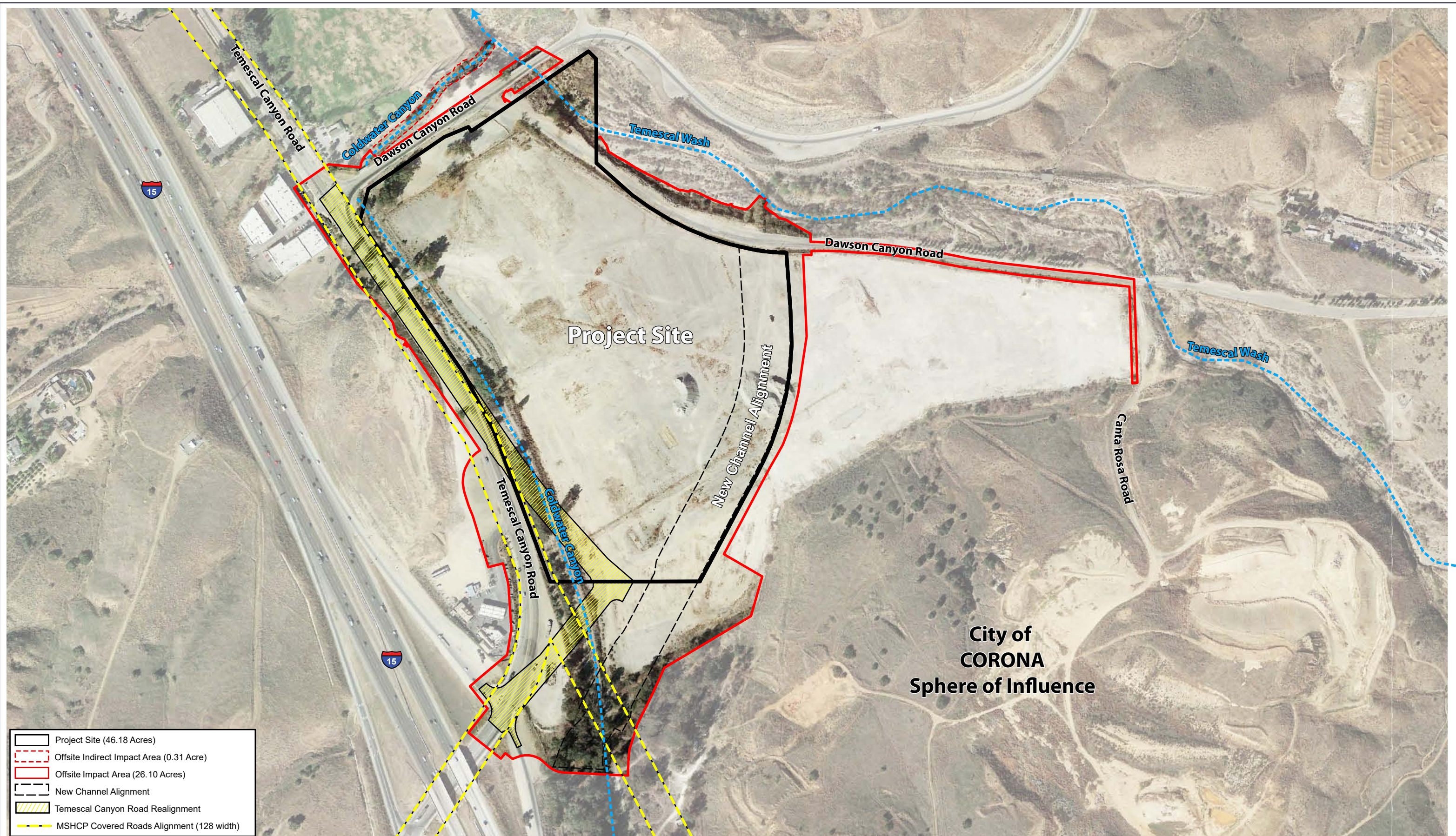
Offsite Total APN 283160009, 283170015, 283190013, 283200008. Offsite Partial APN 283160030, 283160035, 283160041, 283160045, 283170012, 283170013, 283170021, 283190014, 283190025, 283190024, 283190045, 283200009 and Right-of-Ways

Figure 1 - Regional Location Map

*Determination of Biologically Equivalent or Superior Preservation
Temescal Valley Commerce Project Site*

CADRE
Environmental





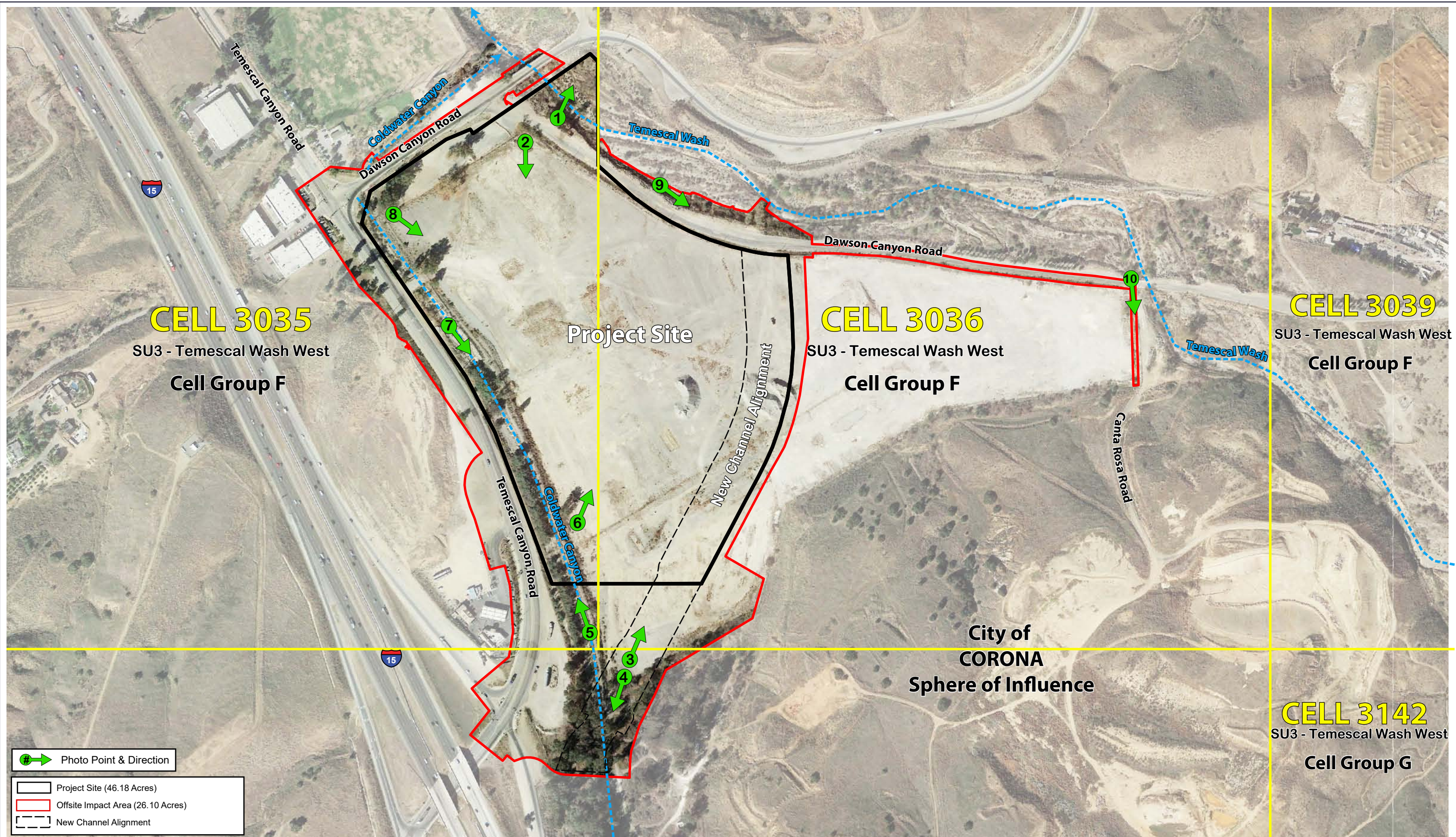
Project Site APNs: 283160046 and 283-190-044 Offsite Total APN 283160009, 283170015, 283190013, 283200008. Offsite Partial APN 283160030, 283160035, 283160041, 283160045, 283170012, 283170013, 283170021, 283190014, 283190025, 283190024, 283190045, 283200009 and Right-of-Ways

Figure 2 - Project Site Map

*Determination of Biologically Equivalent or Superior Preservation
Temescal Valley Commerce Center Project Site*



1 inch = 350 feet



Project Site APNs: 283160046 and 283-190-044 Offsite Total APN 283160009, 283170015, 283190013, 283200008. Offsite Partial APN 283160030, 283160035, 283160041, 283160045, 283170012, 283170013, 283170021, 283190014, 283190025, 283190024, 283190045, 283200009 and Right-of-Ways

Figure 3 - MSHCP Criteria Area and Photographic Key Map

*Determination of Biologically Equivalent or Superior Preservation
Temescal Valley Commerce Center Project Site*



1 inch = 350 feet



PHOTOGRAPH 1 - Northward view of Temescal Wash located within the northwestern region of the Project Site.



PHOTOGRAPH 2 - Southward view of the northwestern region of the Project Site.

Refer to Figure 3- MSHCP Criteria Area and Photograph Key Map

Figure 5 - Current Project Site Photographs

*Determination of Biologically Equivalent or Superior Preservation
Temescal Valley Commerce Center Project Site*





PHOTOGRAPH 3 - Northeast view of offsite new channel alignment.



PHOTOGRAPH 4 - Southwest view of offsite new channel alignment.

Refer to Figure 3- MSHCP Criteria Area and Photograph Key Map

Figure 6 - Current Project Site Photographs

*Determination of Biologically Equivalent or Superior Preservation
Temescal Valley Commerce Center Project Site*





PHOTOGRAPH 5 - Northeast view of Project Site from southeast corner.



PHOTOGRAPH 6 - Northeast view of Project Site from southwest corner.

Refer to Figure 3- MSHCP Criteria Area and Photograph Key Map

Figure 7 - Current Project Site Photographs

*Determination of Biologically Equivalent or Superior Preservation
Temescal Valley Commerce Center Project Site*





PHOTOGRAPH 7 - Southeast view of Coldwater Canyon located onsite and adjacent to Temescal Canyon Road.



PHOTOGRAPH 8 - Southeast view of Project Site from northwest corner.

Refer to Figure 3- MSHCP Criteria Area and Photograph Key Map

Figure 8 - Current Project Site Photographs

*Determination of Biologically Equivalent or Superior Preservation
Temescal Valley Commerce Center Project Site*





PHOTOGRAPH 9 - Southeast view of Temescal Canyon Wash toward proposed outfall structure.



PHOTOGRAPH 10

Refer to Figure 3- MSHCP Criteria Area and Photograph Key Map

Figure 9 - Current Project Site Photographs

*Determination of Biologically Equivalent or Superior Preservation
Temescal Valley Commerce Center Project Site*



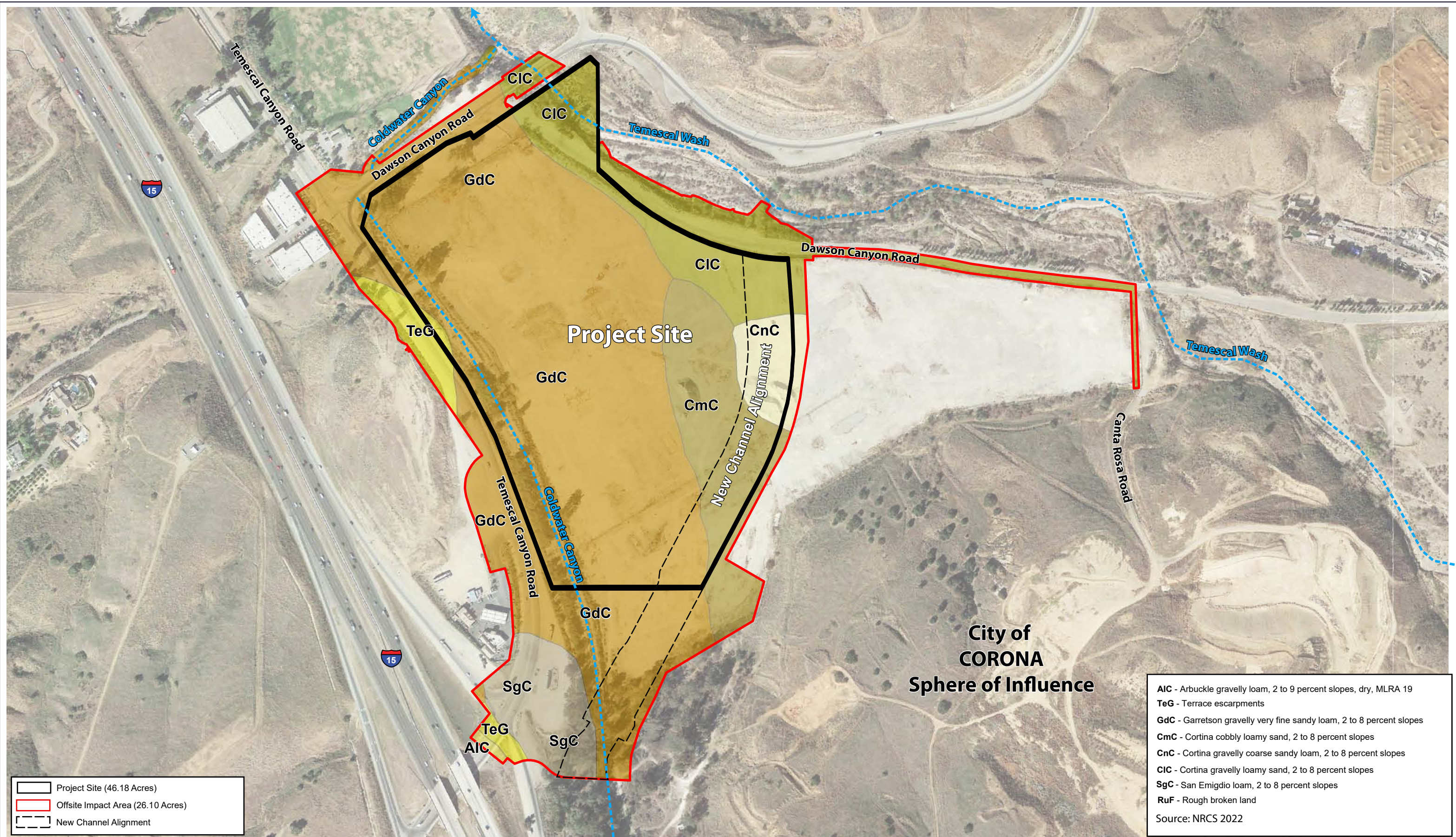


Figure 10 - Soils Association Map

*Determination of Biologically Equivalent or Superior Preservation
Temescal Valley Commerce Center Project Site*



3.2 Results/Impacts

Regulated activities within inland streams, wetlands and riparian areas in Western Riverside County California fall under the jurisdiction of the MSHCP 6.1.2. The MSHCP requires, among other things, assessments for riparian/riverine and vernal pool resources. As projects are proposed within the MSHCP Plan Area, an assessment of the potentially significant effects of those projects on riparian/riverine areas, and vernal pools are required, as currently mandated by CEQA, using available information augmented by project-specific mapping provided to and reviewed by the permittee's biologist(s). Riparian/riverine areas and vernal pools are defined for this section as follows in accordance with Section 6.1.2, Vol. I, of the Final MSHCP Plan:

“Riparian/Riverine Areas are lands which contain habitat dominated by trees, shrubs, persistent emergents, or emergent mosses and lichens, which occur close to or which depend upon soil moisture from a nearby fresh water source; or areas with fresh water flow during all or a portion of the year.” (MSHCP 2004)

It is assumed the first part of the definition defines riparian habitat, and the second part defines riverine areas. Vernal pools are defined as:

“...seasonal wetlands that occur in depression areas that have wetlands indicators of all three parameters (soils, vegetation and hydrology) during the wetter portion of the growing season but normally lack wetlands indicators of hydrology and/or vegetation during the drier portion of the growing season. Obligate hydrophytes and facultative wetlands plant species are normally dominant during the wetter portion of the growing season, while upland species (annuals) may be dominant during the drier portion of the growing season”. (MSHCP 2004)

No vernal pools were documented onsite based on a lack of suitable soils and characteristic vernal pool plant species. Although the one (1) 0.03-acre heavily disturbed basin located along the northwest boundary may be occupied by the common versatile fairy shrimp (*Branchinecta lindahli*), the basin is not expected to be occupied by the vernal pool fairy shrimp. The man-made detention basin and culvert was created in 2012 to capture seasonal overflow from Coldwater Canyon Wash resulting from the unnatural flow pattern at the intersection of Temescal and Dawson Canyon Roads. Coldwater Canyon Wash will be redirected to an alignment in the eastern region of the Project Site and the feature will no longer be hydrated by sheet flow. The Project Site is dominated by sandy loam substrates, and the feature does not provide long-term conservation value for any target MSHCP species.

The criteria used to determine MSHCP Section 6.1.2 Riparian/Riverine resources included the presence of vegetation that requires soil moisture from a nearby water source, a defined drainage that may have flow for a portion of the year, and/or the presence of hydrological connections or conveyances. A total of 2.71-acres of disturbed Riversidean alluvial fan sage scrub was mapped onsite adjacent and outside of the current Coldwater Canyon Wash floodprone area and will be impacted as a result of project implementation. Historically these remnant habitat areas occurred within the

Coldwater Canyon Wash floodprone area prior to the redirection and channelization of the drainage. This remnant habitat type is now composed and dominated by disturbed and Riversidean sage scrub vegetation including the occasional occurrence of scalebroom, thus the characterization as disturbed Riversidean alluvial fan sage scrub. This habitat type is no longer connected hydrologically to any upstream or downstream watercourses and does not meet the criteria of MSHCP riverine classification.

The following section is excerpted and/or summarized directly from the following document prepared by Glenn Lukos Associates “*Jurisdictional Delineation of the Corona Clay Project Site, an Approximate 46.18-Acre Property Located in the City of Corona Sphere of Influence, Riverside County*”, as outlined in Table 3, *MSHCP Section 6.1.2 Riparian/Riverine Resources*, and as shown in Figure 11, *MSHCP Section 6.1.2 Riparian/Riverine Map*.

For purposes of assessing existing conditions and impacts, all resources delineated as CDFW regulated were characterized as MSHCP Section 6.1.2 Riparian and Riverine resources. CDFW jurisdiction is associated with Coldwater Canyon Wash and Temescal Wash described above and is summarized by site-specific descriptions outlined below. CDFW jurisdiction includes all areas of USACE jurisdiction and extend beyond the OHWM to the top of bank or canopy of associated riparian habitat.

Coldwater Canyon Wash

Coldwater Canyon Wash within the Project Site totals approximately 1.22 acres of CDFW jurisdiction, none of which consists of riparian habitat with the exception of a few scattered black willows and a few individuals of mule fat (*Baccharis salicifolia*). Coldwater Canyon Wash traverses along the western boundary of the site for approximately 1,847 linear feet before it extends offsite beneath Dawson Canyon Road through two 7 x 14-foot concrete box culverts. Coldwater Canyon Wash discharges northwest of the Project Site into Temescal Wash. The upstream offsite segment accounts for 1.02-acre of non-riparian and 0.02-acre of riparian CDFW jurisdiction.

Coldwater Canyon Wash, both onsite and offsite, exhibits a well-defined channel and signs of intermittent flow with top the of bank ranging from 17 to 50 feet in width. Vegetation associated with the creek bottom and lower portions of the bank include native and non-native species, including: scale broom (*Lepidospartum squamatum*), brittlebush (*Encelia farinosa*), mugwort (*Artemisia vulgaris*), stinkweed (*Dittrichia graveolens*), oleander (*Nerium oleander*), castor bean (*Ricinus communis*), poison oak (*Toxicodendron diversilobum*), salt cedar (*Tamarix*), tarragon (*Artemisia dracunculus*), sweetbush (*Bebbia juncea*), mule fat (*Baccharis salicifolia*), a canopy of blue-gum eucalyptus (*Eucalyptus globulus*), California sagebrush (*Artemisia californica*), and a few scattered black willow (*Salix gooddingii*) individuals. The top bank supports upland scrub species including sweet bush, scale broom, California sage brush and California buckwheat.

A total of 2.26-acres of CDFW/MSHCP Section 6.1.2 Riparian and Riverine resources within Cold Water Canyon will be permanently impacted as a result of project initiation as summarized in Tables 4, *MSHCP Section 6.1.2 Riparian/Riverine Resources Impacts*, and shown in Figure 12, *MSHCP Section 6.1.2 Riparian/Riverine Impact Map*. The Project

would require that the reach of Coldwater Canyon Wash located adjacent to Temescal and Dawson Canyon Roads be redirected to an alignment in the eastern region of the Project Site. A 180-foot wide, 5.70-acre drainage easement will be granted to the County of Riverside.

Coldwater Canyon Wash was realigned in the late 1960's or early 1970's with the construction of the concrete pipe manufacturing facility that previously occupied the Project site. The path of the creek was shifted from the approximate center of the site to the western edge of the site parallel to Temescal Canyon Road and much of the drainage adjacent to the site has been channelized through the installation of rip rap to maintain the drainage in its current channel. With the realignment, the current channel would be filled during site grading and the drainage would be realigned. With the realignment of the channel and filling of the existing drainage, flows that currently continue downstream from the bridge at Dawson Canyon Road, continuing for approximately 650 feet to Temescal Wash. This 650-foot segment, that averages approximately 20 feet in width, would experience reduced discharge (Glenn Lukos Associates. 2021b). This segment consists largely of unvegetated channel that supports limited riparian habitat consisting of an approximately 0.03-acre patch of arroyo willow which occurs just above the confluence with Temescal Wash. Thus, the reduced discharge would not result in significant losses to riparian habitat, as it is likely, that the willows are supported by subsurface water and do not specifically depend of surface discharge. Nevertheless, CDFW and the RWQCB would likely consider the reduction in hydrology (as opposed to the increases experienced by Temescal Wash) to be a significant impact to the 650-foot segment of Coldwater Canyon Wash, which would remain untouched by the project. Indirect impacts to the offsite, downstream Coldwater Canyon Wash, due to reduction in stream discharge associated with realignment of Coldwater Canyon Wash accounting for 0.31-acre will be mitigated through the purchase of 0.31-acre of reestablishment and 0.31-acre of rehabilitation credits from the Riverpark Mitigation Bank for a ratio of 2:1, totaling 0.62-acre.

Temescal Wash

The northwestern corner of the Project Site and offsite impact area totaling 6.70-acres traverses Temescal Wash including CDFW jurisdictional streambed that includes a low-flow channel, and adjacent areas that exhibit occasional flows. Thus, the area of CDFW jurisdiction associated with Temescal Wash averages approximately 228 feet in width. Vegetation along the channel includes giant reed, scale broom, brittlebush, stinkweed (*Dittrichia graveolens*, Upland (UPL)), castor bean (*Ricinus communis*, Facultative Upland (FACU)), salt cedar (*Tamarix*, Facultative (FAC)), tarragon (*Artemisia dracuncululus*, UPL), sweetbush (*Bebbia juncea*, UPL), and mule fat (*Baccharis salicifolia*, FAC).

Before reaching the northwest corner of the site where the site is traversed by Temescal Wash, Temescal Wash parallels the northern project boundary of the site, remaining offsite. As a component of the Project, Coldwater Creek will be realigned and will discharge to Temescal Wash offsite near the Northeast corner of the site. As noted above, the area where Coldwater Creek will discharge to the site includes a well-defined low-flow channel and a terrace which is well above the low-flow channel, with a steep slope to the top of the Temescal Wash Bank. The low-flow channel is unvegetated with

an algal mat and areas with adjacent mule fat scrub dominated by mule fat (*Baccharis salicifolia*, FAC) and Goodding's black willow forest dominated by Goodding's black willow (*Salix gooddingii*, Facultative Wetland (FACW)) and red willow (*Salix laevigata*, FACW) in the canopy with mule fat in the understory. Two large Fremont cottonwood trees (*Populus fremontii*, FAC) are growing from the toe of the steep slope.

A total of 0.304-acre of permanent and 0.67-acre of temporary CDFW/MSHCP Section 6.1.2 Riverine resources within Temescal Wash will be impacted as a result of project initiation.

A total of 0.15-acre of permanent and temporary impacts to suitable least Bell's vireo habitat (black willow and cottonwood) will occur within the Temescal Wash offsite area all of which occurs within Cell Group F. No impacts to least Bell's vireo habitat outside of Cell Group F is proposed or will occur as a result of the project. This riparian habitat was also documented as occupied by or potential habitat for the least Bell's vireo as summarized in Tables 4, *MSHCP Section 6.1.2 Riparian/Riverine Resources Impacts*, and shown in Figure 12, *MSHCP Section 6.1.2 Riparian/Riverine Impact Map*. As outlined below, the MSHCP identifies four (4) objectives (presented as italics/underlined) for the protection of least Bell's vireo habitat located within the riparian corridor, followed by an analysis of MSHCP project consistency.

1. "Include within the MSHCP Conservation Area at least 9,430 acres of suitable habitat" (MSHCP 2004). Permanent and temporary impacts to 0.15-acre of riparian habitat occupied or representing suitable habitat for the least Bell's vireo within Temescal Wash will be subject to additional mitigation through rehabilitation of 0.28-acre of black willow and 0.16-acre cottonwood (0.44-acre total) resulting in an over 2:1 replacement of Section 6.1.2 Riparian habitat within the Temescal Wash Conservation and Mitigation Area.
2. "Include within the MSHCP Conservation Area at least 8 core areas and interconnecting linkages" (MSHCP 2004). Permanent and temporary impacts to 0.15-acre of riparian habitat occupied or representing suitable habitat for the least Bell's vireo within Temescal Wash will be subject to additional mitigation through rehabilitation of 0.28-acre of black willow and 0.16-acre cottonwood (0.44-acre total) resulting in a 2:1 replacement of Section 6.1.2 Riparian habitat within the Temescal Wash Conservation and Mitigation Area.
3. "Include within the MSHCP Conservation Area additional areas within the Criteria Area identified as important to the least Bell's vireo. If survey results are positive, 90% of the occupied portions of the property that provide for long-term conservation value shall be conserved. This will involve including 100 meters of undeveloped landscape adjacent to the habitat conserved" (MSHCP 2004). Permanent and temporary impacts to 0.15-acre of occupied habitat following implementation of all proposed mitigation measures (0.44-acre of riparian rehabilitation) would not adversely impact conservation of core areas of linkages for the species. All MSHCP Urban/Wildlands Interface Guidelines measures will be implemented to ensure the species is not indirectly impacted by the proposed development and following proposed restoration activities within the temporary impact area.

4. "Within the MSHCP Conservation Area, maintain (once every 3 years) the continued use of, and successful reproduction at 75% percent of known vireo occupied habitat (including any nesting locations identified in the MSHCP Conservation Area in the future)" (MSHCP 2004). Based on recent as well as historic observations of least Bell's vireo within Temescal Wash, the species is expected to breed within the permanent and temporary offsite impact area following completion of rehabilitation measures which meet the minimum success criteria.

In addition to implementing all four (4) least Bell's vireo objectives listed above, initial vegetation clearing of occupied or potential least Bell's vireo habitat will occur outside of the nesting season (March 15th to September 15th). Potential indirect impacts to suitable least Bell's vireo habitat within Temescal Wash during and following completion of construction and riparian rehabilitation will be avoided by implementing all Urban/Wildlands Interface guidelines presented in Section 6.1.4 of the MSHCP and Section 3.3.2 of this report.

Construction activities conducted during the least Bell's vireo breeding season will be monitored by biologist to ensure no direct and/or indirect impacts occur to the species in the vicinity of the project including noise monitoring to ensure that noise levels do not exceed 60 dB within 300 feet of least Bell's vireo habitat during the nesting period.

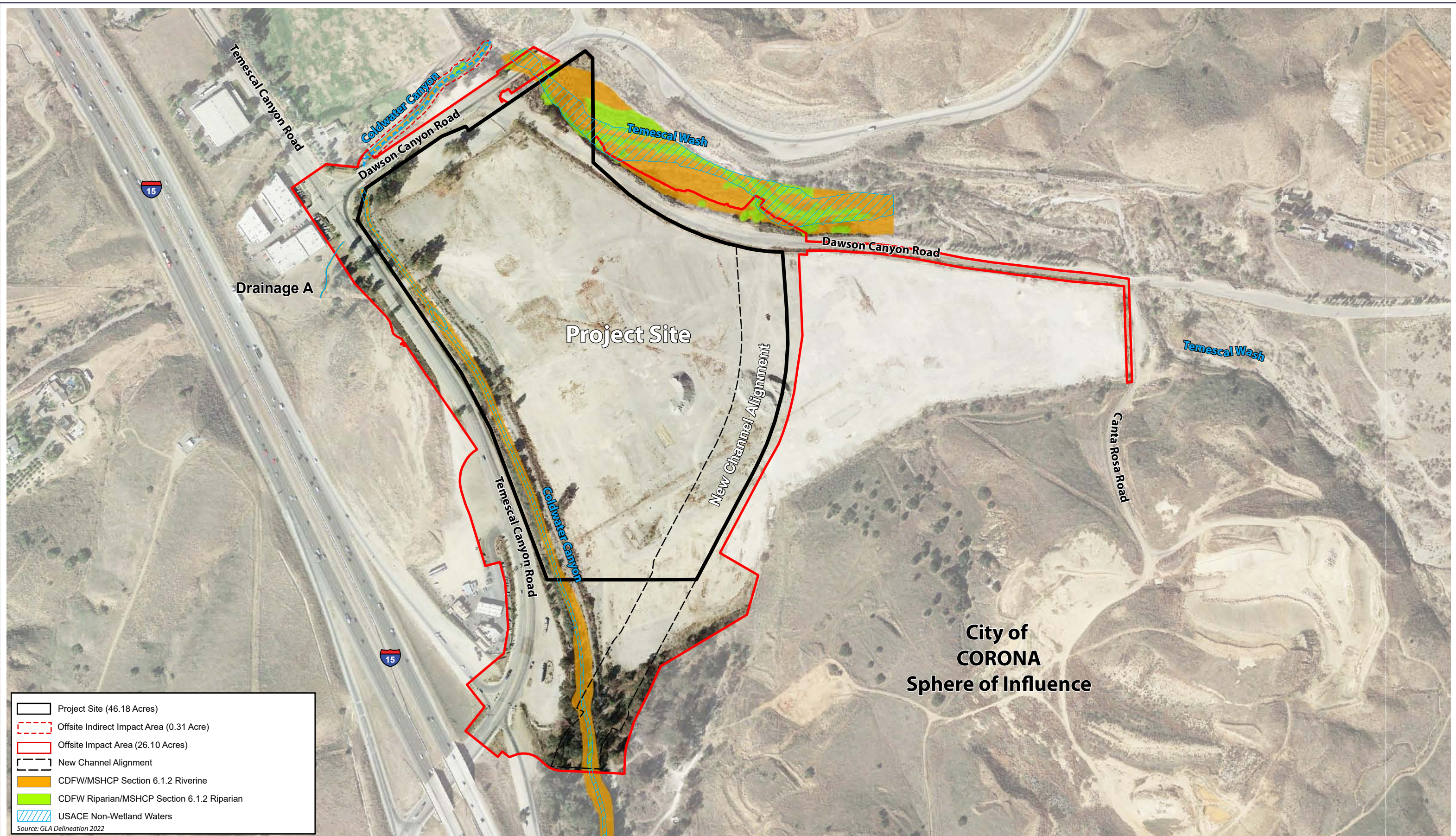
The 0.44-acre of riparian rehabilitation within the Temescal Wash Conservation and Mitigation Area will be completed within 5-years of project initiation or earlier if predetermined success criteria have been achieved and the mitigation is signed off by the regulatory agencies. Following completion of the rehabilitation of riparian habitat, the following will be performed.

- A total of three (3) consecutive years of USFWS focused least Bell's vireo surveys will be conducted throughout the reestablished riparian habitat or until a pair has been documented to utilize the habitat.
- In the event a pair of least Bell's vireo are not detected within the reestablished riparian habitat within the three (3) years of monitoring, the project will be conditioned to purchase a total of 0.44-acre riparian rehabilitation credits from the RCRC.
- Following rehabilitation of riparian habitat within Temescal Wash, the 5.87-acre Temescal Wash Conservation and Mitigation Area will be donated to the RCA in fee title following completion of the restoration program as determined by the RCA, Wildlife Agencies (CDFW and USFWS), and any other water-regulating entities (e.g., Regional Water Quality Control Board).

Table 3
MSHCP Section 6.1.2 Riparian/Riverine Resources

Drainage	Type	Location	Total (acres)	CG F (acres)	Outside CG F (acres)
Coldwater Canyon Wash					
Coldwater Canyon Wash	Non-Riparian Intermittent	Onsite	1.22	1.22	0
Coldwater Canyon Wash	Non-Riparian Intermittent	Offsite	1.02	0.30	0.72
Coldwater Canyon Wash	Riparian Intermittent	Offsite	0.02	0	0.02
Coldwater Canyon Wash Total			2.26	1.52	0.74
Temescal Wash					
Temescal Wash	Non-Riparian Intermittent	Onsite	0.71	0.71	0
Temescal Wash	Intermittent – Mule Fat Scrub	Onsite	0.22	0.22	0
Temescal Wash	Non-Riparian Intermittent	Offsite	2.70	2.70	0
Temescal Wash	Intermittent – Alluvial Scrub	Offsite	1.01	1.01	0
Temescal Wash	Intermittent – Black Willow	Offsite	0.60	0.06	0
Temescal Wash	Intermittent – Cottonwood	Offsite	0.24	0.24	0
Temescal Wash	Intermittent – Mule Fat Scrub	Offsite	1.20	1.20	0
Temescal Wash	Intermittent – Elderberry	Offsite	0.02	0.02	0
Temescal Total			6.70	6.70	0
Drainage A					
Drainage A	Non-Wetland Ephemeral	Offsite	0.01	0.01	0
Drainage A Total			0.01	0.01	0

Source: GLA 2024



Project Site APNs: 283160046 and 283-190-044 Offsite Total APN 283160009, 283170015, 283190013, 283200008. Offsite Partial APN 283160030, 283160035, 283160041, 283160045, 283170012, 283170013, 283170021, 283190014, 283190025, 283190024, 283190045, 283200009 and Right-of-Ways

Figure 11 - MSHCP Section 6.1.2 Riparian/Riverine Map

*Determination of Biologically Equivalent or Superior Preservation
Temescal Valley Commerce Project Site*



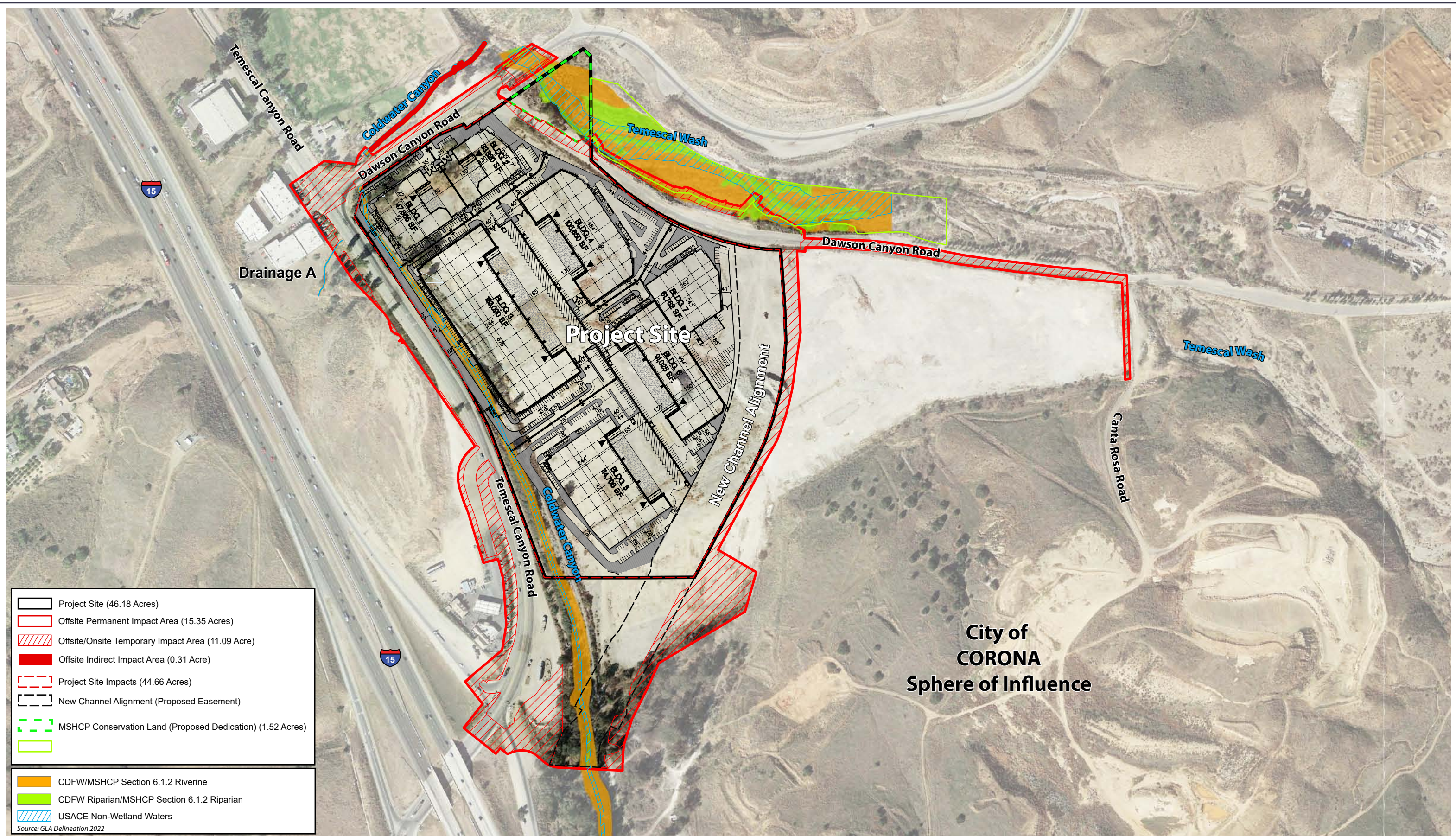


Figure 12 - MSHCP Section 6.1.2 Riparian/Riverine Impact Map
Determination of Biologically Equivalent or Superior Preservation
 Temescal Valley Commerce Project Site

Table 4.
MSHCP Section 6.1.2 Riparian/Riverine Resources Impacts

Drainage	Type	Location	Total (Acres)	CG F Temporary Impact (Acres)	CG F Permanent Impact (Acres)	Outside CG F Temporary Impact (Acres)	Outside CG F Permanent Impact (Acres)
Coldwater Canyon Wash							
Coldwater Canyon Wash	Non-Riparian Intermittent	Onsite	1.22	0	1.22	0	0
Coldwater Canyon Wash	Non-Riparian Intermittent	Offsite	1.02	0	0.30	0	0.72
Coldwater Canyon Wash	Riparian Intermittent	Offsite	0.02	0	0	0	0.02
Coldwater Canyon Wash Total			2.26	0	1.52	0	0.74
Temescal Wash							
Temescal Wash	Non-Riparian Intermittent	Onsite	0.71	0	0	0	0
Temescal Wash	Intermittent – Mule Fat Scrub	Onsite	0.22	0.005	0	0	0
Temescal Wash	Non-Riparian Intermittent	Offsite	2.70	0.43	0.23	0	0
Temescal Wash	Intermittent – Alluvial Scrub	Offsite	1.01	0.05	0.004	0	0
Temescal Wash	Intermittent – Black Willow	Offsite	0.60	0.06	0.01	0	0
Temescal Wash	Intermittent – Cottonwood	Offsite	0.24	0.03	0.06	0	0
Temescal Wash	Intermittent – Mule Fat Scrub	Offsite	1.20	0.07	0	0	0
Temescal Wash	Intermittent - Elderberry	Offsite	0.02	0.02	0	0	0
Temescal Total			6.70	0.67	0.304	0	0
Drainage A							
Drainage A	Non-Wetland Ephemeral	Offsite	0.01	0	0.01	0	0
TOTAL			8.97	0.67	1.834	0	0.74

Source: GLA 2024

Drainage A

Drainage A is an ephemeral drainage that originates west of Temescal Canyon Road and extends to the east where it enters side-by-side culverts and flows under Temescal Canyon Road to Coldwater Canyon Wash. Drainage A supports no wetlands or riparian habitat and the banks support upland non-native grasses and forbs with summer mustard as dominant. CDFW jurisdiction within the area affected by the project totals 0.01 acre.

3.3 Mitigation and Equivalency

Permanent direct onsite/offsite impacts to 2.574-acres (0.09-acre riparian, 2.484-acre riverine) and temporary onsite/offsite impacts to 0.67-acre (0.19-acre riparian, 0.48-acre riverine) of MSHCP Section 6.1.2 Riparian/Riverine resources (3.244-acres total) will occur as a result of project implementation.

The Project would also require that the reach of Coldwater Canyon Wash located adjacent to Temescal and Dawson Canyon Roads be redirected to an alignment in the eastern region of the Project Site. A 180-foot wide, 5.70-acre drainage easement will be granted to the County of Riverside. As a result of the realignment, 0.31-acre of indirect offsite impacts will occur to the downstream reach of Coldwater Canyon Wash due to reduction in stream discharge.

To meet the criteria of a biologically equivalent or superior alternative, the applicant will offset permanent impacts to 2.574-acres (0.09-acre riparian, 2.484-acre riverine) and temporary onsite/offsite impacts to 0.67-acre (0.19-acre riparian, 0.48-acre riverine) of MSHCP Section 6.1.2 riparian and riverine resources (3.244-acres total) as follows and prepare an MSHCP Determination of Biological Equivalent or Superior Preservation.

1. Mitigation for permanent impacts to 2.56-acres of MSHCP Section 6.1.2 riparian and riverine habitat within Coldwater Canyon Wash, Temescal Wash (excluding Riverine – Riversidean Alluvial Fan Sage Scrub (RAFSS) and Riparian Willow Forest; refer to 3 and 4 below for impacts and mitigation for these vegetation types) and Drainage A would be mitigated through a combination of credits from the Riverpark Mitigation Bank and with habitat rehabilitation in the Temescal Wash Conservation and Mitigation Area. Specifically, mitigation for permanent impacts to 0.08 acres of riparian and 2.47 acres of riverine would include 2.55-acres of reestablishment and 2.55-acres of rehabilitation credits from the Riverpark Mitigation Bank for a ratio of 2:1, totaling 5.10-acres. Additionally, impacts to 0.01-acre of riverine habitat would be mitigated with rehabilitation of RAFSS habitats within the Temescal Wash Conservation and Mitigation Area at a ratio of 2:1, totaling 0.02-acre.
2. Mitigation for temporary impacts to 0.56-acre of MSHCP Section 6.1.2 riparian and riverine habitat within Temescal Wash would be mitigated through a combination of credits from the Riverpark Mitigation Bank and with habitat rehabilitation in the Temescal Wash Conservation and Mitigation Area. Specifically, mitigation for temporary impacts to 0.13-acre of riparian and 0.12-acre of riverine habitat would include 0.25-acre of reestablishment and 0.25-acre of rehabilitation credits from the Riverpark Mitigation Bank for a ratio of 2:1, totaling 0.50-acre. Additionally,

impacts to 0.31-acre of riverine habitat would be mitigated with rehabilitation of RAFSS habitats within the Temescal Wash Conservation and Mitigation Area for a ratio of 2:1, totaling 0.62-acre.

3. Mitigation for offsite temporary (0.05-acre) and permanent (0.004-acre) impacts to RAFSS Section 6.1.2 riverine within Temescal Wash as a result of the proposed realignment of Coldwater Canyon Wash will be mitigated at a ratio of 4:1 (0.22-acre) through the rehabilitation of RAFSS in the Temescal Wash Conservation and Mitigation Area.
4. Mitigation for temporary (0.06-acre) and permanent (0.01-acre) impacts to Section 6.1.2 riparian black willow within Temescal Wash as a result of the proposed realignment of Coldwater Canyon Wash will be mitigated at a ratio of 4:1 totaling 0.28-acre of mitigation through a combination of credits from the Riverpark Mitigation Bank and habitat rehabilitation in the Temescal Wash Conservation and Mitigation Area. Specifically, mitigation would include 0.07-acre of reestablishment and 0.07-acre of rehabilitation credits from the Riverpark Mitigation Bank as well as 0.14-acre of rehabilitation of willow habitat within the Temescal Wash Conservation and Mitigation Area.

To meet the criteria of a biologically equivalent or superior alternative, the applicant will offset indirect impacts to 0.31-acre of Coldwater Canyon Wash as follows:

5. Indirect impacts to the offsite, downstream Coldwater Canyon Wash, due to reduction in stream discharge associated with realignment of Coldwater Canyon Wash accounting for 0.31-acre will be mitigated through 0.31-acre of reestablishment and 0.31-acre of rehabilitation credits from the Riverpark Mitigation Bank for a ratio of 2:1, totaling 0.62-acre.

To meet the criteria of a biologically equivalent or superior alternative, the applicant will offset 0.07-acre of permanent and 0.08-acre temporary (0.15-acre total) MSHCP Section 6.1.2 riparian resource impacts to least Bell's vireo habitat as follows:

6. Permanent and temporary impacts to 0.15-acre of riparian habitat (0.07 acre of willow and 0.08 acre of cottonwood) occupied or representing suitable habitat for the least Bell's vireo within Temescal Wash will be subject to rehabilitation of 0.28-acre of black willow, and 0.16-acre cottonwood (0.44-acre total) resulting in a 2:1 replacement of cottonwood and a 4:1 replacement of black willow constituting Section 6.1.2 riparian habitat within the Temescal Wash Conservation and Mitigation Area.

The River Park Mitigation Bank proposes to re-establish (recreate former but no longer existing) alkali plain wetland system habitat and rehabilitate (repair existing but degraded) alkali plain wetland system habitat for a grand total of 583 acres of restoration of various types of alkali plain wetland system plant communities. As stated by the United States Army Corps of Engineers (USACE):

"The Riverpark Mitigation Bank is a proposed 619-acre mitigation bank located along the San Jacinto River (SJR) in western Riverside County"

(Figures 1 and 2). The Bank property is specifically located just downstream of the Ramona Expressway and immediately upstream of Nuevo Road. The site is depicted on the U.S. Geological Survey (USGS) Perris and Romoland Quadrangle Rancho San Jacinto Nuevo y Potrero Land Grant (Figure 3) in unincorporated Riverside County, California (33° 49' 8.4"N, -117° 9' 18"W)." (USACE 2015)

"The primary objective of the proposed mitigation bank would be to replace functions and services of aquatic resources and associated habitats that have been degraded or destroyed as a result of activities conducted in compliance or in violation of Section 404 of the CWA. The proposed mitigation bank would provide mitigation for both permanent and temporary impacts to waters of the U.S. In addition, the proposed mitigation bank may be used to offset environmental losses resulting from unavoidable impacts related to regulated activities by the California Department of Fish and Wildlife and the San Diego and Santa Ana Regional Water Quality Control Boards. Specific objectives include: • Restoration of fluvial processes on site within the San Jacinto River floodplain. • Restoration of alkali playa and vernal pool habitat. • Expansion of existing sensitive plant populations across the site. • Removal of ongoing agricultural activities on the site. • Removal of existing berms and the low flow channel. • Permanent protection of the site through transfer of fee title to the Western Riverside Regional Conservation Authority (RCA). • Permanent management of the site through funding of a non-wasting endowment." (USACE 2015)

"Due to its location along the San Jacinto River and its high potential for successful restoration upon elimination of the artificial low flow channel and berms created by historic agricultural activities, the proposed mitigation bank location has been identified by several state and Federal agencies as a high-priority restoration site." (USACE 2015)

Rough-Step Unit 7 - A grading/clearance permit was issued for this property in 1989 (LU/APP/Pmt. No. 10900) prior to the 1994 vegetation mapping or 2004 adoption of the Western Riverside County MSHCP. With the exception of Riversidean alluvial fan sage scrub (RAFSS) located within Temescal Wash, the 7.70-acre of RAFSS mapped onsite in 1994 is disturbed or developed (Temescal Canyon and Dawson Canyon Roads). The project also includes the dedication of a 1.52-acre reach of Temescal Canyon Wash within which 1.16-acre is RAFSS.

As described in the Jurisdictional Delineation Report prepared by GLA, dated September 26th, 2022, the project will impact two drainage courses: Coldwater Canyon Wash and a limited area of Temescal Wash associated with installation of a storm water outfall structure and associated rip rap. Each is addressed below relative to the lost functions and values and the replacement functions and values associated with the proposed mitigation.

Coldwater Canyon Wash

Within the project site, the entire segment of Coldwater Canyon Wash was channelized in the 1960s when the drainage was relocated from the approximate center of the site to its current location between the previous industrial operations and Temescal Canyon Road. The eastern bank is lined with rip rap while the western bank is vegetated with sage scrub or with a canopy of non-native eucalyptus in the upper segment and has been lined with rip on the western bank in the lower portion. The channelized drainage is straight and exhibits no sinuosity; rather it functions as a flood control channel albeit with inadequate capacity during large storm events. The inadequate capacity is one of the factors that is driving relocation of the channel to its approximate historic location where the channel capacity will be substantially expanded. Before considering the increase in regional wetland functions associated with the proposed mitigation at the Riverpark Mitigation Bank, it is important to emphasize that the Coldwater Canyon Wash Channel is being relocated and the hydrologic and biogeochemical functions will not be lost but will be expanded with the increased size of the channel following construction/relocation. The project is not including relocation of the channel as a component of the project mitigation because the new expanded channel will be transferred to Riverside County Flood Control; nevertheless, the channel will provide expanded hydrologic and biogeochemical functions currently provided by the existing channel. Habitat functions, due to the limited value of the existing channel will be unchanged.

The existing segment of Coldwater Canyon Wash within the Study Area consist of a well-defined channel with signs of intermittent flow. Widths at top the of bank range from 12 to 51 feet. Vegetation associated with the creek bottom include a mix of native and non-native species: limited patches of mule fat (*Baccharis salicifolia*), occasional mugwort (*Artemisia douglasiana*) individuals, invasive exotic stinkweed (*Dittrichia graveolens*) is common, non-natives oleander (*Nerium oleander*) and castor bean (*Ricinus communis*), and non-native invasive salt cedar (*Tamarix ramosissima*). The rip rap lined eastern bank supports limited amounts of scale broom (*Lepidospartum squamatum*), poison oak (*Toxicodendron diversilobum*), and tarragon (*Artemisia dracunculus*), with the dominant plants on the banks consisting of sweetbush (*Bebbia juncea*), brittlebush (*Encelia farinosa*), and California sagebrush (*Artemisia californica*), and a few scattered black willow (*Salix gooddingii*) individuals. The top of bank supports a canopy of blue-gum eucalyptus (*Eucalyptus globulus*), which in some areas exhibits 100-percent cover.

Overall, the functions of Coldwater Canyon Wash are limited by the previous channelization and the lack of native riparian alliances of any extent. Thus, the low value Coldwater Canyon Wash will be replaced with a much higher value resources within a regionally important ecosystem.

Temescal Wash

Temescal Wash is a relatively undisturbed channel that will exhibit limited impacts associated with installation of an outfall for the relocated Coldwater Creek Channel. The area where Coldwater Creek will discharge to the site includes a well-defined low-flow channel and a terrace which is well above the low-flow channel, with a steep slope to the top of the Temescal Wash Bank. The low-flow channel is unvegetated with an algal mat and areas with adjacent mule fat scrub dominated by mule fat (*Baccharis salicifolia*, FAC)

and Goodding's black willow forest dominated by Goodding's black willow (*Salix gooddingii*, FACW) and red willow (*Salix laevigata*, FACW) in the canopy with mule fat in the understory. Terraces above the low flow channel support areas of sparse alluvial scrub dominated by sweetbush (*Bebbia juncea*, UPL), mule fat (*Baccharis salicifolia*, FAC), and scale broom (*Lepidospartum squamatum*, FACU).

Coldwater Canyon Wash does provide wildlife movement opportunities; however, Temescal Wash is more important for wildlife movement. Coldwater Canyon Wash is immediately adjacent to Temescal Canyon Road; whereas Temescal Wash is separated from Temescal Canyon Road by over 800 feet at its nearest point.

As noted above, Coldwater Canyon Wash will be realigned such that it will connect upstream areas to Temescal Wash with a channel that is currently wider than the existing channel.

Riverpark Mitigation Bank & Offsite Rehabilitation Functions and Values

Reestablishment and rehabilitation associated with the Riverpark Mitigation Bank resulted in a functional lift for: groundwater recharge and flood protection which have been significantly enhanced by allowing for overbank flows during small to medium storm events and replacing agricultural lands with native vegetation has significantly improved particulate retention, cycling of elements and compounds, and nutrient and pollutant uptake. Most notably, the existing and reestablished sensitive plant and animal populations and habitats have been significantly enhanced following Riverpark Bank implementation. The Riverpark Bank is an approved bank and recognized as an important resource for the region within an area that was previously under threat of development.

Mitigation for temporary impacts to 0.67-acre and 0.304-acre of permanent impacts to MSHCP Section 6.1.2 riparian and riverine habitat within Temescal Wash would be mitigated through a combination of credits from the Riverpark Mitigation Bank and with habitat rehabilitation in the Temescal Wash Conservation and Mitigation Area, as shown in Figure 13, *Detailed Temescal Wash Impact Map*.

Offsite temporary (0.05-acre) and permanent (0.004-acre) impacts to RAFSS Section 6.1.2 riverine within Temescal Wash as a result of the proposed realignment of Coldwater Wash will be mitigated at a ratio of 4:1 (0.22-acre) through the rehabilitation of RAFSS in the Temescal Wash Conservation and Mitigation Area.

the 5.87-acre Temescal Wash Conservation and Mitigation Area will be donated to the RCA in fee title following completion of the restoration program as determined by the RCA, Wildlife Agencies (CDFW and USFWS), and any other water-regulating entities (e.g., Regional Water Quality Control Board) that extends immediately east of the 1.52-acre MSHCP Proposed Conservation Area, as shown in Figure 14, *Temescal Wash Conservation & Mitigation Area Map*. The habitats will be restored to equivalent or superior conditions resulting in a functional lift through implementation of a habitat mitigation and monitoring plan (HMMP). The relationship between the existing vegetation communities and proposed restoration efforts within the Temescal Wash

Mitigation Area are shown in Figure 15, *Temescal Wash Conservation & Mitigation Area Vegetation Map*. The HMMP must be reviewed and approved by the RCA, the California Department of Fish and Wildlife (CDFW), and the U.S. Fish and Wildlife Service (USFWS), the latter two collectively referred to as the “Wildlife Agencies”. The HMMP will at a minimum include the following:

- A 5-year program. The HMMP will include five years of monitoring to evaluate if success criteria are met.
- At a minimum, 5.0 acres of land will be rehabilitated.
- Commitment to determination of success criteria. Once success criteria have been met, sign off from both the RCA and Wildlife Agencies will be required.

3.3.1 Direct Effects

Direct impacts are considered to be those that involve the loss, modification, or disturbance of natural resources or habitats (i.e., vegetative communities or substrate) that in turn, directly affect plant and wildlife species dependent on that habitat. Direct impacts include the destruction of individual plants or wildlife of low mobility (i.e., plants, amphibians, reptiles, and small mammals). The collective loss of individuals may also directly affect area-wide population numbers or result in the physical isolation of populations thereby reducing genetic diversity and population stability.

Permanent direct onsite/offsite impacts to 2.574-acres (0.09-acre riparian, 2.484-acre riverine) and temporary onsite/offsite impacts to 0.67-acre (0.19-acre riparian, 0.48-acre riverine) of MSHCP Section 6.1.2 Riparian/Riverine resources (3.244-acres total) as summarized in Table 4, *MSHCP Section 6.1.2 Resources Impacts*, and illustrated on Figure 12, *MSHCP Section 6.1.2 Riparian/Riverine Impact Map* will be mitigated following review and approval of the following DBESP by the County of Riverside EPD, Regional Conservation Authority (RCA) and wildlife agencies.

Offsite permanent and temporary impacts (0.054-acre) to RAFSS within Temescal Wash as a result of the proposed realignment of Coldwater Canyon Wash will be mitigated at a ratio of 4:1 (0.22-acre) through the rehabilitation of RAFSS in the 5.87-acre Temescal Wash Conservation and Mitigation Area. The criteria used to determine MSHCP Section 6.1.2 Riparian/Riverine resources included the presence of vegetation that requires soil moisture from a nearby water source, a defined drainage that may have flow for a portion of the year, and/or the presence of hydrological connections or conveyances. A total of 2.71-acres of disturbed Riversidean alluvial fan sage scrub was mapped onsite adjacent and outside of the current Coldwater Canyon Wash floodprone area. Historically these remnant habitat areas occurred within the Coldwater Canyon Wash floodprone area prior to the redirection and channelization of the drainage. This remnant habitat type is now composed and dominated by disturbed and Riversidean sage scrub vegetation including the occasional occurrence of scalebroom, thus the characterization as disturbed Riversidean alluvial fan sage scrub. This habitat type is no longer connected hydrologically to any upstream or downstream watercourses and does not meet the criteria of MSHCP riverine classification.

3.3.2 Indirect Effects

Indirect impacts are considered to be those impacts associated with the project that involve the effects of alteration of the existing habitat and an increase in human population and or landuse within the Project Site. These impacts are commonly referred to as “edge effects” and may result in changes in the behavioral patterns of wildlife and reduced wildlife diversity and abundance in habitats adjacent to the Project Site.

Indirect impacts also include the effects of increases in ambient levels of sensory stimuli (e.g., noise and light), unnatural predators (e.g., domestic cats and other non-native animals), competitors (e.g., exotic plants and non-native animals), and trampling and unauthorized recreational use due to the increase in human population. Other permanent indirect effects may occur that are related to water quality and storm water management, including trash/debris, toxic materials, and dust.

The MSHCP Urban/Wildlands Interface guidelines presented in Section 6.1.4 are intended to address indirect effects associated with locating commercial, mixed uses and residential developments in proximity to an MSHCP Conservation Area. The Project Site is not currently located adjacent to an existing MSHCP Conservation Area. However, final reserve design may result in conserved lands being established both north and east of the Project Site. Therefore, as addressed below all proposed Urban/Wildlands Interface Guidelines and Best Management Practices (BMP) will be implemented.

Water Quality/Hydrology/Vegetation

The project will comply with all applicable water quality regulations, including obtaining and complying with those conditions established in (WDRs) and a National Pollutant Discharge Elimination System (NPDES) permits. Both of these permits include the treatment of all surface runoff from paved and developed areas, the implementation of applicable Best Management Practices (BMPs) during construction activities and the installation and proper maintenance of structural BMPs to ensure adequate long-term treatment of water before entering into any stream course. The Project would also

require that the reach of Coldwater Canyon Wash located adjacent to Temescal and Dawson Canyon Roads be redirected to an alignment in the eastern region of the Project Site. A 180-foot wide, 5.70-acre drainage easement will be granted to the County of Riverside. No significant impacts are anticipated.

Coldwater Canyon Wash was realigned in the late 1960's or early 1970's with the construction of the concrete pipe manufacturing facility that previously occupied the Project site. The path of the creek was shifted from the approximate center of the site to the western edge of the site parallel to Temescal Canyon Road and much of the drainage adjacent to the site has been channelized through the installation of rip rap to maintain the drainage in its current channel. With the realignment, the current channel would be filled during site grading and the drainage would be realigned. With the realignment of the channel and filling of the existing drainage, flows that currently continue downstream from the bridge at Dawson Canyon Road, continuing for approximately 650 feet to Temescal Wash. This 650-foot (0.31-acre) segment, that averages approximately 20 feet in width, would experience reduced discharge. (Glenn Lukos Associates. 2021b)

This segment consists largely of unvegetated channel that supports limited riparian habitat consisting of an approximately 0.04-acre patch of arroyo willow which occurs just above the confluence with Temescal Wash. Thus, the reduced discharge would not result in significant losses to riparian habitat, as it is likely, that the willows are supported by subsurface water and do not specifically depend of surface discharge. Nevertheless, the reduction in hydrology (as opposed to the increases experienced by Temescal Wash) would represent a significant impact to the 650-foot segment of Coldwater Canyon Wash, which would remain untouched by the project. Indirect impacts to the offsite, downstream Coldwater Canyon Wash, due to reduction in stream discharge associated with realignment of Coldwater Canyon Wash accounting for 0.31-acre will be mitigated through the purchase of 0.31-acre of reestablishment and 0.31-acre of rehabilitation credits from the Riverpark Mitigation Bank for a ratio of 2:1, totaling 0.62-acre. With the proposed mitigation, potentially significant indirect impacts would be reduced to less-than-significant. (Glenn Lukos Associates. 2021b)

Drainage A is an ephemeral drainage that originates west of Temescal Canyon Road and extends to the east where it enters side-by-side culverts and flows under Temescal Canyon Road to Coldwater Canyon Wash. Drainage A supports no wetlands or riparian habitat and the banks support upland non-native grasses and forbs with summer mustard as dominant. The proposed action will include the extension of existing culverts directing future flows from Drainage A northeast of the Dawson Canyon Road and Temescal Canyon Road intersection into the 650-foot remaining segment of Coldwater Canyon Wash as described in the previous section.

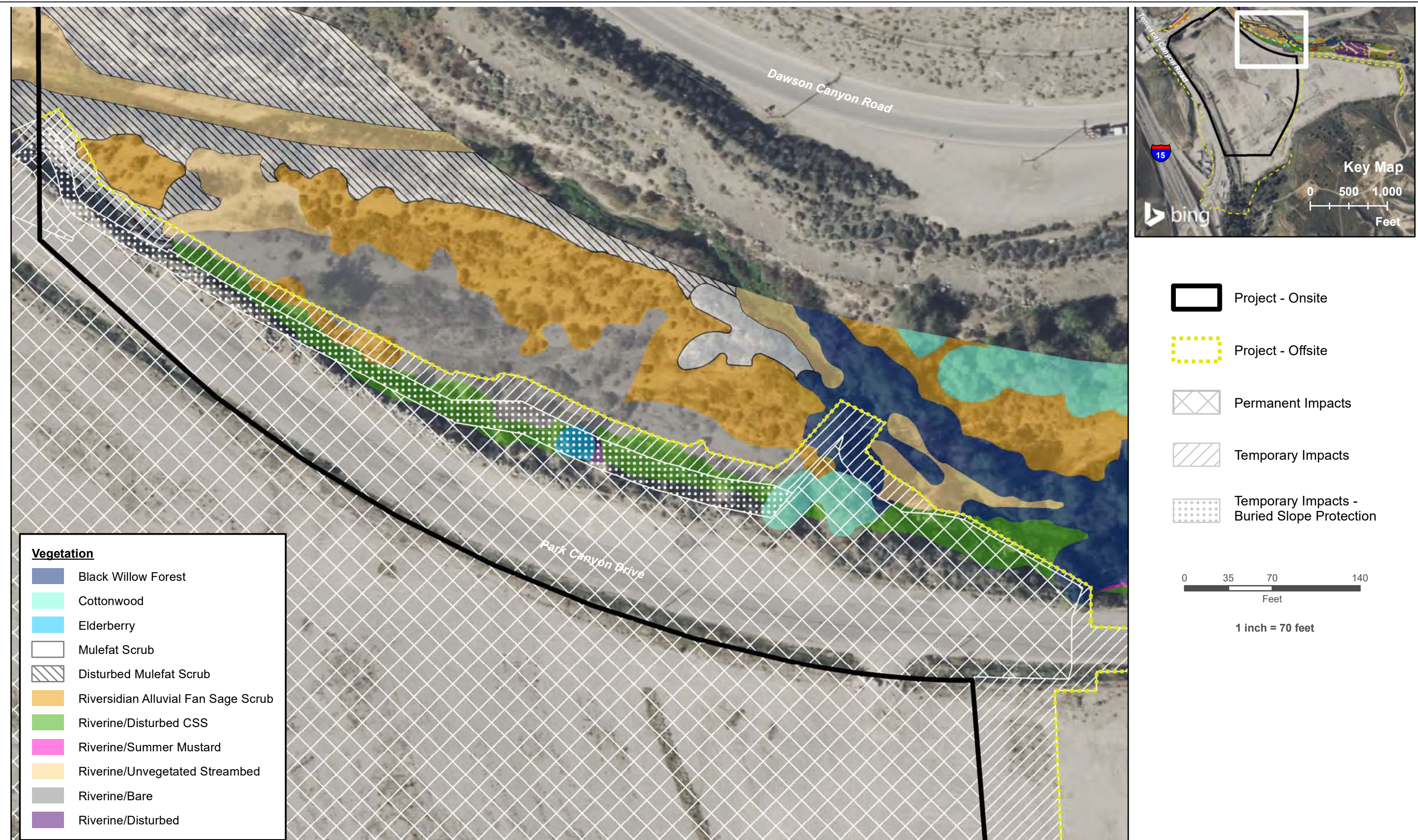
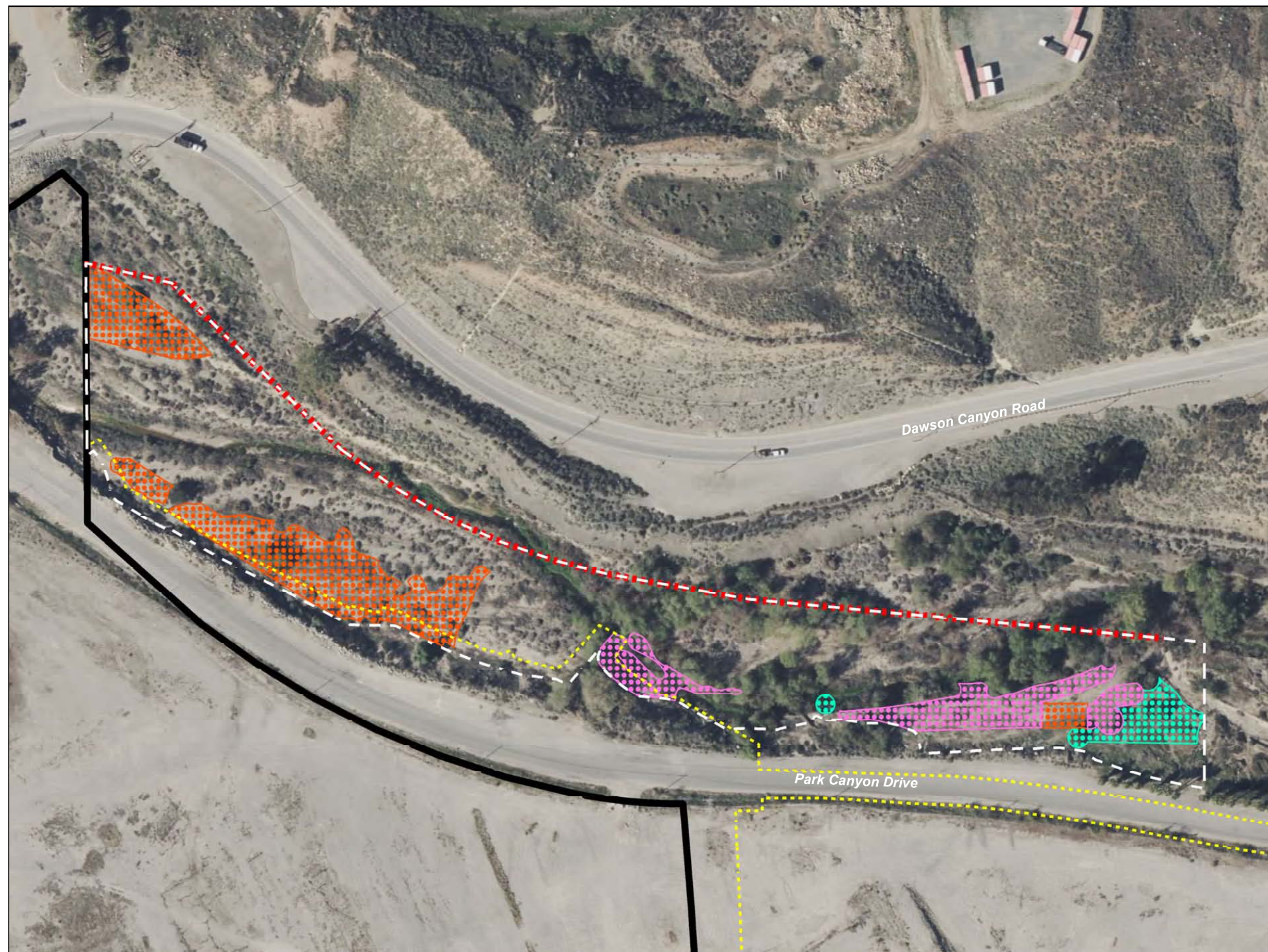


Figure 13 - Detailed Temescal Wash Impact Map

*Determination of Biologically Equivalent or Superior Preservation
Temescal Valley Commerce Project Site*

Source: GLA 2023





-  Project - Onsite
 -  Project - Offsite
 -  Offsite Parcel Boundary
 -  Mitigation/Conservation Area (5.87 ac.)
 -  Reestablishment of RAFSS (0.86 ac.)
 -  Reestablishment of Cottonwood (0.16 ac.)
 -  Reestablishment of Willow (0.42 ac.)
- 0 62.5 125 250
Feet

Figure 14 - Temescal Wash Conservation & Mitigation Area Map

*Determination of Biologically Equivalent or Superior Preservation
Temescal Valley Commerce Project Site*

Source: GLA 2024



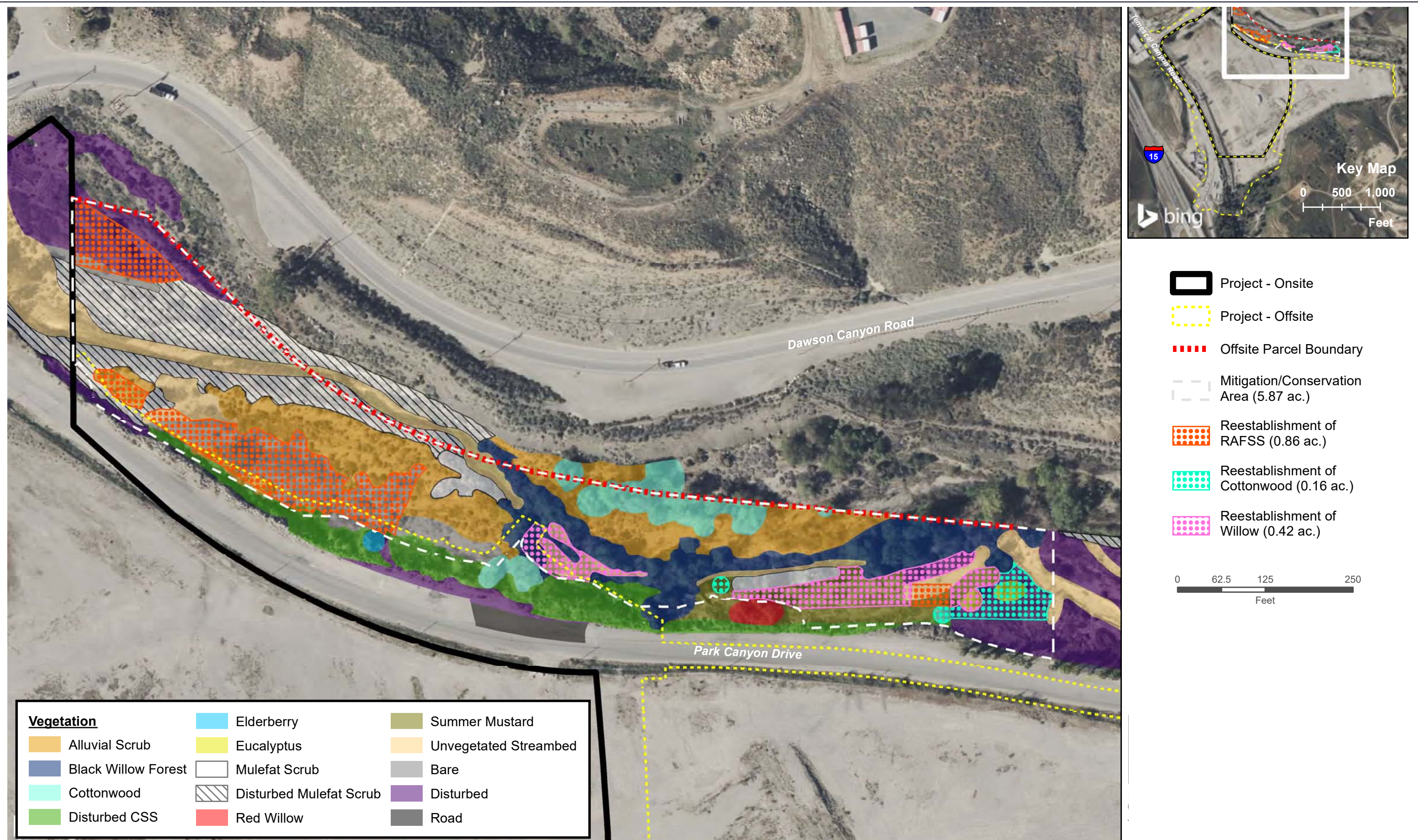


Figure 15 - Temescal Wash Conservation & Mitigation Area Vegetation Map

*Determination of Biologically Equivalent or Superior Preservation
 Temescal Valley Commerce Project Site*

Source: GLA 2024

CADRE
 Environmental



Toxics

Storm water treatment systems will be designed to prevent the release of toxins, chemicals, petroleum products, exotic plant material, or other elements that could degrade or harm downstream biological or aquatic resources. Toxic sources within the Project Site would be limited to those commonly associated with warehouse development, such as pesticides, insecticides, herbicides, fertilizers, and vehicle emissions. In order to mitigate the potential effects of these toxics, the project will incorporate structural BMPs, as required in association with compliance with WDRs and the NPDES permit system, in order to reduce or prevent the level of toxins introduced into the Temescal Wash and the surrounding areas.

Specifically, in terms of safeguarding against release of toxins, the project will possess an underground water quality system. All onsite water will flow through storm drain lines into underground rock lined chambers. There, the water will desilt and settle, then run through bio-filtration units. For the most part, most storms will not make it into the channel. For big events, as the chambers fill, they will release water that has been run through the system. No significant impacts are anticipated.

Lighting

Night lighting associated with the proposed development will be directed away from potential conserved open space habitat including Temescal Wash and proposed realignment of Coldwater Canyon Wash located north and east of the Project Site. No significant impacts are anticipated.

Noise

Because the proposed project development will not result in noise levels that exceed residential, commercial or mixed-use noise standards established for Riverside County, wildlife within open space habitats west of the Project Site will not be subject to noise that exceeds these established standards. Short-term construction-related noise impacts will be reduced by the implementation of the following:

- During all Project Site excavation and grading on-site, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards.
- The construction contractor shall limit all construction-related activities that would result in high noise levels according to the construction hours to be determined by County of Riverside staff.
- The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment. To the extent feasible, haul routes shall not pass sensitive land uses or residential dwellings.

Construction activities conducted during the least Bell's vireo breeding season will be monitored by biologist to ensure no direct and/or indirect impacts occur to the species in

the vicinity of the project including noise monitoring to ensure that noise levels do not exceed 60 dB within 300 feet of least Bell's vireo habitat during the nesting period.

No significant impacts are anticipated.

Invasive Species

The landscape plans for the residential, commercial and mixed development shall avoid the use of invasive species for the portions of the development areas adjacent to the open space areas west of the Project Site. Invasive plants that should be avoided are included in Table 6-2 of the MSHCP, *Plants That Should Be Avoided Adjacent to the MSHCP Conservation Area*.

Barriers

Barriers are intended to reduce or minimize unauthorized public access and associated impacts to protected resources. The Project Site is a commercial warehouse project which will be completely fenced preventing staff from entering potential conserved lands both north and west of the property. No barriers within Temescal Wash or Coldwater Canyon Warehouse proposed.

Implementation of all Urban/Wildlands Interface guidelines will minimize adverse project indirect impacts and ensure consistency with MSHCP Section 6.1.4 guidelines.

4. NARROW ENDEMIC PLANT SPECIES MITIGATION (SECTION 6.1.3)

The MSHCP has determined that all of the sensitive species potentially occurring onsite or within the offsite Project Site have been adequately covered (MSHCP Table 2-2 Species Considered for Conservation Under the MSHCP Since 1999, 2004). However, additional surveys may be required for narrow endemic plants if suitable habitat is documented and the assessment area is located within a predetermined "Survey Area" (MSHCP 2004).

The Project Site occurs partially within a predetermined Survey Area for nine (9) MSHCP narrow endemic plant species including (RCA GIS Data Downloads 2020).

- Munz's onion (*Allium munzii*) [Federally Endangered (FE)/State Threatened, CRPR List 1B.1];
- San Diego ambrosia (*Ambrosia pumila*) [FE, CRPR 1B.1];
- slender-horned spineflower (*Dodecahema leptoceras*) [FE/SE, CRPR 1B.1];
- multi-stemmed dudleya (*Dudleya multicaulis*) [CRPR List 1B.2];
- spreading navarretia (*Navarretia fossalis*) [FT/SE, CRPR List 1B.1];
- California Orcutt grass (*Orcuttia californica*) [FE/SE, CRPR List 1B.1];
- San Miguel savory (*Clinopodium chandleri*, formerly *Satureja chandleri*) [CRPR List 1B.2];
- Hammitt's clay-cress (*Sibaropsis hammittii*) [CRPR 1B.2];
- Wright's trichocoronis (*Trichocoronis wrightii* var. *wrightii*) [CRPR List 2.1].

4.1 Methods

Reconnaissance surveys of the Project Site and offsite impact areas were conducted by Ruben Ramirez, Cadre Environmental on May 21st, 2019 and September 14th, 2020 in order to characterize and identify potential wildlife habitats, and to establish the accuracy of the data identified in the literature search and previous surveys.

An initial habitat assessment/survey for sensitive plants was conducted by Glenn Lukos Associates on August 20th 2019 and additional focused surveys were conducted on March 5th and August 12th 2020. (Glenn Lukos Associates 2021a).

Existing biological resources within and adjacent to the Project Site were initially investigated through a review of pertinent literature and online data. The California Natural Diversity Database (CNDDDB 2020), and CNPS (2020). In addition, soil, local floras, and consultation with local experts were utilized in the identification of species, soils, or habitats that could support the target MSHCP sensitive plants within or adjacent to the Project Site. These and other references are listed below and in References.

Prior to conducting fieldwork, a thorough archival review was conducted using the following baseline resources:

- California Native Plant Society 8th Inventory Online (2020);
- California Natural Diversity Data Base for the USGS 7.5' Lake Mathews Quadrangle (CNDDDB 2020a);
- Soil Survey of Western Riverside Area (Knecht 1971; USDA-NRCS 2020);
- Vegetation Alliances of Western Riverside County, California (Klein and Evens 2005);
- Vascular Flora of Western Riverside County (Roberts et al. 2004); and
- Reports prepared by the Regional Conservation Authority, Western Riverside County (<http://www.wrc-rca.org/about-rca/monitoring/monitoring-surveys/>).

4.2 Results/Impacts

The following section is excerpted and/or summarized based on the results of the following document “*Rare Plant Habitat Assessment and Focused Surveys for HANS 190024 – Temescal Canyon Road and Dawson Canyon Road Warehouse Site (APN 283-160-043, Riverside County, California)* (Glenn Lukos Associates 2021a)”

The Project Site includes a large mostly flat area that has been subject to past mining and associated support operations. The majority of the Project Site is dominated by heavily disturbed and altered soils generally devoid of vegetation. Species documented within this habitat type include mostly non-native annuals typical of long-term disturbance on the site, including invasive species such as stinknet and stink wort (*Dittrichia graveolens*). Other non-native species common on the site include black mustard, tocalote, red-stemmed filaree, white-stemmed filaree, prickly lettuce, Russian thistle, and foxtail chess. Occasional native species include mule fat (*Baccharis salicifolia*), Boccone's sand spurrey (*Spergularia bocconi*), poverty weed, common knotweed, and salt heliotrope.

The western edge of the Project Site is traversed by Coldwater Canyon Wash, which historically extended across the central portion of the site and was re-aligned and channelized prior to 1980 along the western site boundary. Vegetation associated with the creek bank and channel consists of native and non-native species, including: scale broom, brittlebush, mugwort, stink wort, oleander (*Nerium oleander*), castor bean (*Ricinus communis*) poison oak (*Toxicodendron diversilobum*), salt cedar (*Tamarix, ramosissima*), tarragon (*Artemisia dracunculus*), sweetbush (*Bebbia juncea*), mule fat, a canopy of blue-gum eucalyptus, California sagebrush, and a few scattered black willow (*Salix gooddingii*) individuals.

Consistent with the disturbed conditions across most of the site, a review of historic aerial photographs beginning in 1994 extending through the present shows intense land uses during this period. An aerial from 1980 depicts land use very similar to December 2003 and March 2011 that show the intensity of the land use on the site that persisted for over 30 years until the operations on site were abandoned in 2014. The site has been vacant since 2014. The intense land uses during this period resulted in elimination of nearly all native habitat from the site, except for a narrow strip of disturbed Riversidean alluvial fan sage scrub on the eastern edge of Coldwater Canyon Wash. Since the mining operation was abandoned, small patches of native vegetation that has colonized localized areas and support highly opportunistic species that include brittlebush, California sagebrush, California buckwheat, annual sunflower, yellow sweetclover, caterpillar phacelia, common sand aster, deerweed, telegraph weed, clustered tarweed and non-natives such as prickly sow thistle, horehound, Italian thistle, and pineapple weed.

Habitat/Suitability Assessment for NEPSA Plants

The Project Site occurs partially within a predetermined Survey Area for nine (9) MSHCP narrow endemic plant species including Munz's onion, San Diego ambrosia, many-stemmed dudleya, spreading navarretia, slender-horned spineflower, San Miguel savory, Hammitt's clay-cress, California Orcutt grass, and Wright's trichocoronis (RCA GIS Data Downloads 2020).

Suitable soils and/or habitat conditions are not present for (5) five of the NEPSA species including Munz's onion and Hammitt's clay-cress due to lack of suitable clay soils, many-stemmed dudleya, due to a lack of suitable soils and habitat, spreading navarretia and California Orcutt grass due to a lack of vernal pools. Also, as discussed in detail below, suitable habitat and soils are lacking for Wright's trichocoronis.

Potentially Suitable soil conditions and limited areas of native vegetation were documented onsite for four (4) NEPSA species, San Diego ambrosia, slender horned spineflower, San Miguel savory and Wright's trichocoronis. The potential need for these focused MSHCP sensitive plant surveys are addressed below pursuant to MSHCP Section 6.1.3.

As discussed below, three of the plants determined to have potential for presence on the site occur within streams and associated floodplains. Thus, it is important to note that the segment of Coldwater Canyon Wash which crossed the site until it was developed (during the 1970s) was realigned and channelized with steep banks, eliminating any floodplain functions. The channel bottom exhibit scour and support mostly non-native herbaceous

species, while the top of the eastern bank supports disturbed scrub and the top of the western bank supports a windrow of blue gum eucalyptus with no native understory.

San Diego ambrosia – According to the U.S. Fish and Wildlife Service 5-Year Review¹ this species is an herbaceous perennial that produces aerial stems from their underground rhizomes in early spring after winter rains, and flower between May and October. This species occurs primarily on upper terraces of rivers and drainages but can also occur in other settings, including disturbed grasslands, which are lacking from the site. The only suitable habitat would be the terraces of Temescal Wash or Coldwater Canyon Wash. Coldwater Canyon Wash and Temescal Wash was thoroughly surveyed during the jurisdictional delineation with all plant species recorded. The survey occurred in August during the peak of the blooming period and this easily identified species was not detected. No additional surveys are needed.

Slender-horned Spineflower – is usually found in drought prone alluvial benches subject to only rare flood events as noted by USFWS in the 2010 5-Year Review of the species.² The habitat that supports most occurrences of this species has generally been categorized as alluvial scrub. This shrub habitat is found on sandy and gravelly soils in sandy wash systems where intermittent, scouring flood events occur. Importantly for this evaluation, USFWS reports that plants are typically found in alluvial fan scrub on benches and terraces away from active channels in areas receiving little surface disturbance from flooding, but subject to sheet or overland flows. The association of the species with older alluvial benches and terraces indicates the need or tolerance of infrequent flood events to maintain suitable habitat conditions. A few occurrences of this species are found on low alluvial benches or braids within active channels.

As noted above, Coldwater Canyon Wash is a realigned channel lacking in benches or braids that are typical of the habitat for this species as this drainage consist of a channel with high steep constructed banks that do not contain terraces or benches typical for this species. Therefore, Coldwater Canyon Wash does not exhibit potential for supporting this species.

According to USFWS in the 5-Year Recover Plan, the occurrence of this species in the Temescal Wash was presumed extant as of 2010 although the site was impacted by vandalism in 1989 and freeway construction. This occurrence is approximately five miles upstream of the Project Site and Corona Lake impounds Temescal Wash upstream of the site, substantially reducing potential for dispersal to the segment of Temescal Wash that crosses the corner of the site. Temescal Wash was thoroughly surveyed during the jurisdictional delineation with all plant species recorded. The survey occurred in August during the peak of the blooming period and this easily identified species was not detected. No additional surveys are needed.

Wright's trichocoronis – California Native Plant Society reports that this species occurs in alkaline meadows and seeps; marshes and swamps, riparian forests and vernal pools³,

¹ U.S. Fish and Wildlife Service. 2010. *Ambrosia pumila* (San Diego ambrosia) 5-Year Review: Summary and Evaluation

² U.S. Fish and Wildlife Service. 2010. *Dodecahema leptoceras* (slender-horned spineflower) 5-Year Review: Summary and Evaluation

³ <http://www.rareplants.cnps.org/detail/1520.html>

while the Jepson Herbarium reports the species from “moist places, drying riverbeds”.⁴ The only documented occurrences of this species in Western Riverside County occur within the San Jacinto River drainage and floodplain, which exhibits suitable conditions including floodplain areas that exhibit seasonal ponding and drying riverbeds. Coldwater Canyon Wash does not exhibit suitable conditions for this species lack all of the habitat requirements for this species which has no potential to occur.

San Miguel Savory – this species occurs in the Santa Ana Mountains to the southeast of the Project Site, where it occurs primarily on shaded slopes and within canyons in chaparral or oak woodland. The Project Site contains no potential for this species.

Following the habitat assessment, focused surveys and review of species distribution and habitat requirements, no MSHCP Narrow Endemic Plant Species are expected to occur within the Project Site impact area as shown in Table 5, *Potential MSHCP Narrow Endemic Plant Assessment* (Glenn Lukos Associates 2021a)

Table 5.
Potential MSHCP Narrow Endemic Plant Assessment

Species Name (Scientific Name)	Habitat Description	Comments
Status		
MSHCP Narrow Endemic Species		
California Orcutt grass (<i>Orcuttia californica</i>) FE/SE CRPR 1B.1 MSHCP Covered	Vernal pools.	<u>No Potential</u> – Not expected to occur on site due to the lack of suitable vernal pool habitat. (Glenn Lukos Associates 2021a)
Hammitt’s clay-cress (<i>Sibaropsis hammittii</i>) CRPR 1B.2 MSHCP Covered	Occurs within chaparral and grassland habitats in association with clay substrates.	<u>No Potential</u> – Not expected to occur on site based on a lack of suitable clay and clay associated substrates, vegetation and historic disturbed conditions of the Project Site. (Glenn Lukos Associates 2021a)
Many-stemmed dudleya (<i>Dudleya multicaulis</i>) CRPR 1B.2 MSHCP Covered	Chaparral, coastal sage scrub, valley and foothill grassland. Often occurring in clay soils.	<u>No Potential</u> – Not expected to occur on site due to a lack of suitable habitat, including suitable clay and clay associated substrates, in conjunction with historic mining disturbance on the Site. (Glenn Lukos Associates 2021a)

⁴ http://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=79193

Species Name (<i>Scientific Name</i>)	Habitat Description	Comments
Status		
Munz's onion (<i>Allium munzii</i>) FE/ST CRPR 1B.1 MSHCP Covered	Restricted to mesic clay soils in western Riverside County, California within southern needlegrass grassland, annual grassland, open coastal sage scrub, or occasionally, in cismontane juniper woodlands.	<u>No Potential</u> – Not expected to occur on site due to a lack of suitable habitat, including suitable clay and clay associated substrates, in conjunction with historic mining disturbance on the Site. (Glenn Lukos Associates 2021a)
San Diego ambrosia (<i>Ambrosia pumila</i>) FE CRPR 1B.1 MSHCP Covered	Chaparral, coastal sage scrub, valley and foothill grassland, vernal pools. Often in disturbed habitats.	<u>No Potential</u> – Not expected to occur on site. Study Area is located north of known range for the species and not detected during focused surveys. (Glenn Lukos Associates 2021a)
San Miguel savory (<i>Clinopodium chandleri</i> (formerly <i>Satureja chandleri</i>)) CRPR 1B.12 MSHCP Covered	Occurs in chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grasslands from 120 to 1,075 meters (394 to 3,526 feet).	<u>No Potential</u> – No potential to occur on site due to lack of suitable habitat. (Glenn Lukos Associates 2021a)
Slender-horned spineflower (<i>Dodecahema leptoceras</i>) FT CRPR 1B.1 MSHCP Covered	Sandy soils in alluvial scrub, chaparral, cismontane woodland.	<u>No Potential</u> – Not expected to occur due to lack of suitable habitat. (Glenn Lukos Associates 2021a)
Spreading navarretia (<i>Navarretia fossalis</i>) FT CRPR 1B.1 MSHCP Covered	Vernal pools, playas, chenopod scrub, marshes and swamps (assorted shallow freshwater).	<u>No Potential</u> – Not expected to occur on site due to the lack of suitable vernal pool habitat. (Glenn Lukos Associates 2021a)
Wright's trichocoronis (<i>Trichocoronis wrightii</i> var. <i>wrightii</i>) CRPR 2.1 MSHCP Covered	Alkaline soils in meadows and seeps, marshes and swamps, riparian scrub, vernal pools.	<u>No Potential</u> – Not expected to occur on site due to the lack of suitable vernal pool or seasonal marsh habitat. (Glenn Lukos Associates 2021a)

California Native Plant Society (CNPS): California Rare Plant Rank (CRPR)

CRPR 1A – plants presumed extinct in California
CRPR 1B – plants rare, threatened, or endangered in California, but more common elsewhere
CRPR 2A – plants presumed extirpated in California but common elsewhere
CRPR 2B – plants rare, threatened, or endangered in California but more common elsewhere
CRPR 3 – plants about which we need more information, a review list
CRPR 4 – plants of limited distribution, a watch list
.1 – Seriously endangered in California
.2 – Fairly endangered in California
.3 – Not very endangered in California

Species Name (Scientific Name)	Habitat Description	Comments
Status		
Federal (USFWS) Protection and Classification FE – Federally Endangered FT – Federally Threatened FC – Federal Candidate for Listing State (CDFW) Protection and Classification SE – State Endangered ST – State Threatened		

4.3 Mitigation and Equivalency

No impact and no mitigation proposed. As referenced in HANS 190024, all 1.52 acres of the Project Site located within the Temescal Wash floodprone area and identified as MSHCP Proposed Conservation Area will be dedicated as conserved land. The conserved lands represent suitable habitat for several MSHCP planning species.

The County of Riverside will condition the project to convey the proposed conservation area to the RCA prior to any project ground disturbance.

4.3.1 Direct Effects

No impact and no mitigation proposed. As referenced in HANS 190024, all 1.52 acres of the Project Site located within the Temescal Wash floodprone area and identified as MSHCP Proposed Conservation Area will be dedicated as conserved land. The conserved lands represent suitable habitat for several MSHCP planning species.

The County of Riverside will condition the project to convey the proposed conservation area to the RCA prior to any project ground disturbance.

4.3.2 Indirect Effects

No impact and no mitigation proposed. As previously stated, the Project Site is not currently located adjacent to an existing MSHCP Conservation Area. However, final reserve design may result in conserved lands being established both north and east of the Project Site. Therefore, as addressed below all proposed Urban/Wildlands Interface Guidelines and Best Management Practices (BMP) will be implemented.

5. CRITERIA AREA SPECIES MITIGATION (SECTION 6.3.2)

The MSHCP has determined that all of the sensitive species potentially occurring onsite or within the offsite Project Site have been adequately covered (MSHCP Table 2-2 Species Considered for Conservation Under the MSHCP Since 1999, 2004). However, additional surveys may be required for criteria area species if suitable habitat is documented onsite and the assessment areas are located within a predetermined "Survey Area" (MSHCP 2004).

5.1 Criteria Area Species Survey Area – Plants

The Project Site occurs completely within an MSHCP Criteria Area Plant Survey Area for seven (7) species including:

- Parish's brittlebush (*Atriplex parishii*) [California Rare Plant Ranking (CRPR) List 1B.1];
- Davidson's saltscale (*Atriplex serenana* var. *davidsonii*) [CRPR List 1B.2];
- thread-leaved brodiaea (*Brodiaea filifolia*) [Federally Threatened (FT)/State Endangered (SE), CRPR List 1B.1];
- smooth tarplant (*Centromadia pungens* ssp. *laevis*) [CRPR 1B.1];
- round-leaved filaree (*Erodium macrophyllum*) [CRPR List 2.1];
- Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*) [CRPR List 1B.1];
- little mousetail (*Myosurus minimus* ssp. *apus*) [CRPR List 3.1].

Following the habitat assessment and review of species distribution and habitat requirements, a single MSHCP criteria area plant species has potential to occur within the Project Site impact area, smooth tarplant, as shown in Table 6, *Potential MSHCP Criteria Area Plant Assessment* (Glenn Lukos Associates 2021a). However, the species was not observed during general biological surveys (Glenn Lukos Associates 2021a).

5.1.1 Methods

Reconnaissance surveys of the Project Site and offsite impact areas were conducted by Ruben Ramirez, Cadre Environmental on May 21st, 2019 and September 14th, 2020 in order to characterize and identify potential wildlife habitats, and to establish the accuracy of the data identified in the literature search and previous surveys. A habitat assessment for sensitive plants was conducted by Glenn Lukos Associates on August 20th 2019 (Glenn Lukos Associates 2021a).

Existing biological resources within and adjacent to the Project Site were initially investigated through a review of pertinent literature and online data. The California Natural Diversity Database (CNDDDB 2020), and CNPS (2020). In addition, soil, local floras, and consultation with local experts were utilized in the identification of species, soils, or habitats that could support the target MSHCP sensitive plants within or adjacent to the Project Site. These and other references are listed below and in References.

Prior to conducting fieldwork, a thorough archival review was conducted using the following baseline resources:

- California Native Plant Society 8th Inventory Online (2020);
- California Natural Diversity Data Base for the USGS 7.5' Lake Mathews Quadrangle (CNDDDB 2020a);
- Soil Survey of Western Riverside Area (Knecht 1971; USDA-NRCS 2020);
- Vegetation Alliances of Western Riverside County, California (Klein and Evens 2005);
- Vascular Flora of Western Riverside County (Roberts et al. 2004); and

- Reports prepared by the Regional Conservation Authority, Western Riverside County (<http://www.wrc-rca.org/about-rca/monitoring/monitoring-surveys/>).

5.1.2 Results/Impacts

Following the habitat assessment and review of species distribution and habitat requirements, a single MSHCP criteria area plant species has potential to occur within the Project Site impact area, smooth tarplant, as shown in Table 6, *Potential MSHCP Criteria Area Plant Assessment* (Glenn Lukos Associates 2021a). However, the species was not observed during general biological surveys (Glenn Lukos Associates 2021a).

Table 6.
Potential MSHCP Criteria Area Plant Assessment

Species Name (Scientific Name)	Habitat Description	Comments
Status		
MSHCP Criteria Area Species		
Coulter's goldfields <i>(Lasthenia glabrata ssp. coulteri)</i> CRPR 1B.1 MSHCP Covered	Playas, vernal pools, marshes and swamps (coastal salt).	<u>No Potential</u> – Not expected to occur on site due to a lack of suitable habitat, including suitable clay and clay associated substrates, in conjunction with historic mining disturbance on the Site. (Glenn Lukos Associates 2021a)
Davidson's saltscale <i>(Atriplex serenana var. davidsonii)</i> CRPR 1B.2 MSHCP Covered	Alkaline soils in coastal sage scrub, coastal bluff scrub and alkali sink scrub.	<u>No Potential</u> – Not expected to occur on site due to a lack of suitable habitat, including suitable clay and clay associated substrates, in conjunction with historic mining disturbance on the Site. (Glenn Lukos Associates 2021a)
Little mousetail <i>(Myosurus minimus ssp. apus)</i> CRPR 3.1 MSHCP Covered	Little mousetail is widespread in California. It occurs in alkaline vernal pools, and vernal alkali plains and grasslands, and blooms March to June.	<u>No Potential</u> – Not expected to occur on site due to a lack of suitable habitat vernal pool or vernal marsh habitat in conjunction with historic mining on the Site. (Glenn Lukos Associates 2021a)
Parish's brittlescale <i>(Atriplex parishii)</i> CRPR 1B.1 MSHCP Covered	Occurs on alkali or saline flats, alkali meadows, and in or along the margins of vernal pools or playa depressions.	<u>No Potential</u> – Not expected to occur onsite based on the absence of suitable alkali clay soils, associated habitats and historic disturbed conditions of the Site. (Glenn Lukos Associates 2021a)

Species Name (<i>Scientific Name</i>)	Habitat Description	Comments
Status		
Round-leaved filaree (<i>Erodium macrophyllum</i>) CRPR 1B.2 MSHCP Covered	Open areas in cismontane woodland and valley and foothill grasslands, which are often associated with heavy clay soils below 3,600 feet elevation.	<u>No Potential</u> – Not expected to occur onsite based on a lack of suitable clay and clay associated substrates, vegetation and historic disturbed conditions of the Project Site. (Glenn Lukos Associates 2021a)
Smooth tarplant (<i>Centromadia pungens</i> ssp. <i>laevis</i>) CRPR 1B.1 MSHCP Covered	Alkaline soils in chenopod scrub, meadows and seeps, playas, and disturbed habitats.	<u>Limited Potential</u> - to occur onsite although not observed during general biological surveys. (Glenn Lukos Associates 2021a)
Thread-leaved brodiaea (<i>Brodiaea filifolia</i>) FT/SE CRPR 1B.1 MSHCP Covered	Typically occurs on gentle hillsides, valleys, and floodplains in semi-alkaline flats of riparian areas, vernal pools, mesic southern needlegrass grassland, mixed native-annual grassland, and alkali grassland plant communities in association with clay, clay loam, or alkaline silty-clay soils.	<u>No Potential</u> – Not expected to occur onsite based on a lack of suitable clay and clay associated substrates, vegetation and historic disturbed conditions associated with mining activities on the Site. (Glenn Lukos Associates 2021a)
California Native Plant Society (CNPS): California Rare Plant Rank (CRPR) CRPR 1A – plants presumed extinct in California CRPR 1B – plants rare, threatened, or endangered in California, but more common elsewhere CRPR 2A – plants presumed extirpated in California but common elsewhere CRPR 2B – plants rare, threatened, or endangered in California but more common elsewhere CRPR 3 – plants about which we need more information, a review list CRPR 4 – plants of limited distribution, a watch list .1 – Seriously endangered in California .2 – Fairly endangered in California .3 – Not very endangered in California Federal (USFWS) Protection and Classification FE – Federally Endangered FT – Federally Threatened FC – Federal Candidate for Listing State (CDFW) Protection and Classification SE – State Endangered ST – State Threatened		

5.1.3 Mitigation and Equivalency

No impact and no mitigation proposed. As referenced in HANS 190024, all 1.52 acres of the Project Site located within the Temescal Wash floodprone area and identified as MSHCP Proposed Conservation Area will be dedicated as conserved land. The conserved lands represent suitable habitat for several MSHCP planning species. The County of Riverside will condition the project to convey the proposed conservation area to the RCA prior to any project ground disturbance.

5.2 Criteria Area Species Survey Area – Burrowing Owl

The MSHCP has determined that all of the sensitive species potentially occurring onsite have been adequately covered (MSHCP Table 2-2 Species Considered for Conservation Under the MSHCP Since 1999, 2004). However, additional surveys may be required wildlife species if suitable habitat is documented onsite and/or if the property is located within a predetermined “Survey Area” (MSHCP 2004).

The Project Site occurs partially within a predetermined Survey Area for the burrowing owl. Suitable burrowing owl burrows potentially utilized for refugia and/or nesting were documented adjacent to the property including foraging habitat documented throughout the Project Site. Therefore, focused surveys were conducted by Cadre Environmental during the spring and summer of 2019 and 2021.

5.2.1 Methods

Burrowing Owl Habitat Assessment and Focused Surveys

In accordance with the MSHCP Burrowing Owl Survey Instructions (2006), survey protocol consists of two steps, Step I – Habitat Assessment and Step II – Locating Burrows and Burrowing Owls. Step II is comprised of two parts, Part A: Focused Burrow Surveys and Part B: Focused Burrowing Owl Surveys.

Each step is briefly outlined below, followed by the methodology and results of each survey conducted within the Project Site. All initial habitat assessment, burrow and focused surveys were conducted by Ruben Ramirez.

Surveys were conducted during weather that is conducive to observing owls outside their burrows and detecting burrowing owl sign. Surveys were not conducted during rain, high winds (> 20 mph), dense fog, or temperatures over 90 °F. None of the surveys were conducted within five (5) days of measurable precipitation.

In addition to the MSHCP guidelines, field notes were taken daily. These notes recorded the date, location, animal species observed, and general habitat characteristics of each area and habitat examined that day.

Step I – Habitat Assessment

Step 1 of the MSHCP habitat assessment for burrowing owl consists of a walking survey to determine if suitable habitat is present onsite. Cadre Environmental conducted the

habitat assessment on May 21st, 2019. Upon arrival at the Project Site, and prior to initiating the assessment survey, Cadre Environmental used binoculars to scan all suitable habitats on and adjacent to the property, including perch locations, to ascertain owl presence.

All suitable areas of the Project Site were surveyed on foot by walking slowly and methodically while recording/mapping areas that may represent suitable owl habitat onsite. Primary indicators of suitable burrowing owl habitat in western Riverside County include, but are not limited to, native and non-native grassland, interstitial grassland within shrub lands, shrub lands with low density shrub cover, golf courses, drainage ditches, earthen berms, unpaved airfields, pastureland, dairies, fallow fields, and agricultural use areas. Burrowing owls typically use burrows made by fossorial mammals, such as ground squirrels (*Otospermophilus beecheyi*) or badgers (*Taxidea taxus*), but they often utilize man-made structures, such as earthen berms, cement culverts, cement, asphalt, rock, or wood debris piles, or openings beneath cement or asphalt pavement. Burrowing owls are often found within, under, or in close proximity to man-made structures.

According to the MSHCP guidelines, if suitable habitat is present the biologist should also walk the perimeter of the property, which consists of a 150-meter (approximately 500 feet) buffer zone around the Project Site boundary. If permission to access the buffer area cannot be obtained, the biologist shall not trespass, but visually inspect adjacent habitats with binoculars.

Results from the habitat assessment indicated that suitable burrowing owl burrows potentially utilized for refugia and/or nesting were documented within the property including foraging habitat documented throughout the Project Site. Accordingly, if suitable habitat is documented onsite, both Step II surveys and the 30-day pre-construction surveys are required in order to comply with the MSHCP guidelines.

Step II – Locating Burrows and Burrowing Owls

Concurrent with the initial habitat assessment, a detailed focused burrow survey was conducted and included documentation of appropriately sized natural burrows or suitable man-made structures that may be utilized by burrowing owl - as part of the MSHCP protocol, which is described below under Part A. Focused Burrow Survey. The MSHCP protocol indicated that no more than 100 acres should be surveyed per day/per biologist.

Part A: Focused Burrow Survey

A systematic survey for burrows, including burrowing owl sign, was conducted by walking across all suitable habitats mapped within the Project Site on May 21st, 2019. Pedestrian survey transects were spaced to allow 100% visual coverage of the ground surface. The distances between transect centerlines were no more than 20 meters (approximately 66 ft.) apart to the extent possible, and owing to the terrain and safety concerns along the northern Project Site boundary. Transect routes were also adjusted to account for topography and in general ground surface visibility. All observations of suitable burrows or dens, natural or man-made, or sightings of burrowing owl, were recorded and mapped during the survey.

Part B: Focused Burrowing Owl Surveys

Eight (8) focused burrowing owl surveys (in addition to the initial focused burrow survey – Step II, Part A) were conducted on May 31st, June 20th, July 10th, August 10th, 2019, April 10th, 30th, May 20th and June 9th, 2021 from one hour before sunrise to two hours after sunrise (Cadre Environmental 2020, 2021). During visual surveys, all potentially suitable burrow or structure entrances were investigated for signs of owl occupation, such as feathers, tracks, or pellets, and carefully observed to determine if burrowing owls utilize these features, when present. All burrows are monitored at a short distance from the entrance, and at a location that would not interfere with potential owl behavior, when present. In addition to monitoring potential burrow locations, all suitable habitats in the Project Site were walked along transects averaging 20 meters (approximately 66 feet) between centerlines to the extent possible.

5.2.2 Results/Impacts

The Project Site occurs partially within a predetermined Survey Area for the burrowing owl. Suitable burrowing owl burrows potentially utilized for refugia and/or nesting were documented adjacent to the property including foraging habitat documented throughout the Project Site. Therefore, focused surveys were conducted by Cadre Environmental during the spring and summer of 2019 and 2021. No burrowing owl or characteristic sign such as white-wash, feathers, tracks, or pellets were detected within or immediately adjacent to the Project Site during the 2019 or 2021 survey effort (Cadre Environmental 2020, 2021).

5.2.3 Mitigation and Equivalency

Due to the presence of potentially suitable habitat, a 30-day pre-construction survey for burrowing owls is required prior to initial ground-disturbing activities (including vegetation clearing, clearing and grubbing, tree removal, site watering, equipment staging, grading, etc.) to ensure that no owls have colonized the site in the days or weeks preceding the ground-disturbing activities. If burrowing owls have colonized the project site prior to the initiation of ground-disturbing activities, the project proponent will immediately inform the Regional Conservation Authority (RCA) and the Wildlife Agencies, and will need to coordinate further with RCA and the Wildlife Agencies, including the possibility of preparing a Burrowing Owl Protection and Relocation Plan, prior to initiating ground disturbance. If ground-disturbing activities occur, but the site is left undisturbed for more than 30 days, a pre-construction survey will again be necessary to ensure burrowing owl has not colonized the site since it was last disturbed. If burrowing owl is found, the same coordination described above will be necessary.

Following submittal, review and approval of the 30-day burrowing owl preconstruction survey report by the City of County of Riverside and compliance with all species-specific conservation goals, if detected within or adjacent to the Project Site, the project will be consistent with MSHCP Section 6.3.2.

5.3 Criteria Area Species Survey Area – Mammals

The MSHCP has determined that all of the sensitive species potentially occurring onsite or within the offsite Project Site have been adequately covered (MSHCP Table 2-2 Species Considered for Conservation Under the MSHCP Since 1999, 2004). However, additional surveys may be required if suitable habitat for mammals is documented onsite and the property is located within a predetermined “Survey Area” (MSHCP 2004).

The Project Site and offsite Project Site do not occur within a predetermined Survey Area for mammal species. Compliance with Section 6.1.3 respective of MSHCP mammals is not applicable to the proposed Project Site or offsite Project Site.

5.3.1 Methods

Compliance with Section 6.1.3 respective of MSHCP mammals is not applicable to the proposed Project Site or offsite Project Site.

5.3.2 Results/Impacts

Compliance with Section 6.1.3 respective of MSHCP mammals is not applicable to the proposed Project Site or offsite Project Site.

5.3.3 Mitigation and Equivalency

Compliance with Section 6.1.3 respective of MSHCP mammals is not applicable to the proposed Project Site or offsite Project Site.

5.4 Criteria Area Species Survey Area – Amphibians

The MSHCP has determined that all of the sensitive species potentially occurring onsite or within the offsite Project Site have been adequately covered (MSHCP Table 2-2 Species Considered for Conservation Under the MSHCP Since 1999, 2004). However, additional surveys may be required if suitable habitat for amphibian species is documented onsite and the property is located within a predetermined “Survey Area” (MSHCP 2004).

5.4.1 Methods

Compliance with Section 6.1.3 respective of MSHCP amphibians is not applicable to the proposed Project Site or offsite Project Site.

5.4.2 Results/Impacts

Compliance with Section 6.1.3 respective of MSHCP amphibians is not applicable to the proposed Project Site or offsite Project Site.

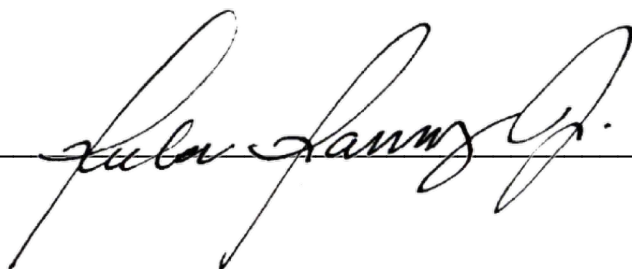
6. REFERENCES

- Cadre Environmental. 2021. Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) Focused Burrowing Owl & Least Bell's Vireo Surveys for the 46.17-Acre Temescal & Dawson Canyon Road Warehouse Project Site, Unincorporated Riverside County, Western Riverside County, California.
- Cadre Environmental. 2020. General MSHCP Biological Resources Habitat Assessment /Constraints Analysis for the 46.18-Acre Temescal & Dawson Canyon Road Warehouse Project Site, Unincorporated Riverside County, Western Riverside County, California.
- Cadre Environmental. 2019. Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) Focused Burrowing Owl & Least Bell's Vireo Surveys for the 70-Acre Corona Clay Company Project Site, City of Corona Sphere of Influence, Unincorporated Western Riverside County, California.
- California Department of Fish and Wildlife. 2012. Staff Report on Burrowing Owl Mitigation, State of California Natural Resources Agency.
- County of Riverside. 2006. Burrowing Owl Survey Instructions – Western Riverside Multiple Species Habitat Conservation Plan Area.
- Glenn Lukos Associates. 2020. Jurisdictional Delineation of the Corona Clay Project Site, an Approximate 46.18-Acre Property Located in the City of Corona Sphere of Influence, Riverside County, California (Updated February 2022).
- Glenn Lukos Associates. 2021a. Rare Plant Habitat Assessment and Focused Surveys for HANS 190024 – Temescal Canyon Road and Dawson Canyon Road Warehouse Site (APN 283-160-043, Riverside County, California (Updated February 2022).
- Glenn Lukos Associates. 2021b. Evaluation of Impacts to Riparian Habitat Associated with Changes to Hydrology for Temescal Wash and Coldwater Canyon Creek Associated with the Proposed Temescal Business Park, Corona, Riverside County.
- Glenn Lukos Associates. 2022. Jurisdictional Delineation of the Corona Clay Project Site, an Approximate 46.18-Acre Property Located in the City of Corona Sphere of Influence, Riverside County, California (Updated September 26th, 2022).
- Glenn Lukos Associates. 2023. Temescal Valley Commerce Center: Revised Riparian/Riverine Impacts and Mitigation in Temescal Wash (Updated October 25th, 2023).
- Riverside County Integrated Project (RCIP) Multiple Species Habitat Conservation Plan (MSHCP), March 2004.

United States Department of Agriculture. 2020. Custom Soil Resources Report for Western Riverside Area, California. Natural Resources Conservation Service. <https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>, accessed November 2020.

Certification *"I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge."*

Author: _____



Date: May 1, 2024

GLENN LUKOS ASSOCIATES

Regulatory Services



March 2, 2021
[Revised October 6, 2021]
[Revised December 19, 2022]
[Revised October 25, 2023]

Matt Englhard
Dawson Canyon LLC
11777 San Vicente Boulevard, Suite 780
Los Angeles, California 90049

SUBJECT: Jurisdictional Delineation of the 46.18-acre Temescal Valley Commerce Center Project Site and Associated Offsite Impact Areas, Located in the City of Corona Sphere of Influence, Riverside County, California

Dear Mr. Englhard:

This letter report summarizes our preliminary findings of U.S. Army Corps of Engineers (Corps) and California Department of Fish and Wildlife (CDFW) jurisdiction for the above-referenced property.¹ The approximately 46.18-acre Project site is located in the Corona Sphere of Influence [Exhibit 1] and contains portions of two blue-line drainages, Coldwater Canyon Creek and Temescal Wash, (as depicted on the U.S. Geological Survey (USGS) topographic map Lake Mathews, California [dated 1967 and photorevised in 1988]) [Exhibit 2]. The portion of Coldwater Canyon Creek, as depicted within the Project site on the USGS topographic map, was relocated and currently extends along the western boundary of the Project site. Temescal Wash traverses a small portion of the site at the northwest corner and the segment upstream of the site parallels the northern site boundary, with a limited area of offsite Temescal Wash subject to offsite impacts associated with an outfall for Coldwater Creek.

On August 20, 2019 and August 12, October 8, and November 20, 2020, and February 19, 2021, and January 3 and 11, 2022 regulatory specialists of Glenn Lukos Associates, Inc. (GLA) examined the Project site and portions of Coldwater Canyon Creek upstream of the site, an offsite segment of Temescal Wash, and an offsite ephemeral drainage west of Temescal Canyon Road, to determine the limits of (1) Corps jurisdiction pursuant to Section 404 of the Clean

¹ This report presents our best effort at estimating the subject jurisdictional boundaries using the most up-to-date regulations and written policy and guidance from the regulatory agencies. Only the regulatory agencies can make a final determination of jurisdictional boundaries. If a final jurisdictional determination is required, GLA can assist in getting written confirmation of jurisdictional boundaries from the agencies.

Matt Englhard

Dawson Canyon LLC

March 2, 2021 [Revised October 6, 2021][Revised December 19, 2022][October 25, 2023]

Page 2

Water Act, and (2) CDFW jurisdiction pursuant to Division 2, Chapter 6, Section 1600 of the Fish and Game Code. Enclosed are two 450-scale maps [Exhibits 3A and 3B] that depict the areas of Corps and CDFW jurisdiction. Photographs to document the topography, vegetative communities, and general widths of each of the waters are provided as Exhibit 4.

I. SUMMARY OF FINDINGS

As discussed below, the project would fill an onsite segment of Coldwater Canyon Creek, which would be realigned and relocated along the eastern site boundary. The realignment would directly impact both an offsite upstream segment of Coldwater Canyon Creek south of the project site, and the onsite portion of the creek. Another segment of Coldwater Canyon Creek northwest of the Project site would be avoided but would be indirectly impacted by the loss of hydrology. The realigned segment of Coldwater Canyon Creek would discharge to Temescal Wash immediately to the north of the project site, which would result in a combination of permanent and temporary impacts to the offsite segment of Temescal Wash for construction of an outfall structure. Following preparation of the October 6, 2021 version of this report, additional offsite impacts were identified by the project engineer associated with bank stabilization of the western bank of Temescal Wash and armoring of Temescal Wash under the Dawson Canyon Bridge north of the project site. Following preparation of the December 19, 2022 version of the report, the outfall and bank stabilization impacts were re-designed in coordination with the Riverside County Flood Control and Water Conservation District (RCFCWCD). As quantified and discussed in the impact section below, these changes have resulted in decreased impacts to Corps and CDFW jurisdiction in Temescal Wash.

A. Coldwater Canyon Creek

Corps jurisdiction associated with the onsite segment of Coldwater Canyon Creek totals approximately 0.50 acre and the offsite segment totals 0.23 acre, none of which consist of jurisdictional wetlands, and combined, includes approximately 2,531 linear feet of streambed. Construction of the project will result in fill of the 0.50 acre (1,722 linear feet) onsite segment of Corps jurisdiction and 0.23 acre (809 linear feet) of offsite areas, none of which consists of wetlands.

CDFW jurisdiction associated with the onsite segment of Coldwater Canyon Creek totals 1.22 acres and the offsite segment totals 1.02 acres of unvegetated channel and 0.02 acre of riparian habitat. Construction of the project will result in fill of the 1.22 acres of CDFW jurisdiction onsite, and would also include fill of 1.04 acres of offsite areas, of which 0.02 acre consists of vegetated riparian habitat.

The realignment of Coldwater Canyon Creek and subsequent reduction of hydrology in a section of the creek north of the Project site will result in indirect impacts to CDFW and Regional Board

Matt Englhard

Dawson Canyon LLC

March 2, 2021 [Revised October 6, 2021][Revised December 19, 2022][October 25, 2023]

Page 3

jurisdiction.² The reduction of hydrology will indirectly impact 0.31 acre (639 linear feet) of Regional Board jurisdiction, and 0.31 acre of CDFW jurisdiction, of which 0.03 consists of vegetated riparian habitat.

B. Temescal Wash

Corps jurisdiction associated with the onsite segment of Temescal Wash totals approximately 0.13 acre, none of which consists of wetlands. Total Corps jurisdiction associated with offsite areas total 3.26 acres, none of which consists of wetlands. Permanent impacts to intermittent streambed total 0.11 acre offsite. Temporary impacts to offsite intermittent streambed total 0.16 acre.

CDFW jurisdiction associated with the onsite segment of Temescal Wash totals approximately 0.93 acre. Permanent offsite impacts to Temescal Wash total 0.304 acre of which 0.704 acre consists of vegetated riparian habitat and/or Riversidian Alluvial Fan Sage Scrub (RAFSS). Temporary offsite impacts total 0.67 acre of which 0.24 acre consists of vegetated riparian habitat and/or RAFSS.

C. Drainage A

Construction of the project will result in fill of offsite Drainage A totaling 0.002 acre (58 linear feet) of Corps jurisdiction, none of which consists of wetlands.

Construction of the project will result in fill of offsite Drainage A totaling 0.01 acre of CDFW jurisdiction, none of which consists of riparian habitat.

II. METHODOLOGY

Prior to beginning the field delineation, a color aerial photograph, a topographic base map of the property, and the previously cited USGS topographic map were examined to determine the locations of potential areas of Corps/CDFW jurisdiction. Suspected jurisdictional areas were field checked for the presence of definable channels and/or wetland vegetation, soils and hydrology. Suspected wetland habitats on the site were evaluated using the methodology set forth in the U.S. Army Corps of Engineers 1987 Wetland Delineation Manual³ (Wetland Manual) and the 2008 Regional Supplement to the Corps of Engineers Wetland Delineation

² As the subject section of Coldwater Canyon Creek is not being filled, this action will not impact Corps jurisdiction.

³ Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1, U.S. Army Engineer Waterways Experimental Station, Vicksburg, Mississippi.

Manual: Arid West Supplement (Arid West Supplement)⁴. While in the field the limits of Corps and CDFW jurisdiction were recorded using sub-meter GPS technology.

II. JURISDICTION

A. Army Corps of Engineers

Pursuant to Section 404 of the Clean Water Act, the Corps regulates the discharge of dredged and/or fill material into waters of the United States. The term “waters of the United States” is defined in Corps regulations at 33 CFR Part 328.3(a) as:

- (1) Waters which are:
 - (i) Currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
 - (ii) The territorial seas; or
 - (iii) Interstate waters;
- (2) Impoundments of waters otherwise defined as waters of the United States under this definition, other than impoundments of waters identified under paragraph (a)(5) of this section;
- (3) Tributaries of waters identified in paragraphs (a)(1) or (2) of this section that are relatively permanent, standing or continuously flowing bodies of water;
- (4) Wetlands adjacent to the following waters:
 - (i) Waters identified in paragraph (a)(1) of this section; or
 - (ii) Relatively permanent, standing or continuously flowing bodies of water identified in paragraph (a)(2) or (a)(3) of this section and with a continuous surface connection to those waters;
- (5) Intrastate lakes and ponds not identified in paragraphs (a)(1) through (4) of this section that are relatively permanent, standing or continuously flowing bodies of water with a continuous surface connection to the waters identified in paragraph (a)(1) or (a)(3) of this section.

Corps regulations at 33 CFR Part 328.3(b) exclude the following from being “waters of the United States” even where they otherwise meet the terms of paragraphs (a)(2) through (5) above:

⁴ U.S. Army Corps of Engineers. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

- (1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act;
- (2) Prior converted cropland designated by the Secretary of Agriculture. The exclusion would cease upon a change of use, which means that the area is no longer available for the production of agricultural commodities. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA;
- (3) Ditches (including roadside ditches) excavated wholly in and draining only dry land and that do not carry a relatively permanent flow of water;
- (4) Artificially irrigated areas that would revert to dry land if the irrigation ceased;
- (5) Artificial lakes or ponds created by excavating or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing;
- (6) Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating or diking dry land to retain water for primarily aesthetic reasons;
- (7) Waterfilled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States; and
- (8) Swales and erosional features (e.g., gullies, small washes) characterized by low volume, infrequent, or short duration flow.

In the absence of wetlands, the limits of Corps jurisdiction in non-tidal waters, such as intermittent streams, extend to the OHWM which is defined at 33 CFR 328.3(c)(4) as:

...that line on the shore established by the fluctuation of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

“Adjacent” wetlands are defined by 33 CFR 328.3(c)(2) as having a “continuous surface connection” to other waters of the United States.

1. Wetland Definition Pursuant to Section 404 of the Clean Water Act

The term “wetlands” (a subset of “waters of the United States”) is defined at 33 CFR 328.3(c)(1) as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support...a prevalence of vegetation typically adapted for life in saturated soil conditions.” In 1987 the Corps published a manual to guide its field personnel in determining jurisdictional wetland boundaries. The methodology set forth in the 1987 Wetland Delineation Manual and the Arid West Supplement generally require that, in order to be considered a wetland, the vegetation, soils, and hydrology of an area exhibit at least minimal hydric characteristics. While the manual and Supplement provide great detail in methodology and allow for varying special conditions, a wetland should normally meet each of the following three criteria:

- more than 50 percent of the dominant plant species at the site must be typical of wetlands (i.e., rated as facultative or wetter in the Arid West 2016 Regional Wetland Plant List⁵);
- soils must exhibit physical and/or chemical characteristics indicative of permanent or periodic saturation (e.g., a gleyed color, or mottles with a matrix of low chroma indicating a relatively consistent fluctuation between aerobic and anaerobic conditions); and
- Whereas the 1987 Manual requires that hydrologic characteristics indicate that the ground is saturated to within 12 inches of the surface for at least five percent of the growing season during a normal rainfall year, the Arid West Supplement does not include quantitative criteria with the exception for areas with “problematic hydrophytic vegetation”, which require a minimum of 14 days of ponding to be considered a wetland.

B. Regional Water Quality Control Board

The State Water Resource Control Board and each of its nine Regional Boards regulate the discharge of waste (dredged or fill material) into waters of the United States⁷ and waters of the

⁵ Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. Arid West 2016 Regional Wetland Plant List. Phytoneuron 2016-30: 1-17. Published 28 April 2016.

⁶ Note the Corps also publishes a National List of Plant Species that Occur in Wetlands (Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. Phytoneuron 2016-30: 1-17. Published 28 April 2016.); however, the Regional Wetland Plant List should be used for wetland delineations within the Arid West Region.

⁷ Therefore, wetlands that meet the current definition, or any historic definition, of waters of the U.S. are waters of the state. In 2000, the State Water Resources Control Board determined that all waters of the U.S. are also waters of the state by regulation, prior to any regulatory or judicial limitations on the federal definition of waters of the U.S. (California Code of Regulations title 23, section 3831(w)). This regulation has remained in effect despite subsequent changes to the federal definition. Therefore, waters of the state includes features that have been determined by the

State. Waters of the United States are defined above in Section II.A and waters of the State are defined as “any surface water or groundwater, including saline waters, within the boundaries of the state” (California Water Code 13050[e]).

Section 401 of the CWA requires certification for any federal permit or license authorizing impacts to waters of the U.S. (i.e., waters that are within federal jurisdiction), such as Section 404 of the CWA and Section 10 of the Safe Rivers and Harbors Act, to ensure that the impacts do not violate state water quality standards. When a project could impact waters outside of federal jurisdiction, the Regional Board has the authority under the Porter-Cologne Water Quality Control Act to issue Waste Discharge Requirements (WDRs) to ensure that impacts do not violate state water quality standards. Clean Water Act Section 401 Water Quality Certifications, WDRs, and waivers of WDRs are also referred to as orders or permits.

1. State Wetland Definition

The State Board Wetland Definition and Procedures define an area as wetland as follows: “An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area’s vegetation is dominated by hydrophytes or the area lacks vegetation.”

The following wetlands are waters of the State:

1. Natural wetlands;
2. Wetlands created by modification of a surface water of the state;⁸ and
3. Artificial wetlands⁹ that meet any of the following criteria:
 - a. Approved by an agency as compensatory mitigation for impacts to other waters of the state, except where the approving agency explicitly identifies the mitigation as being of limited duration;

U.S. Environmental Protection Agency (U.S. EPA) or the U.S. Army Corps of Engineers (Corps) to be “waters of the U.S.” in an approved jurisdictional determination; “waters of the U.S.” identified in an aquatic resource report verified by the Corps upon which a permitting decision was based; and features that are consistent with any current or historic final judicial interpretation of “waters of the U.S.” or any current or historic federal regulation defining “waters of the U.S.” under the federal Clean Water Act.

⁸ “Created by modification of a surface water of the state” means that the wetland that is being evaluated was created by modifying an area that was a surface water of the state at the time of such modification. It does not include a wetland that is created in a location where a water of the state had existed historically but had already been completely eliminated at some time prior to the creation of the wetland. The wetland being evaluated does not become a water of the state due solely to a diversion of water from a different water of the state.

⁹ Artificial wetlands are wetlands that result from human activity.

- b. Specifically identified in a water quality control plan as a wetland or other water of the state;
- c. Resulted from historic human activity, is not subject to ongoing operation and maintenance, and has become a relatively permanent part of the natural landscape; or
- d. Greater than or equal to one acre in size, unless the artificial wetland was constructed, and is currently used and maintained, primarily for one or more of the following purposes (i.e., the following artificial wetlands are not waters of the state unless they also satisfy the criteria set forth in 2, 3a, or 3b):
 - i. Industrial or municipal wastewater treatment or disposal,
 - ii. Settling of sediment,
 - iii. Detention, retention, infiltration, or treatment of stormwater runoff and other pollutants or runoff subject to regulation under a municipal, construction, or industrial stormwater permitting program,
 - iv. Treatment of surface waters,
 - v. Agricultural crop irrigation or stock watering,
 - vi. Fire suppression,
 - vii. Industrial processing or cooling,
 - viii. Active surface mining – even if the site is managed for interim wetlands functions and values,
 - ix. Log storage,
 - x. Treatment, storage, or distribution of recycled water, or
 - xi. Maximizing groundwater recharge (this does not include wetlands that have incidental groundwater recharge benefits); or
 - xii. Fields flooded for rice growing.

All artificial wetlands that are less than an acre in size and do not satisfy the criteria set forth in 2, 3.a, 3.b, or 3.c are not waters of the state. If an aquatic feature meets the wetland definition, the burden is on the applicant to demonstrate that the wetland is not a water of the state.

C. California Department of Fish and Wildlife

Pursuant to Division 2, Chapter 6, Sections 1600-1603 of the California Fish and Game Code, the CDFW regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake, which supports fish or wildlife.

The Fish and Game Code defines a stream (including creeks and rivers) as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation." CDFW also defines a stream as "a body of water

that flows, or has flowed, over a given course during the historic hydrologic regime, and where the width of its course can reasonably be identified by physical or biological indicators.”

It is important to note that the Fish and Game Code defines fish and wildlife to include: all wild animals, birds, plants, fish, amphibians, invertebrates, reptiles, and related ecological

communities including the habitat upon which they depend for continued viability (FGC

Division 5, Chapter 1, section 45 and Division 2, Chapter 1 section 711.2(a) respectively).

Furthermore, Division 2, Chapter 5, Article 6, Section 1600 et seq. of the California Fish and Game Code does not limit jurisdiction to areas defined by specific flow events, seasonal changes in water flow, or presence/absence of vegetation types or communities.

III. RESULTS

A. Corps/Regional Board Jurisdiction

Corps jurisdiction within the Project site is associated with three intermittent drainages, Temescal Wash, Coldwater Canyon Creek, and Drainage A. A limited portion of Temescal Wash traverses the northwestern corner of the Project site and an additional segment of Temescal Wash parallels the northern project boundary and is discussed below. Coldwater Canyon Creek traverses the western and northwestern boundary of the Project site, and is tributary to Temescal Wash. Historically, Coldwater Canyon Creek extended across the middle portion of the Project site and was subsequently diverted into an earthen channel that extends along the western and northwestern site boundary. The discussion of Coldwater Canyon Creek includes offsite areas to the south of the project site that would be subject to impacts associated with widening of Temescal Canyon Road. Drainage A is an ephemeral drainage that originates west of Temescal Canyon Road and is tributary to Coldwater Canyon Creek.

1. Coldwater Canyon Creek

Coldwater Canyon Creek within the Project site totals approximately 0.50 acres of non-wetland, intermittent waters of the U.S. Coldwater Canyon Creek extends along the western boundary of the site for approximately 1,872 linear feet before discharging offsite beneath Dawson Canyon Road through two 7 by 14-foot concrete box culverts. Coldwater Canyon Creek ultimately discharges to the northwest of the Project site into Temescal Wash. The offsite segment accounts for 0.23 acre (809 linear feet) of non-wetland intermittent waters.

Coldwater Canyon Creek exhibits an OHWM ranging from 10 to 18 feet in width and was indicated by the presence of a defined channel with algal mats, debris wrack, and shelving and terracing [Exhibit 4, Photographs 1 – 2]. Vegetation associated with the creek bank and channel consists of native and non-native species, including scale broom (*Lepidospartum squamatum*, FACU), brittlebush (*Encelia farinosa*, UPL), mugwort (*Artemisia douglasiana*, FAC),

stinkweed (*Dittrichia graveolens*, UPL), oleander (*Nerium oleander*, UPL), castor bean (*Ricinus communis*, FACU), poison oak (*Toxicodendron diversilobum*, FACU), salt cedar (*Tamarix* sp., FAC), tarragon (*Artemisia dracunculus*, UPL), sweetbush (*Bebbia juncea*, UPL), mulefat (*Baccharis salicifolia*, FAC), a canopy of blue-gum eucalyptus (*Eucalyptus globulus*, UPL), California sagebrush (*Artemisia californica*, UPL), and a few scattered black willow (*Salix gooddingii*, FACW) individuals.

2. Temescal Wash

The northwestern corner of the Project site is traversed by a segment of Temescal Wash, which totals approximately 0.13 acre of non-wetland, intermittent waters of the U.S. The offsite portion contains 3.26 acres of waters of the U.S. The channel consists of finer substrates mixed with gravel and cobble. Vegetation along the channel includes giant reed (*Arundo donax*, FACW), scale broom (*Lepidospartum squamatum*, FACU), brittlebush (*Encelia farinosa*, UPL), mugwort (*Artemisia douglasiana*, FAC), stinkweed (*Dittrichia graveolens*, UPL), oleander (*Nerium oleander*, UPL), castor bean (*Ricinus communis*, FACU), poison oak (*Toxicodendron diversilobum*, FACU), salt cedar (*Tamarix*, FAC), tarragon (*Artemisia dracunculus*, UPL), sweetbush (*Bebbia juncea*, UPL), and mulefat (*Baccharis salicifolia*, FAC). The OHWM associated with this segment of Temescal Wash averages approximately 33 feet in width.

Before reaching the northwest corner of the site, Temescal Wash remains offsite and parallels the northern project boundary. As a component of the Project, Coldwater Creek will be realigned and will discharge to Temescal Wash offsite near the Northeast corner of the site. The area of Temescal Wash where Coldwater Creek will discharge to the site includes a well-defined low-flow channel and a terrace which is well above the low-flow channel, with a steep slope to the top of the Temescal Wash bank. The low-flow channel is unvegetated with an algal mat. The areas directly adjacent to the low-flow channel are vegetated with mulefat scrub dominated by mulefat (*Baccharis salicifolia*, FAC) and Goodding's black willow forest dominated by Goodding's black willow (*Salix gooddingii*, FACW) and red willow (*Salix laevigata*, FACW) in the canopy with mulefat in the understory [Exhibit 4, Photographs 3 and 4]. Terraces above the low flow channel support areas of sparse RAFSS dominated by sweetbush (*Bebbia juncea*, UPL), mulefat (*Baccharis salicifolia*, FAC), and scale broom (*Lepidospartum squamatum*, FACU).

Where Temescal Wash flows under the Dawson Canyon Bridge at the northernmost end of the Project site, the OHWM narrows. Of the four piers that support Dawson Canyon Bridge, the two inner piers are within Corps jurisdictional limits, while the two outer piers are on upland terraces outside of Corps jurisdiction [Exhibit 4, Photographs 5 – 6].

3. Drainage A

Drainage A is an ephemeral drainage that originates west of Temescal Canyon Road and extends to the east where it enters side-by-side culverts and flows under Temescal Canyon Road to Coldwater Canyon Creek. Drainage A supports no wetlands or riparian habitat and the banks support upland non-native grasses and forbs with summer mustard as dominant. Corps jurisdiction within the area affected by the project totals 0.002 acre.

4. Non-Jurisdictional Drainage Ditch

The site contains a man-made drainage swale that was used to capture drainage as part of the mining operation, which extends along the eastern and southeastern boundaries of the Project site. Vegetation associated with the drainage swale include tocalote (*Centaurea melitensis*, UPL), summer mustard (*Hirschfeldia incana*, UPL), annual fescue (*festuca myuros*, FACU), scale broom (*Lepidospartum squamatum*, FACU), salt cedar (*Tamarix ramosissima*, FAC), one black willow, slender wild oat (*Avena barbata*), and soft brome (*Bromus hordeaceus*, FACU). The drainage swale was excavated on dry land and drains primarily uplands, and is therefore excluded from the definition of waters of the U.S.

B. CDFW Jurisdiction

CDFW jurisdiction is associated with Coldwater Canyon Creek, Temescal Wash, and Drainage A is summarized below. CDFW jurisdiction includes all areas of Corps jurisdiction and extends beyond the OHWM to the top of bank or canopy of associated riparian habitat.

1. Coldwater Canyon Creek

Coldwater Canyon Creek within the Project site totals approximately 1.22 acres of CDFW jurisdiction, none of which consists of riparian habitat with the exception of a few scattered black willows and a few individuals of mulefat (*Baccharis salicifolia*). Coldwater Canyon Creek traverses along the western boundary of the site for approximately 1,872 linear feet before it extends offsite beneath Dawson Canyon Road through two 7 by 14-foot concrete box culverts. Coldwater Canyon Creek discharges northwest of the Project site into Temescal Wash. The upstream offsite segment accounts for 1.04 acres, of which 0.02 acre consists of riparian habitat.

Coldwater Canyon Creek, both onsite and offsite, exhibits a well-defined channel and signs of intermittent flow with top of bank ranging from 12 to 51 feet in width [Exhibit 4, Photographs 1 – 2]. Vegetation associated with the creek bottom and lower portions of the bank include native and non-native species, including scale broom (*Lepidospartum squamatum*), brittlebush (*Encelia farinosa*), mugwort (*Artemisia vulgaris*), stinkweed (*Dimorphandra graveolens*), oleander (*Nerium oleander*), castor bean (*Ricinus communis*), poison oak (*Toxicodendron*

diversilobum), salt cedar (*Tamarix* sp.), tarragon (*Artemisia dracunculus*), sweetbush (*Bebbia juncea*), mulefat (*Baccharis salicifolia*), a canopy of blue-gum eucalyptus (*Eucalyptus globulus*), California sagebrush (*Artemisia californica*), and a few scattered black willow (*Salix gooddingii*) individuals. The top bank supports upland scrub species including sweetbush, scalebroom, California sage brush and California buckwheat.

2. Temescal Wash

The northwestern corner of the Project site is traversed by a segment of Temescal Wash, which totals approximately 1.02 acre of CDFW jurisdictional streambed that includes a low-flow channel, and adjacent areas that exhibit occasional flows. Thus, the area of CDFW jurisdiction associated with Temescal Wash averages approximately 228 feet in width. Vegetation along the channel includes giant reed, scale broom, brittlebush, stinkweed (*Dittrichia graveolens*, UPL), castor bean (*Ricinus communis*, FACU), salt cedar (*Tamarix* sp., FAC), tarragon (*Artemisia dracunculus*, UPL), sweetbush (*Bebbia juncea*, UPL), and mulefat (*Baccharis salicifolia*, FAC).

Before reaching the northwest corner of the site, Temescal Wash remains offsite and parallels the northern project boundary. As a component of the Project, Coldwater Creek will be realigned and will discharge to Temescal Wash offsite near the Northeast corner of the site.

As noted above, the area where Coldwater Creek will discharge to the site includes a well-defined low-flow channel and a terrace which is well above the low-flow channel, with a steep slope to the top of the Temescal Wash Bank. The low-flow channel is unvegetated with an algal mat. Areas directly adjacent to the low-flow channel are vegetated with mulefat scrub dominated by mulefat (*Baccharis salicifolia*, FAC) and Goodding's black willow forest dominated by Gooddingi's black willow (*Salix gooddingii*, FACW) and red willow (*Salix laevigata*, FACW) in the canopy with mulefat in the understory [Exhibit 4, Photographs 3 and 4]. Two large Fremont cottonwood trees (*Populus fremontii*, FAC) are growing from the toe of the steep slope.

Where Temescal Wash flows under the Dawson Canyon Bridge at the northernmost end of the Project site, the width of CDFW jurisdiction narrows. Of the four piers that support Dawson Canyon Bridge, the two inner piers are within CDFW jurisdictional limits, while the two outer piers are on upland terraces outside of CDFW jurisdiction [Exhibit 4, Photographs 5 – 6].

3. Drainage A

Drainage A is an ephemeral drainage that originates west of Temescal Canyon Road and extends to the east where it enters side-by-side culverts and flows under Temescal Canyon Road to Coldwater Canyon Creek. Drainage A supports no wetlands or riparian habitat and the banks support upland non-native grasses and forbs with summer mustard as dominant. CDFW jurisdiction within the area affected by the project totals 0.01 acre and extends for 58 linear feet.

IV. IMPACTS

Construction of the project would result to permanent and temporary impacts to Corps, Regional Board, and CDFW jurisdiction. Tables 1 and 2 below summarize the total jurisdiction and impacts to each jurisdiction. Exhibits 5A and 5B depict the project impacts and Exhibits 6A and 6B depict the project impacts to Temescal Wash and includes the vegetation alliances.

A. Corps/Regional Board Jurisdiction

1. Coldwater Canyon Creek

Construction of the project will result in fill of the 0.50 acre (1,722 linear feet) onsite segment of Corps jurisdiction, and 0.23 acre (809 linear feet) of offsite areas.

2. Temescal Wash

Construction of the outfall, access road, and bank stabilization would result in permanent impacts to 0.11 acre (62 linear feet) of offsite Corps jurisdiction, and 0.16 acre (45 linear feet) of temporary impacts to offsite Corps jurisdiction, none of which consist of wetlands.

3. Drainage A

Construction of the project will result in fill of an offsite portion of Drainage A consisting primarily of grouted rip rap. Impacts to Drainage A total 0.002 acre (58 linear feet) of Corps jurisdiction, none of which consists of wetlands.

Table 1 - Corps Jurisdiction: Impacts and Avoidance					
Drainage	Type	Location	Total Jurisdiction (acres/linear feet)	Temporary Impact (acres/linear feet)	Permanent Impact (acres/linear feet)
Coldwater Canyon Creek					
Coldwater Canyon Creek	Non-Wetland Intermittent	Onsite	0.50/1,722	0.00/0	0.50/1,722
Coldwater Canyon Creek	Non-Wetland Intermittent	Offsite	0.23/809	0.00/0	0.23/809
Coldwater Canyon Creek Total			0.73/2,531	0	0.73/2,531

Matt Englhard

Dawson Canyon LLC

March 2, 2021 [Revised October 6, 2021][Revised December 19, 2022][October 25, 2023]

Page 14

Temescal Wash					
Temescal Wash	Non-Wetland Intermittent	Onsite	0.13/279	0.0/0	0/0
Temescal Wash	Non-Wetland Intermittent	Offsite	3.26/1,371	0.16/45	0.11/62
Temescal Total			3.39	0.16/45	0.11/62
Drainage A					
Drainage A	Non-Wetland Ephemeral	Offsite	0.002/58	0.0/0	0.002/58
Total				0.16	0.84

B. CDFW Jurisdiction

1. Coldwater Canyon Creek

Construction of the project will result in fill of the 1.22-acres of CDFW jurisdiction onsite and would also include fill of 1.04 acres of offsite areas, of which 0.02 acre consists of vegetated riparian habitat.

2. Temescal Wash

Temporary onsite impacts to Temescal Wash total 0.005 acre, all of which consists of vegetated riparian habitat. Permanent offsite impacts to Temescal Wash total 0.304 acre of which 0.074 acre consists of vegetated riparian habitat and/or RAFSS. Temporary offsite impacts total 0.67 acre of which 0.24 acre consists of vegetated riparian habitat and/or RAFSS.

3. Drainage A

Construction of the project will result in fill of an offsite portion of Drainage A consisting primarily of grouted rip rap. Impacts associated with Drainage A total 0.01 acre of CDFW jurisdiction, none of which consists of vegetated riparian habitat.

Matt Englhard

Dawson Canyon LLC

March 2, 2021 [Revised October 6, 2021][Revised December 19, 2022][October 25, 2023]

Page 15

Table 2 - CDFW Jurisdiction: Impacts and Avoidance					
Drainage	Type	Location	Total Jurisdiction (Acres)	Temporary Impact (Acres)	Permanent Impact (Acres)
Coldwater Canyon Creek					
Coldwater Canyon Creek	Non-Riparian Intermittent	Onsite	1.22	0.00	1.22
Coldwater Canyon Creek	Non-Riparian Intermittent	Offsite	1.02	0.00	1.02
Coldwater Canyon Creek	Riparian Intermittent	Offsite	0.02	0.00	0.02
Coldwater Canyon Creek Total			2.26	0.00	2.26
Temescal Wash					
Temescal Wash	Non-Riparian Intermittent	Onsite	0.71	0.00	0.00
Temescal Wash	Mulefat Scrub Intermittent	Onsite	0.215	0.005	0
Temescal Wash	Non-Riparian	Offsite	2.70	0.43	0.23
Temescal Wash	RAFSS Intermittent	Offsite	1.01	0.05	0.004
Temescal Wash	Black/Red Willow Intermittent	Offsite	0.60	0.06	0.01
Temescal Wash	Cottonwood Intermittent	Offsite	0.24	0.03	0.06
Temescal Wash	Mulefat Scrub Intermittent	Offsite	1.2	0.07	0
Temescal Wash	Elderberry Intermittant	Offsite	0.02	0.02	0
Temescal Total			6.70	0.67*	0.304
Drainage A					
Drainage A	Non-Riparian Ephemeral	Offsite	0.01	0.00	0.01
Total			8.97	0.67*	2.574

*Total assumes rounding to the nearest tenth.

Matt Englhard

Dawson Canyon LLC

March 2, 2021 [Revised October 6, 2021][Revised December 19, 2022][October 25, 2023]

Page 16

C. Hydrology Reduction (CDFW and Regional Board)

The realignment of Coldwater Canyon Creek and subsequent reduction of hydrology in a section of the creek north of the Project site will result in indirect impacts to CDFW and Regional Board jurisdiction. The reduction of hydrology will indirectly impact 0.31 acre (639 linear feet) of Regional Board jurisdiction, and 0.31 acre of CDFW jurisdiction, of which 0.03 consists of vegetated riparian habitat.

V. MITIGATION

As summarized in the permanent impact section above, impacts to CDFW jurisdiction exceed impacts to Corps jurisdiction and any project mitigation necessary to satisfy the requirements of CDFW would also satisfy the requirement of the Corps and Regional Board.

In summary, impacts to CDFW jurisdiction includes the following permanent impacts:

- 2.26 acres of the Coldwater Canyon Creek Channel of which
 - 2.24 acres consist of non-riparian streambed
 - 0.02 acre vegetated riparian habitat
- 0.304 acre of Temescal Wash of which
 - 0.23 acre consists of unvegetated channel or upland vegetation
 - 0.074 acre consists of riparian habitat or RAFSS
- 0.01 acre of impact to Drainage A, located west of Temescal Valley Road.

temporary impacts:

- 0.67 acre of Temescal Wash of which:
 - 0.43 acre consists of unvegetated intermittent channel or upland vegetation
 - 0.235 acre consists of riparian habitat and/or RAFSS.

Indirect impacts associated with hydrology reduction for Coldwater Canyon Creek downstream of the Project site between the intersection of Temescal Valley Road and Dawson Canyon Road and Temescal Wash includes 0.31 acre of CDFW jurisdiction, of which 0.03 consists of vegetated riparian habitat.

The Applicant obtained compensatory mitigation through purchase of credits at the Riverpark Mitigation Bank in Western Riverside County. Specifically, based on the impacts reported in the June 7, 2021 cover letter, the applicant has purchased 8.64 acre of credits including 4.32 acres of riparian reestablishment and 4.32 acres of riparian rehabilitation.

Matt Englhard

Dawson Canyon LLC

March 2, 2021 [Revised October 6, 2021][Revised December 19, 2022][October 25, 2023]

Page 17

To mitigate for additional impacts that exceed the impacts covered by the Riverpark mitigation credits, the applicant is proposing “permittee-responsible” mitigation within Temescal Wash. A Habitat Mitigation and Monitoring Plan has been completed providing in-kind rehabilitation within Temescal Wash as follows:

- Rehabilitation of willow forest at 4:1
- Rehabilitation of all other vegetated riparian habitat at 2:1
- Rehabilitation of RAFSS at 4:1
- For impacts to jurisdictional areas that are either unvegetated or dominated by upland vegetation, rehabilitation of RAFSS at 2:1.

If you have any questions about this letter report, please contact Tony Bomkamp at (949) 340-7333.

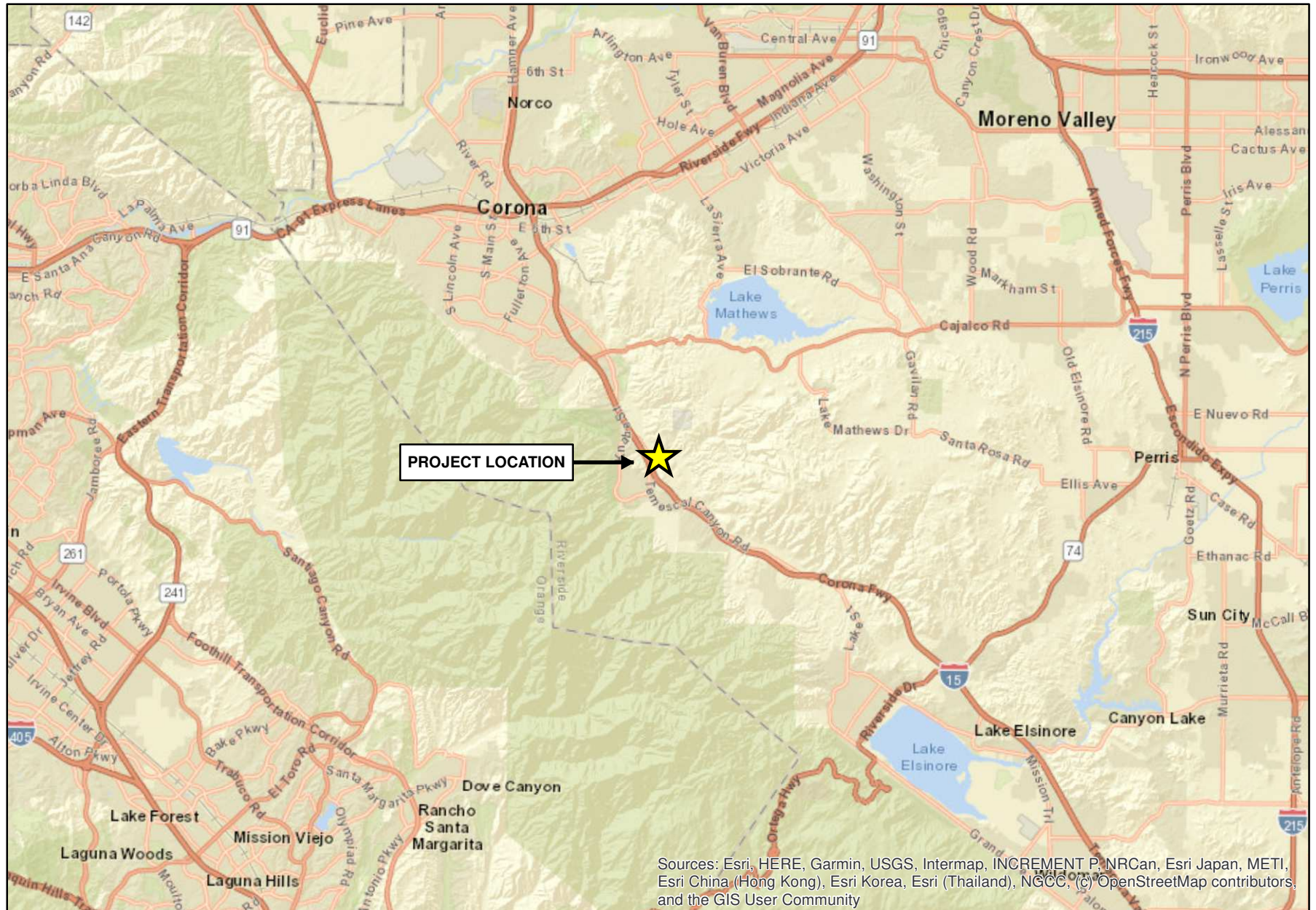
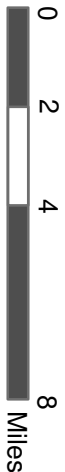
Sincerely,

GLENN LUKOS ASSOCIATES, INC.

A handwritten signature in black ink, reading "Tony Bomkamp", enclosed in a thin black rectangular border.

Tony Bomkamp
Regulatory Specialist

Source: ESRI World Street Map



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

TEMESCAL CANYON BUSINESS PARK PROJECT SITE

Regional Map

GLENN LUKOS ASSOCIATES

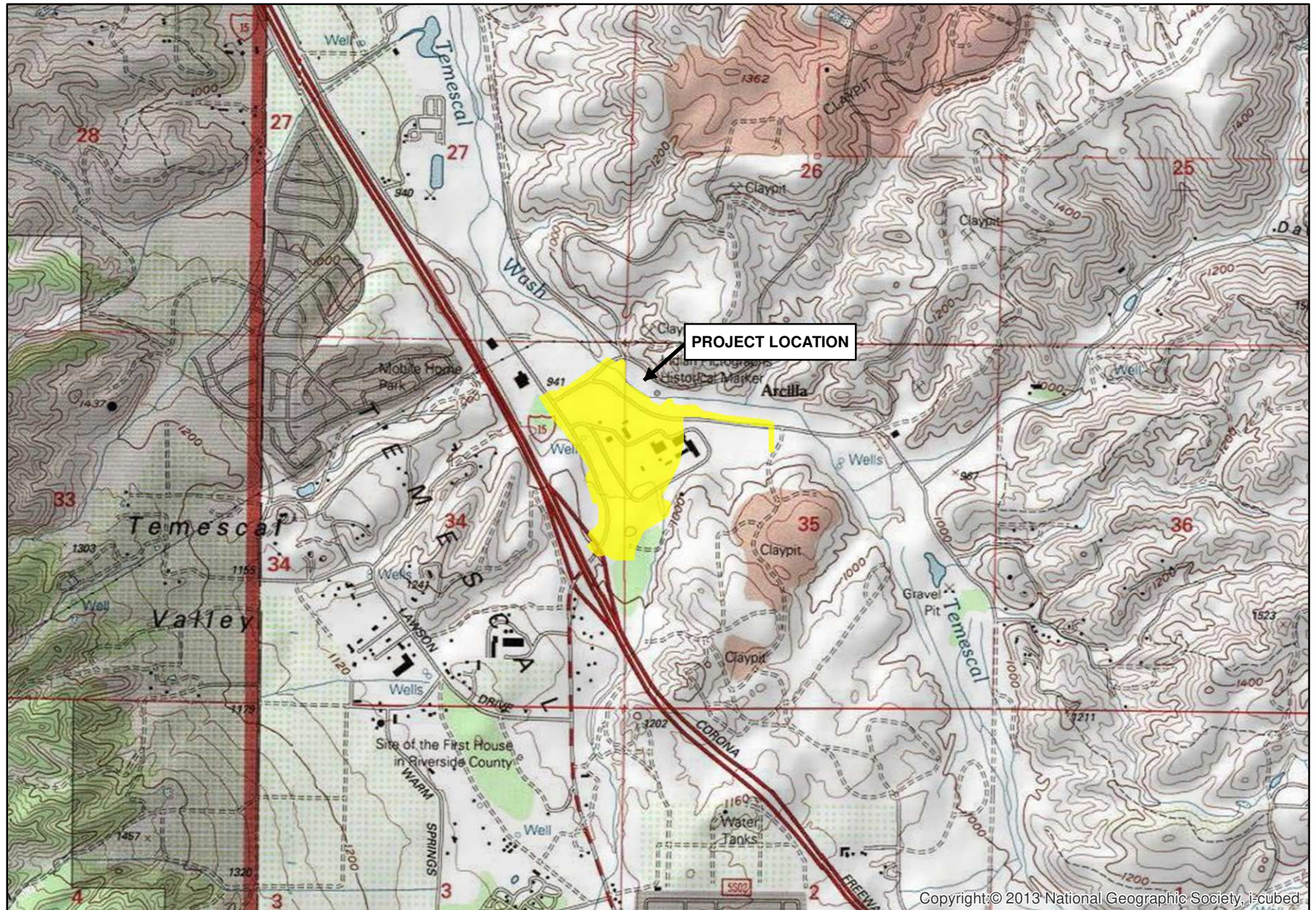
Exhibit 1



Adapted from USGS Lake Mathews, CA quadrangle



0
1,000
2,000
4,000
Feet



Copyright © 2013 National Geographic Society, i-cubed

TEMESCAL CANYON BUSINESS PARK PROJECT SITE

Vicinity Map

GLENN LUKOS ASSOCIATES

Exhibit 2





Photograph 1: Coldwater Creek looking downstream from project southern boundary showing unvegetated channel and banks with upland vegetation.



Photograph 2: Coldwater Creek looking downstream near northern project boundary showing unvegetated channel and banks with upland vegetation.



Photograph 3: Temescal Wash looking upstream from northern boundary of offsite impact areas showing stream channel and associated scrub vegetation.



Photograph 4: Temescal wash looking upstream at black willow forest to be partially impacted by offsite outfall construction.





Photograph 5: Downstream-facing view of Dawson Canyon Bridge piers on the southwest end of the bridge. The southwestern-most pier is on an upland terrace above CDFW and Corps jurisdiction.



Photograph 6: Downstream-facing view of Dawson Canyon Bridge piers from the northeast end of the bridge. The terrace on the right (northeast) side of the photo is above Corps and CDFW jurisdiction. The northeastern-most pier is not pictured but is to the right (northeast) of the piers in the photo and is above jurisdictional limits of both Corps and CDFW.



GLENN LUKOS ASSOCIATES

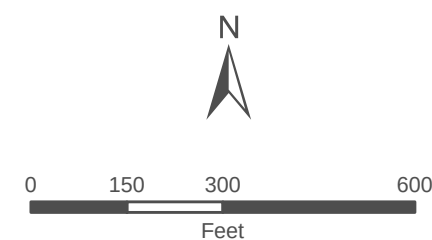
Exhibit 4 – Page 2

TEMESCAL VALLEY COMMERCE CENTER

Site Photographs



- Project - Onsite
- Permanent Onsite Impacts
- Permanent Offsite Impacts
- Offsite Hydrology Reduction
- Temporary Impacts
- Temporary Impacts - Buried Slope Protection
- Non-Wetland Waters
- # Width of Drainage in Feet



1 inch = 300 feet

Coordinate System: State Plane 6 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: October 30, 2023

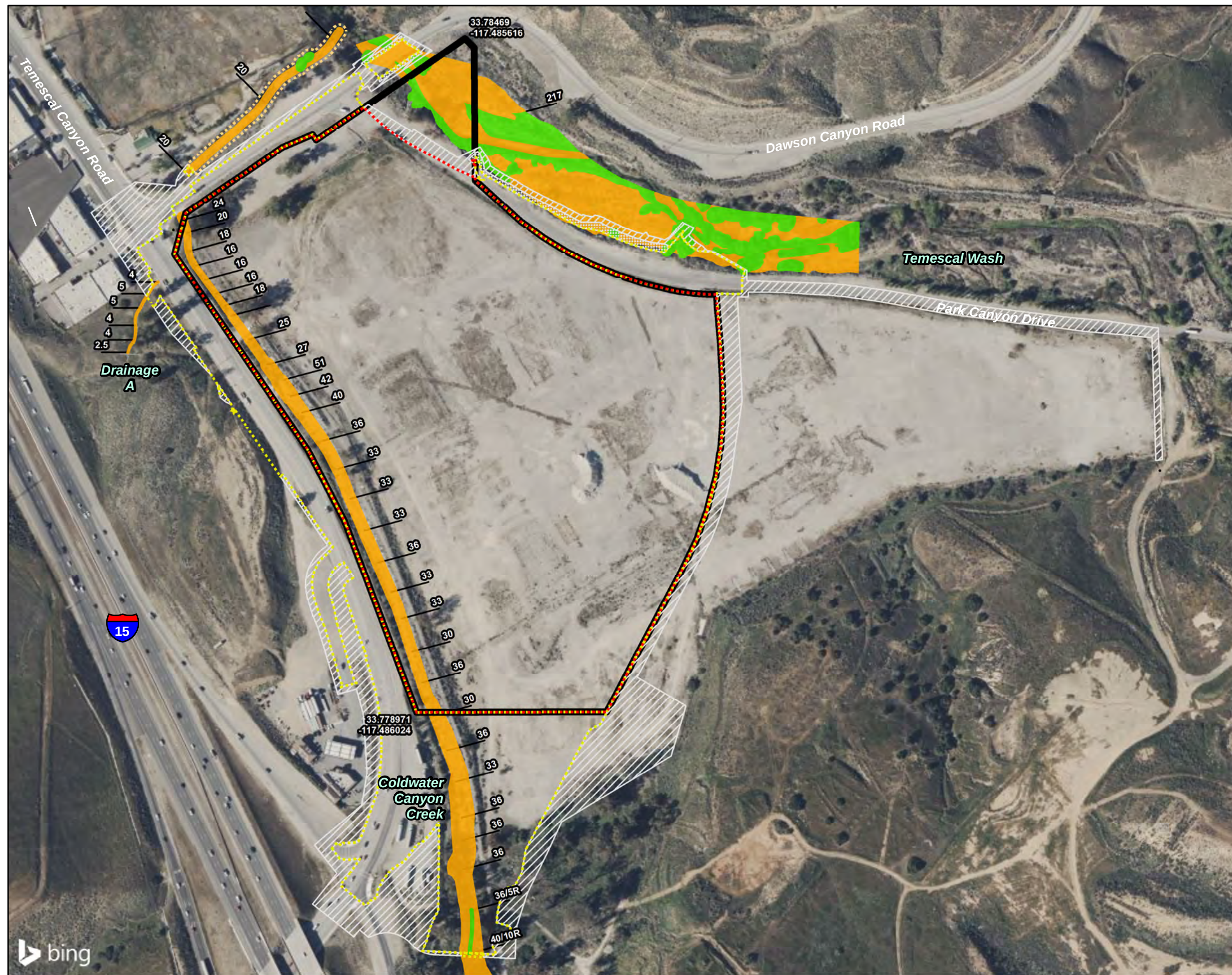
TEMESCAL CANYON BUSINESS PARK PROJECT SITE

Corps/RWQCB Jurisdictional Delineation Map

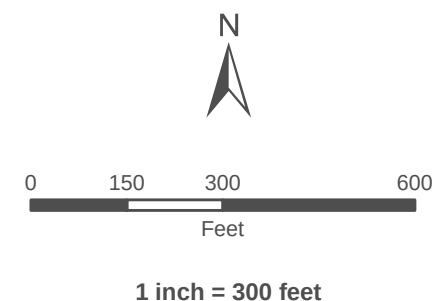
GLENN LUKOS ASSOCIATES



Exhibit 3A



- Project - Onsite
- Permanent Onsite Impacts
- Permanent Offsite Impacts
- Offsite Hydrology Reduction
- Temporary Impacts
- Temporary Impacts - Buried Slope Protection
- CDFW Riparian
- CDFW Non-Riparian Stream
- # Width of Drainage in Feet



Coordinate System: State Plane 6 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: October 30, 2023

TEMESCAL CANYON BUSINESS PARK PROJECT SITE

CDFW Jurisdictional Delineation Map

GLENN LUKOS ASSOCIATES

Exhibit 3B



**HYDRAULIC ANALYSIS REPORT
FOR
TEMESCAL VALLEY COMMERCE CENTER**

Job Number 18602

**October 29, 2020
Revised: September 24, 2021**

RICK ENGINEERING COMPANY

ENGINEERING COMPANY

RICK ENGINEERING CO

HYDRAULIC ANALYSIS REPORT
FOR
TEMESCAL VALLEY COMMERCE CENTER

Job Number 18602

Brendan Hastie, P.E.
R.C.E. #65809
Exp. 09/23

Prepared for:
Proficiency Capital LLC
11777 San Vicente Blvd., Suite 780
Los Angeles, CA 90049
(310) 979-8000

Prepared by:
Rick Engineering Company
Water Resources Division
5620 Friars Road
San Diego, California 92110-2596
(619) 291-0707

October 29, 2020
Revised: September 24, 2021

TABLE OF CONTENTS

Revision Paged dated September 24, 2021.....	i
1.0 Introduction.....	1
1.1 Topography	4
2.0 Hydraulics	4
2.1 Hydraulic Methodology and Criteria	4
2.2 Hydraulic Analysis of Coldwater Canyon Wash.....	4
2.3 Hydraulics Temescal Wash	8
3.0 Hydraulic Results.....	12
4.0 Conclusion	14

Tables

Table 1: Manning’s n-Values.....	6
Table 2: Summary of Temescal Wash Discharges.....	8
Table 3: Temescal Wash Existing Condition Model Cross Sections Summary.....	10
Table 4: Temescal Wash Proposed Condition Model Cross Sections Summary.....	11
Table 5: Drop Structure Riprap Protection Locations.....	13
Table 6: Temescal Wash 100-yr WSE Comparison.....	13

Figures

Figure 1: Vicinity Map.....	3
-----------------------------	---

Appendices

Appendix A: Hydraulic Backup	
Appendix B: Coldwater Creek Wash Hydraulics	
Appendix C: Temescal Wash Hydraulics	
Appendix D: Proposed Flood Extents Exhibit	

**HYDRAULIC ANALYSIS REPORT
FOR
TEMESCAL VALLEY COMMERCE CENTER**

REVISION PAGE

SEPTEMBER 24, 2021

This report presents revisions to the October 29, 2020 report pursuant to comments received as part of the 2nd plan check review by the Riverside County Flood Control and Water Conservation District (DAC #2). Itemized responses to comments received regarding the Hydraulic Design report are included below. Responses by Rick Engineering are shown below **in bold**.

1. Future exhibits shall depict all proposed flood control and drainage facilities including watercourses, dams, retention basins, channels, storm drains, culverts, brow and slope drains with type, grades, dimensions, and easement or right-of-way widths clearly shown. Centerline curve radii and typical sections shall be shown for all open channel facilities. The exhibit shall depict all points of concentration where offsite runoff enters the site and points of discharge from the site, including the drainage area in acres and the one-percent annual chance (100-year) discharge at each point.

Noted. The CCW channel is not anticipated to convey flows from the on-site development. Therefore Comment #1 from Flood Control is considered to apply to only the onsite preliminary drainage study by others.

- a. Exhibit A shows a proposed Channel bisecting the project site, along the east boundary of the developed area, to collect and convey flows from the Coldwater Canyon Wash to Temescal Wash. This development is dependent on an adequately designed flood control facility to collect and contain the 100-year storm event for Coldwater Canyon Wash. This channel must be designed to the District's standards.

This comment is noted. The channel has been designed to the District's standards for future maintenance by the District. Design analysis of the proposed channel is presented by the report titled "Hydraulic Analysis Report for Temescal Valley Commerce Center", prepared by Rick Engineering Company.

- b. Exhibits for an "offsite plot plan" were submitted which included cross sections for Temescal Canyon Road, Dawson Canyon Road, and Coldwater Creek Channel. It is

unclear who is building these improvements, and the timeline for their construction. Since the entire project site is impacted by the Coldwater Creek floodplain, the Coldwater Creek Channel must be constructed prior to CUP 200044. Provide additional information on when the channel is being built and by who. Additional information will be required to determine how upstream flows will be collected, how flows will be discharged to Temescal Wash, and whether additional right of way is required for maintenance.

This comment is noted. Additional information will be included with the hydraulic design report for reference and the offsite exhibits have been updated for clarity.

2. The grading plans show fill proposed within the FEMA floodplain. The developer must submit a floodplain analysis of Temescal Creek to determine potential impacts of the development to the FEMA floodplain. The hydraulic model submitted will need to be updated to match the FEMA effective water surface elevations within 0.5' at the upstream and downstream limits per FEMA criteria. The updated Temescal Creek model may then be used as the downstream control for Coldwater Creek model, otherwise the FEMA effective model should be used as the control.

This comment is noted. The project intends to submit and process a CLOMR/LOMR to correct the limits of the floodplain in relation to the proposed project.

3. The developer must submit a floodplain analysis to determine potential impacts of the development to the DWR floodplain.

As no DWR floodplain is in the vicinity, this comment is understood to be in regards to Riverside County Ordinance 458. A floodplain analysis is included with the resubmittal in the form of the revised report titled "Hydraulic Analysis Report for Temescal Valley Commerce Center", prepared by Rick Engineering Company.

4. A hydraulic analysis report was submitted for Temescal Wash and Coldwater Creek.
 - a. Regarding the hydraulics for Coldwater Creek Channel;
 - i. Downstream control should be consistent with the water surface elevation of Temescal Creek. FEMA's effective water surface elevation in Temescal Creek is significantly different than the Temescal Creek hydraulic model submitted.

The CCW model has be revised accordingly. Per communications with district staff, analysis of the coincident peak within Temescal Wash is considered appropriate to determine the starting WSE

- ii. The Manning's value for the invert is too low for an earthen bottomed channel.

The manning's roughness value used to model the earthen bottom channel has been revised per correspondence with District staff.

- iii. Supercritical flow is not acceptable on an earthen channel.

This comment is noted. The design approach within the report has been clarified, and is illustrated by the accompanying plans, to consist of subcritical non-erosive flow along the earthen bottom, with supercritical flow being limited to armored drop structures

- iv. There appears to be a 20 foot drop just between station 1854 and 2050, with supercritical flow. The channel is shown to have an earthen bottom. Redesign or explain.

The revised report and accompanying plan include analysis and limits for armoring of drop structures.

- v. Explain how upstream flows will be collected. The model shows an abrupt transition from natural to channelized.

As previously discussed with district staff, the upstream limits of the channel have been refined for the revised submittal, based on coordination with upstream stakeholders.

- vi. The realigned Temescal Canyon Road is not shown on the model; verify it has been modeled correctly to account for the future bridge.

The revised hydraulic report includes a narrative that the future Temescal Canyon Road crossing will be designed by others in the future.

- vii. Show how channel will discharge to Temescal Creek. The model shows work being done in Temescal creek, which will require permits.

This comment is noted. The CCW outfall into Temescal Wash is analyzed by the revised hydraulic analysis, and also depicted on the accompanying channel improvement plans.

5. A draft EIR was submitted for the Temescal Valley Commerce Center, It does not appear to discuss impacts of the construction of Coldwater Creek Channel, or associated modifications to Temescal Creek. This project cannot be built until the channel is constructed. Update the DEIR or provide information on when and by who the channel is being built.

This comment is noted.

1.0 INTRODUCTION

This report presents a hydraulic analyses of the proposed Coldwater Canyon Wash (CCW) channel and a portion of Temescal Wash in support of the proposed Temescal Valley Commerce Center project (herein referred to as “the project”). The project is a planned commercial development on approximately 50-acres. The project is located southeast of the intersection of Temescal Canyon Road and Dawson Canyon Road in the County of Riverside, CA. Refer to Figure 1.0 for a Vicinity Map of the project.

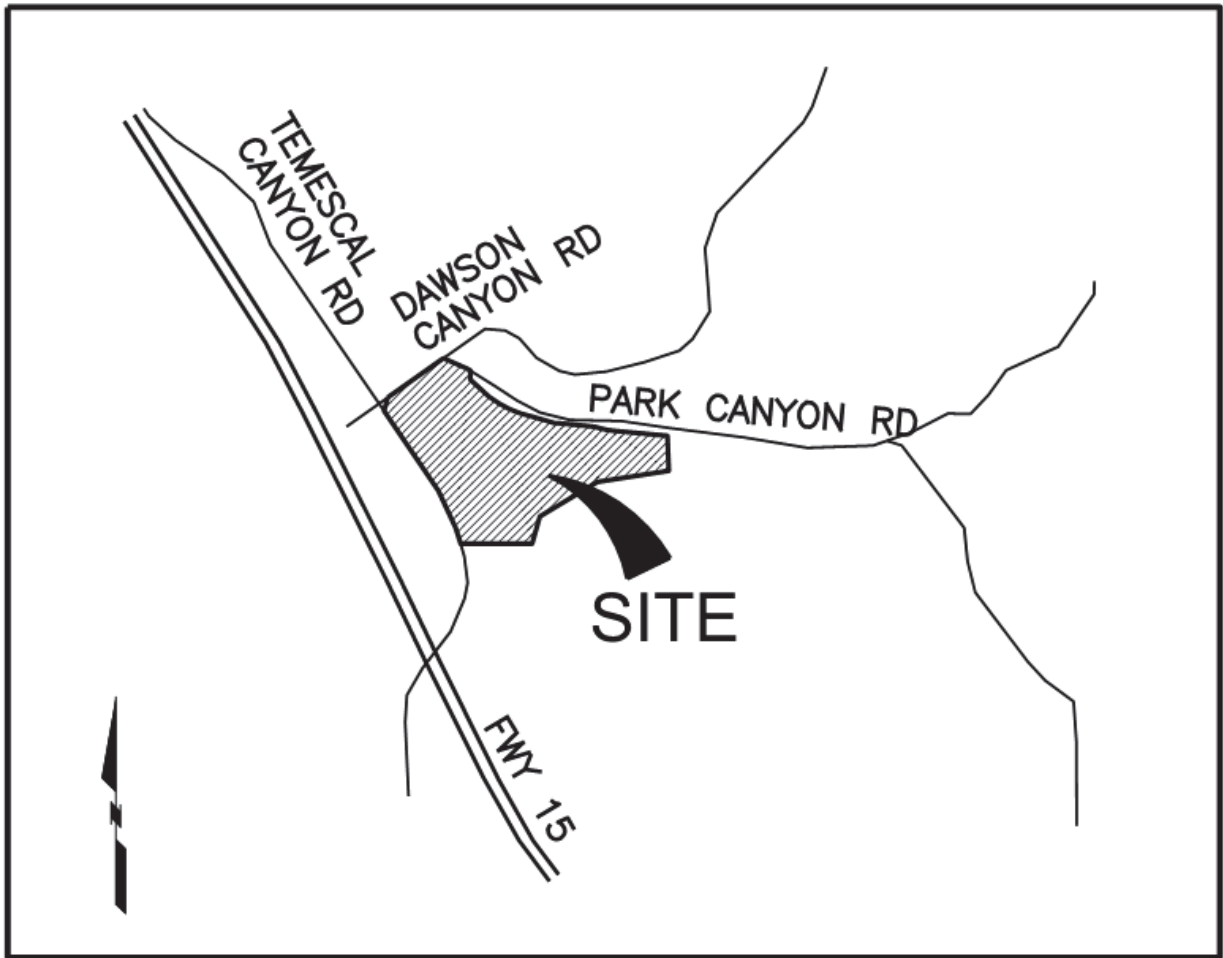
The reach of the Coldwater Canyon Wash covered by this study extends from the point of confluence of the proposed Coldwater Canyon Wash and Temescal Wash to approximately 3,500 linear feet upstream along the existing Coldwater Canyon Wash streambed. Coldwater Canyon Wash has been studied in detail previously by a report prepared for Riverside County Flood Control and Water Conservation District titled “Coldwater Canyon Wash Geomorphology Study,” prepared by JE Fuller, and dated October 2018. As identified in Section 4.2 of that report, private developments have previously proposed to realign Coldwater Canyon Wash away from Temescal Canyon Road, which can mitigate flood hazards in the project area. A new channel is proposed by this project to by-pass Coldwater Canyon Wash through the project site, resulting in a new point of confluence with Temescal Wash approximately 1,300 linear feet upstream along the Temescal Wash streambed. The point of the proposed outfall is generally restoring the historical outfall location of the CCW channel into Temescal Wash, as presented by Figure 32 of the above reference report.

The proposed re-alignment of Coldwater Canyon Wash channel is to include a total of three drop structures; two riprap drop lined structures and one concrete lined drop structure. Also proposed are maintenance access roads at the top of slope on either side of the channel with ramps providing access above and below of each drop structure to the channel bottom.

The reach of Temescal Wash covered by this study extends from the point of confluence of the existing Coldwater Canyon Wash and Temescal Wash to approximately 4,000 linear feet upstream along Temescal Wash streambed. The primary purpose of the hydraulic analysis is to assist in the design of the proposed channel by-passing Coldwater Canyon Wash and assess potential impacts to the water surface elevations and velocities within the Temescal Wash as a result of the new Coldwater Canyon Wash outfall. The study prepared and compared the results of the pre-project and post-project hydraulic capacity (“capacity run”) hydraulic models for the specified reach of Temescal Wash and proposed Coldwater Canyon Wash channel.

This document includes a summary of the hydraulic analysis for the proposed re-alignment of Coldwater Canyon Wash, as well as approximately 4,000 linear feet of the affected portion of Temescal Wash.

Figure 1: Vicinity Map



VICINITY MAP
NO SCALE

1.1 Topography

The topographic information used to develop the hydraulic models within the Temescal Valley Commerce Center project is based project specific topography consisting of 1-foot contours on the NAVD88 vertical datum from a survey conducted by Rick Engineering Company, and available area topography consisting of 1-foot contours on the NAVD88 vertical datum from the USGS. Cross sections for this hydraulic analysis were created using this topography for existing and proposed conditions.

2.0 HYDRAULICS

2.1 Hydraulic Methodology and Criteria

The GeoHECRAS computer modeling software was used as a supplemental tool to help build the hydraulic model and the HEC-RAS v5.0.7 computer program was used (as the main engine) to execute the hydraulic calculations. The HEC-RAS is intended for calculating water surface elevations (WSELs) for supercritical, subcritical and mixed flow regimes in natural or man-made channels. The effects of the various obstructions such as culverts may be considered in the computations.

Flood Insurance Study (FIS) Data has been obtained from the Federal Emergency Management Agency (FEMA) including data for Panel 1390 of 3805, Map Number 06065C1390G. The proposed hydraulic modeling performed as part of this hydraulic study is compared to a Duplicate Effective Model based on the Effective Model that was provided by FEMA on February 23, 2020. The Effective Model was based on the U.S. Army Corps of Engineers' HEC-2 program. The Effective Model, and thus the Duplicate Effective Model, extend further upstream and downstream, however the Existing Condition and Proposed Condition Models only include a portion of Temescal Wash related to this project and the related requested mapping revision.

2.2 Hydraulic Analysis of Coldwater Canyon Wash

Existing Condition and Project Phasing

In the existing condition Coldwater Canyon Wash (CCW) is routed to the west around the pad formerly known as the Rinker Plant. There are multiple driveways across the existing Coldwater

Canyon Wash alignment as well as a dual box culvert underneath Dawson Canyon Rd where CCW is then conveyed north to the confluence with Temescal Wash downstream of Dawson Canyon Rd. As studied by the JE Fuller report, this existing reach only has capacity for approximately 2,000 cfs which is approximately the 5-year storm event for Coldwater Canyon Wash. The JE Fuller report documents that split flow occurs during larger storm events with a portion of flow traveling north through the Rinker Plant to confluence with Temescal Wash upstream of Dawson Canyon Rd bridge, and a portion of flow also traveling west along Temescal Canyon Road to ultimately confluence with Temescal Wash downstream of the Dawson Canyon Road bridge. The existing condition model generated by the JE Fuller Study has been utilized to calculate that with a total flow rate of 3,500 cfs within the CCW channel (coinciding with the 100-year flow event in Temescal Wash) the amount of split-flow through the Rinker Plant is approximately 960 cfs.

Ultimate condition improvements, including a proposed culvert crossing for Temescal Canyon Road across Coldwater Canyon Wash and associated upstream channel improvements are understood to be planned by others in the future.

Model Extents and Boundary Conditions

In effort to assist in the design of, and to determine the impacts of proposed Coldwater Canyon channel improvements of the Temescal Valley Commerce Center project, the HEC-RAS model extends approximately 2,500 linear feet upstream from the point of proposed outfall location to Temescal Wash, through the proposed project site and to the existing streambed just upstream of the project boundary.

Hydraulic analysis of the proposed realignment and arch culverts along Coldwater Canyon Wash is included with Appendix B. Hydrologic information for the reach is obtained from the report titled “Coldwater Canyon Wash Geomorphology Study,” prepared by JE Fuller, and dated September 2018. Relevant excerpts of this report are included in Appendix A for reference. A flowrate of 5,250 cfs was used for design purposes, though the peak flowrate is anticipated to be reduced to in the future pending the construction of an upstream regional detention basin.

Manning's n Values

Manning's n-values for the model upstream of proposed improvements were based on visual observations which found moderate overgrowth with scattered brush and heavy weeds. Manning's n-values for the proposed portion of Coldwater Canyon Wash reflect a maintained condition as directed by the Riverside County Flood Control and Water Control District (RCFC). Manning's n-values for riprap were obtained from literature provided by the RCFC included in Appendix B.

Table 1 below summarizes the n-values used in each condition within the Coldwater Canyon Wash channel improvements reach:

Table 1 – Modeled Manning's "n" Values

Condition	Velocity	Maintained
Location	Manning's n	Manning's n
Natural Channel Bottom upstream of Proposed Channel Improvements	0.050	0.050
Overbanks upstream of Channel Improvements	0.050	0.050
Vegetated Channel within Channel Improvements	0.025	0.030
Concrete Structures	0.018	0.018
¼ Ton Riprap	0.038	0.038
½ Ton Riprap	0.039	0.039
2 Ton Riprap	0.045	0.045

Proposed Condition Model

The following model was created for design purposes which reflects the most recent design configuration and is intended to study the proposed conditions of the Coldwater Canyon Wash channel. For a direct comparison, the same cross-sections are calculated for each condition. Locations of "n" values were readjusted accordingly to meet the proposed extents of vegetation and riprap.

The proposed condition models incorporate three proposed drop structures. One drop structure is proposed to drop approximately 20 vertical feet and be concrete lined. The other two drop structures are proposed to drop approximately 4 and 6 feet, both riprap lined. The entire length of both side slopes of the proposed portion of the channel are to be riprap lined. A map of the HEC-RAS cross-section locations is included in Appendix B. An executable copy of the HEC-RAS model is included as a separate attachment to this report. A discussion of the results may be found in the following section.

Proposed Condition Model – Velocity

The “n” values in this model reflect a minimally vegetated state of the channel, when flow velocities are anticipated to be the highest.

HEC-RAS Files:

The following HEC-RAS files reflect the Proposed Velocity Condition hydraulic model for Coldwater Canyon Wash channel:

<u>File:</u>	<u>Title:</u>
Project: 18602B_Proposed_CCW.prj	CoronaClay_CCW
Plan: 18602B_Proposed_CCW.p14	CCW_Proposed_Velocity
Geometry: 18602B_Proposed_CCW.g13	CCW_Proposed_Velocity
Flow: 18602B_Proposed_CCW.f03	CCW

Proposed Condition Model – Maintained

The “n” values in this model reflect the anticipated long-term condition of the channel and the typical anticipated maintained vegetated condition.

HEC-RAS Files:

The following HEC-RAS files reflect the Proposed Maintained Condition hydraulic model for Coldwater Canyon Wash channel:

<u>File:</u>	<u>Title:</u>
Project: 18602B_Proposed_CCW.prj	CoronaClay_CCW
Plan: 18602B_Proposed_CCW.p15	CCW_Proposed_Maintained

Geometry: 18602B_Proposed_CCW.g14

CCW_Proposed_Maintained

Flow: 18602B_Proposed_CCW.f03

CCW

Discussion of the hydraulic results is included in Section 3 of this report.

2.3 Hydraulic Analysis of Temescal Wash

Model Extents and Boundary Conditions

In effort to determine the impacts of proposed Coldwater Canyon channel improvements of the Temescal Valley Commerce Center project, the HEC-RAS model extends approximately 4,000 linear feet upstream of a point just downstream of the existing point of confluence of Coldwater Canyon Wash and Temescal Wash.

The Hydrologic Data used to model Temescal Wash was taken from the Effective Model and FIS for Riverside County, CA, dated March 6, 2018. Table 10 of the FIS shows 100-year discharges for Temescal Wash at Magnolia Avenue as 22,000 cubic feet per second (cfs). No other storm event discharges are provided for Temescal Was upstream of Magnolia Avenue, which is located approximately seven miles downstream of the project area. The Effective Model includes more detailed flow rate changes throughout Temescal Wash, which was utilized for the hydraulic analyses. The hydrologic data is summarized in Table 1.

Table 2 – Summary of Temescal Wash Discharges from the Effective Model

Cross Section Flow Change Location	100-year Peak Discharges (cfs)
Effective Model Section 68448 (FIS Section AS)	19,400
Existing Model Section 69198	15,900
Existing Model Section 69733	13,220
Existing Model Section 73193	15,900

Flow rates for lesser storm events within the same reach of Temescal Wash have been estimated by the report titled “Hydraulic and Scour Studies for Two Bridges on Temescal Wash” by Chang Consultants, dated September 2014 and have been analyzed to determine the downstream water surface elevation for the proposed alignment of Coldwater Canyon Wash, based on an estimation of the coincident peaks of the two drainage areas per Table 7-3 of HEC-22.

Existing Condition Model

The Existing Condition Model was prepared in HEC-RAS based on the Corrected Effective Model. The Existing Condition Model removed cross sections that were either not effective or outside of the project area. No additional cross sections were added to the Existing Condition Model, however cross section geometries have been updated based on existing condition topography. This included updating the modeling of Dawson Canyon Road Bridge (between Effective Cross Sections 69733 and 69773) based on the survey conducted by Rick Engineering Company. More specifically, the bridge location was changed, from between Cross Sections 69733 and 69773 to between Cross Sections 69773 and 69819, and the geometry of the bridge was updated. Additionally, the Effective FIS data models a split flow scenario at the Dawson Canyon Bridge crossing, in which 2,680 cubic feet per second (cfs) overtops the south channel bank and bypasses the bridge to the south east at a low point of Dawson Canyon Road (i.e., a flow change reduction of 2,680 cfs at cross section 69733). The Existing Condition modeling determined that flow does not overtop the south bank, in the vicinity of the Dawson Canyon Road Crossing, and thus does not model a split flow analysis at Dawson Canyon Road (i.e., removed the flow change at cross section 69733). To account for the existing split flow condition through the Rinker plant, 960 cfs is added to the flowrate for section 69955. The changes incorporated into the Existing Condition are summarized in Table 5.

Table 3 – Existing Condition Model Cross Sections Summary

Cross Section¹	Changes Incorporated Into Existing Model Cross Section Data
67548	Effective Model data
68448	Updated geometry based on existing topography
69198	“
69733	“
69773	Added a flow increase of 960 cfs to account for split-flow condition through the Rinker Plant. Removed flow change (previously showed a 2,680 cfs reduction)
Bridge	Updated bridge geometry and location based on survey (previously between cross sections 69733 and 69773)
69813	Updated geometry based on existing topography
70193	“
70743	“
71893	Effective Model data
72643	“
73193	“
73193	“

¹ Cross sections not shown on this table have been removed from the Existing Condition Model

Manning’s N values for the Existing Condition Model are consistent with the Effective Model.

HEC-RAS Files:

The following HEC-RAS files reflect the Existing Capacity Condition hydraulic model for Temescal Wash:

	<u>File:</u>	<u>Title:</u>
Project:	18602_CoronaClay_CCW.prj	18602A_CoronaClay_EffectiveModel
Plan:	18602_CoronaClay_CCW.p05	Existing_Condition
Geometry:	18602_CoronaClay_CCW.g06	Existing Condition
Flow:	18602_CoronaClay_CCW.f07	Existing_Flow

Proposed Condition Model

The Proposed Condition Model was prepared in HEC-RAS to model the proposed grading and surface improvements at the proposed site. Cross Sections 70193 and 70743 were updated with the proposed grading associated with the adjacent development and road improvements to create the Proposed Condition Model. Additionally, the project proposes a channel re-alignment of Coldwater Creek Wash, a tributary that outlets into Temescal Wash downstream of the Dawson Canyon Bridge Crossing in the existing condition. The modeling of this re-alignment included moving the full flow increase in Temescal Wash from Coldwater Creek Wash (3,500 cfs), located at Cross Section 68448 in the Existing Condition, to Cross Section 70743. The changes incorporated into the Proposed Condition are summarized in summarized in Table 5.

Table 4 – Proposed Condition Model Cross Sections Summary

Cross Section¹	Changes Incorporated Into Proposed Model Cross Section Data
67548	Matches Existing Condition Model
68448	“
69198	“
69733	“
69773	“
Bridge	“
69813	“

70193	Incorporated proposed grading on southern bank
70743	Incorporated proposed grading on southern bank and flow increase of 3,500 cfs from Coldwater Creek Wash
71893	Matches Existing Condition Model
72643	“
73193	“

¹ Cross sections not shown on this table have been removed from the Proposed Condition Model

HEC-RAS Files:

The following HEC-RAS files reflect the Existing Capacity Condition hydraulic model for Temescal Wash:

	<u>File:</u>	<u>Title:</u>
Project:	18602_CoronaClay_CCW.prj	18602A_CoronaClay_EffectiveModel
Plan:	18602_CoronaClay_CCW.p07	Proposed_Condition
Geometry:	18602_CoronaClay_CCW.g07	Proposed Condition
Flow:	18602_CoronaClay_CCW.f06	Proposed_Flow

3.0 HYDRAULIC RESULTS

As previously discussed, hydraulic models were created in the GeoHECRAS modeling software and the HEC-RAS v5.0.7 program was used to evaluate the hydraulic impacts to the proposed Coldwater Canyon Wash channel and Temescal Wash and analyze the effectiveness of proposed stabilization methods proposed in the Coldwater Canyon Wash channel design. The resulting 100-year storm event model output may be found in Appendices B and C.

Coldwater Canyon Wash Riprap Sizing

Tractive forces and velocities associated with the “velocity” and “maintained” runs were considered with respect to the minimum riprap size assigned to stabilize channel structures. Riprap size assigned with consideration to the guidelines provided by RCFC. Table 2 below

summarizes the riprap placement at drop structures. For comparison to the plans the stationing of the HEC-RAS cross-sections corresponds to the stationing of the channel improvement plan set. Standard riprap sizes are included in Appendix XX.

Table 5 – Drop Structure Riprap Protection Locations

Top of Drop Ras Station	Toe of Drop Ras Station	Vertical Drop (ft)	Start ¼ Ton Ras Station	Start ½ Ton Ras Station	Start 2 Ton - u.s. drop Ras Station	Start 2 Ton - d.s. drop Ras Station	End 2 Ton - d.s. drop Ras Station
2669.26	2376.9	19	2727.95	Concrete Lined 1683.93-2362.54		2348.17	333.8
2051	2035	4	2121.97	-	2075.66	-	1991.358
1703	1677	6	1775.14	1714.28	1703	-	1605.70

Lateral Storm Drain Design

One existing 54” storm drain discharges to Coldwater Canyon Wash near the upper limits of proposes improvements and is anticipated to convey flows in the proposed condition and is not anticipated to impact the results of hydraulic analysis presented by this report.

Temescal Wash Hydraulic Results

A summary comparison of the Effective, Existing Condition, and Proposed Condition 100-year water surface elevations (WSE) are provided in the table below.

Table 6– 100-yr WSE Comparison; Existing (Effective) vs. Proposed

Cross Section	Effective WSE ¹	Existing Condition WSE ¹	Proposed Condition WSE ¹	Difference (Proposed – Existing)
67548	910.15	909.23	909.23	0
68448	916.88	912.56	912.56	0
69198	922.17	917.51	917.51	0.0
69733	927.69	920.36	922.03	1.67
69773	931.97	922.42	923.33	0.91

Bridge	-	-	-	-
69813	932.13	926.01	926.89	0.88
70193	933.03	927.44	928.37	0.93
70743	933.76	930.27	931.54	1.27
71893	937.34	938.93	939.30	0.37
72643	945.65	942.34	942.35	-0.01
73193	947.01	946.87	946.87	0

¹WSE = 100-year Water Surface Elevation

Water Surface Elevations are in reference to NAVD 88.

As shown in the table, multiple cross sections experience rises in water surface elevations when comparing the Existing Condition to the Proposed Condition. However, it should be noted that, other than Cross Section 71893, the Proposed Condition water surface elevations are still lower than the Effective water surface elevations. This is due to the updated channel geometry based on the Existing Condition channel topography. Additionally, although the Proposed Condition shows a rise at Cross Section 71893 when compared to the Effective water surface elevation, the revised floodplain mapping shows a general decrease in the floodplain and floodway extents.

4.0 CONCLUSION

This report presents hydraulic analyses for the proposed realignment and stabilization of Coldwater Creek Wash and affected reach of Temescal Wash in support of the Temescal Valley Commerce Center project.

Appendix A
Hydraulic Backup

Coldwater Canyon Wash Geomorphology Study

Task 4 – Recommended Management Measures



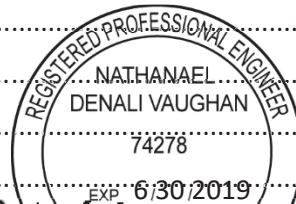
Nathanael Vaughan
10-25-18

October
2018

prepared for |
Riverside County Flood Control and Water Conservation District

Table of Contents

1	Introduction	4
1.1	Study Limits	4
1.2	Task Objectives	4
1.3	Reach Descriptions.....	4
1.4	Project Stationing.....	5
2	Geomorphic Assessment Review	8
2.1	Historical Overview	8
2.2	Task 1 Review	10
2.3	Task 2 Review	11
2.4	Task 3 Review	11
3	Improvement Periods	12
3.1	Near-Term	12
3.2	Pre-Pit Capture	13
3.3	Post-Pit Capture	14
4	CCW Corridor Management Activities	16
4.1	Proposed Public Agency Activities in the CCW Corridor	16
4.1.1	City of Corona Infiltration Basins	16
4.1.2	Riverside County Transportation Culvert at Temescal Canyon Road	16
4.1.3	RCFCWCD Basin.....	16
4.1.4	Squaw Mountain Road Bridge Scour Retrofit	16
4.1.5	Additional Monitoring and Maintenance	17
4.2	Proposed Private Development Activity	17
4.2.1	Reaches 1, 2, and 3: North of I-15 to Temescal Wash	17
4.2.2	Reaches 4,5 and 6: South of I-15 to Glen Ivy Road	20
4.2.3	4.2.3 Reach 7: South of Glen Ivy Road to the mouth of CCW	20
5	Management and Regulatory Framework	23
5.1	Protection of Public Infrastructure	23
5.2	Flood Hazard Zone Adoption	23
5.3	Development Standards	23
6	References	25



Nathanael Vaughan
10-25-18

Riverside County will require scour retrofit measures to be constructed. The scour retrofit plans have been drafted and are currently under County Transportation's review.

4.1.5 Additional Monitoring and Maintenance

While not presently at risk, several areas in public right-of-way are subject to possible future erosion hazards. Specifically, the slope adjacent to the Painted Hills community and the Trilogy Outfall will be subject to on-going monitoring and maintenance by the County.

While the slope at the Painted Hills community lacks engineered bank protection, a review of historical bank alignments (see previous reports for this study) indicates the right-bank position has not changed significantly during the period of review of this study. Should that condition change and active bank erosion is observed, RCFCWCD has acquired sufficient right-of-way to access the upstream section of slope and will place riprap to protect the slope if necessary.

The Trilogy Outfall, while showing no evidence of flows of significant magnitude, is subject to vertical degradation within CCW which may cause riprap at the outfall terminus to launch into CCW. Riverside County will monitor this condition and may apply additional rock as needed to stabilize the stone chute.

4.2 PROPOSED PRIVATE DEVELOPMENT ACTIVITY

4.2.1 Reaches 1, 2, and 3: North of I-15 to Temescal Wash

The reaches downstream of I-15 are subject to private commercial development which, through the development process, will mitigate the flood hazards present in the reaches.

Specifically, the Serrano Commerce Center planning documents depict collecting CCW immediately downstream of I-15 along the wash's historic flow path through Reach 3 (Proactive Engineering Consultants, 2006). Near the downstream terminus of the development, a re-alignment of Temescal Canyon Road is proposed which would cross CCW. As stated in the planning documents, the channel is intended to be an earthen bottomed, steep-sided channel with bank protection, grade control structures, and maintenance access points. The stated intent is for the developer to transfer ownership and maintenance of the channel to RCFCWCD. Figure 5 shows the extent and location of proposed improvements.

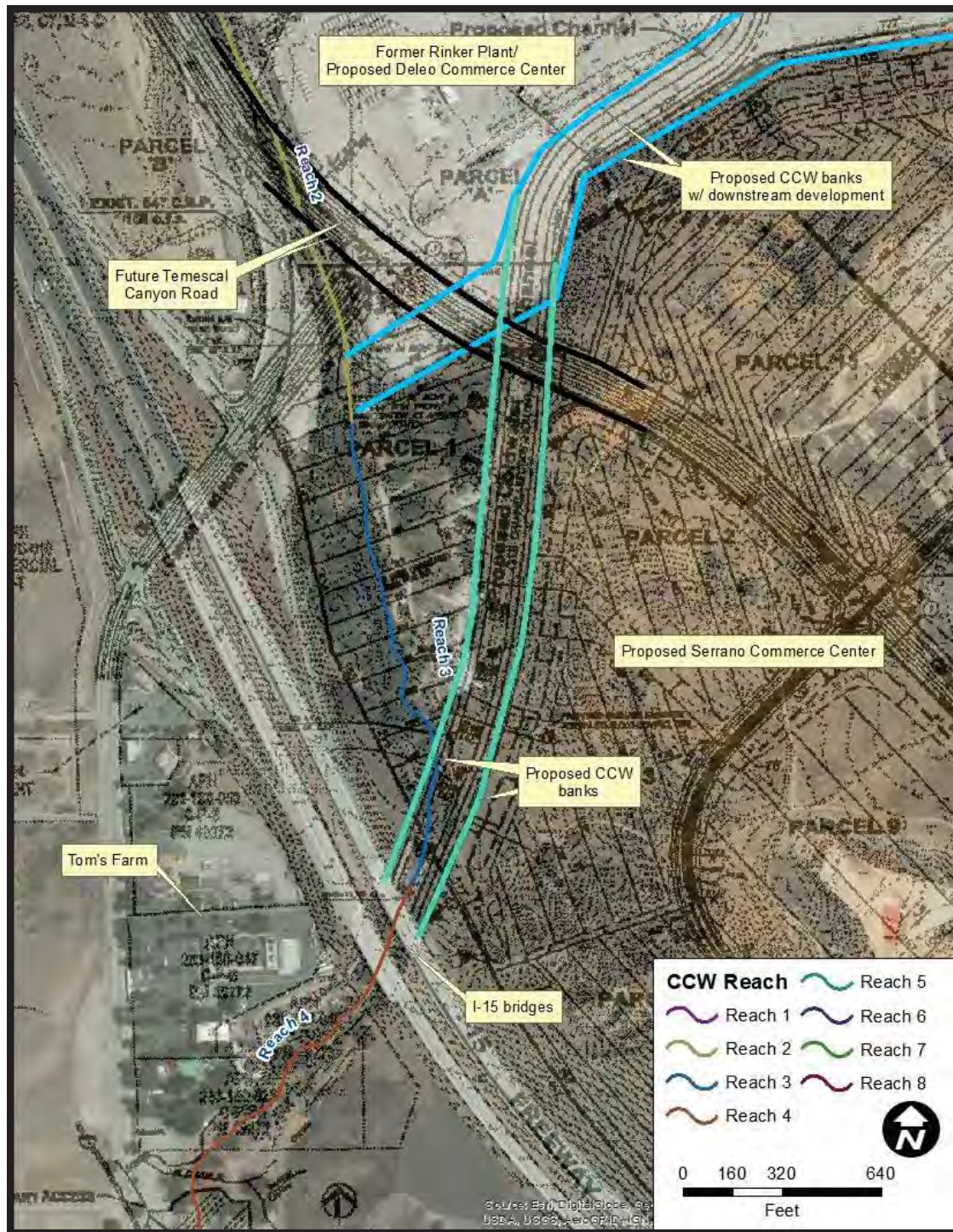


Figure 5 - CCW at Serrano Commerce Center

Immediately downstream of the Serrano Commerce Center, the Deleo Commerce Center has submitted a pre-application review (PAR) to RCFCWCD (Proactive Engineering Consultants West, Inc., 2017). The Deleo PAR documentation indicates an understanding of the possible upstream development and shows an interim routing of CCW with future re-alignment at the upstream end of the project “by others”. The

Deleo PAR explicitly indicates grade control structures and bank slopes, but bank protection methods are not detailed. **Figure 6** shows the extent and location of the proposed improvements.



Figure 6 - CCW at Deleo Commerce Center

Coldwater Canyon Wash Geomorphology Study

Task 2/3 – Future Erosion and Equilibrium Assessment



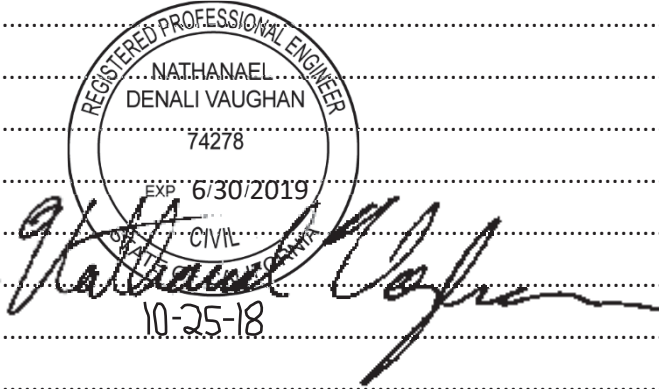
Nathanael Vaughan
10-25-18

October
2018

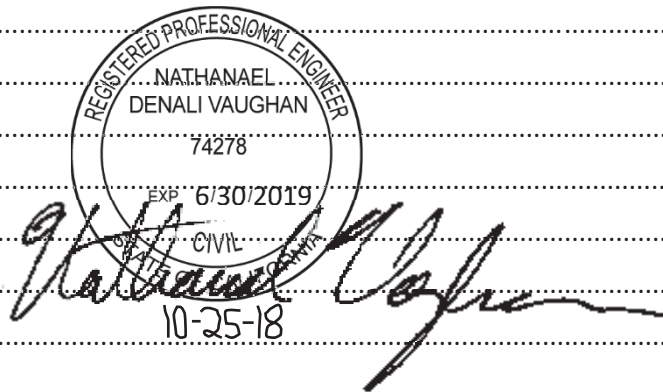
prepared for |
Riverside County Flood Control and Water Conservation District

Table of Contents

Executive Summary.....	i
1 Introduction	1
1.1 Study Limits.....	1
1.2 Task Objectives	1
1.3 Reach Descriptions.....	2
1.4 Project Stationing.....	2
2 Geomorphic Assessment Review	5
2.1 Historical Overview	5
2.2 Task 1 Review.....	7
3 Hydrology	9
3.1 Previous Hydrology Analyses	10
3.2 Methodology.....	12
3.3 Results.....	14
3.4 2010 Event Hydrology	16
3.4.1 Trilogy Hydrology for 2010 Event	16
4 Sediment Distribution	20
4.1 Sediment Sampling	20
4.2 Armoring	24
4.3 Synthetic Historical Gradation	25
4.4 Sediment Gradation Reaches.....	28
5 Hydraulic and Sediment Transport Modeling.....	30
5.1 Model Development	30
5.1.1 Hydraulic Model.....	30
5.1.2 Sediment Transport Model	35
5.2 Model Results	38
5.2.1 Steady State Hydraulic Results.....	38
5.2.2 Sediment Transport Results.....	45
5.3 Model Validation.....	48
5.3.1 Hydraulic	48
5.3.2 Sediment	50
6 Future Erosion Assessment.....	52
6.1 Geomorphic Trend Analysis	52



6.1.1	Lateral change	52
6.1.2	Vertical Change	62
6.1.3	Temescal Wash	65
6.2	Geomorphic Channel Pattern Relationship	66
6.2.1	Methodology	66
6.2.2	Results	67
6.3	Channel Geometry Characteristics Analysis	70
6.3.1	Methodology	70
6.3.2	Results	73
6.3.3	Summary	75
6.4	Stable Bank Slope	79
6.5	Erosion Resistance Assessment	81
6.5.1	Vertical Erosion	81
6.5.2	Lateral Erosion	83
6.6	Flood Hazard Zones	85
6.7	Sediment Volume Comparisons	87
6.8	Sediment Continuity	88
6.8.1	Channel Response to Large Events	88
6.8.2	Long-term Channel Response	89
7	Equilibrium Assessment	92
7.1	Dominant Discharge	92
7.2	Equilibrium Slope	94
7.3	Sediment Continuity	96
7.4	Conclusion	97
8	Conclusions	98
8.1	Hydrology	98
8.2	Equilibrium Trends	98
8.3	Future Trends	99
8.3.1	Reach-by-Reach Summary	99
9	References	104



List of Figures

Figure 1. Project study reach vicinity map.....	3
Figure 2. Project Control Stationing.....	4
Figure 3. Contributing Watersheds.....	9
Figure 4. Recurrence Interval Hydrographs.....	15
Figure 5. 2010 Event Hydrograph.....	16
Figure 6. Debris Deposit at Upstream Headwall of Trilogy Culvert near Temescal Canyon Road.....	18
Figure 7. Google Earth Imagery Dated 3/10/2011 of Trilogy Channel	18
Figure 8. Google Earth Imagery Dated 3/10/2011 of Trilogy Confluence with Coldwater Canyon Wash..	19
Figure 9. Sediment Sample Locations.....	21
Figure 10. Armor layer downstream of Temescal Canyon Road.....	25
Figure 11. Vertical degradation downstream of I-15.....	25
Figure 12. Armor layer upstream of Squaw Mountain Road.....	25
Figure 13. Grain Size Distributions for Current Study.....	26
Figure 14. Sediment Gradation Reaches.....	29
Figure 15. HEC-RAS Cross-Section Locations.....	30
Figure 16. HEC-RAS Cross-Section Locations, cont.....	31
Figure 17. HEC-RAS Cross-Section Locations, cont.....	31
Figure 18. Downstream Lateral Weirs.....	34
Figure 19. 50 Year Probable Storm Sequence.....	36
Figure 20. Hydraulic Depth Results (Project Stationing).....	38
Figure 21. Velocity Results (Project Stationing).....	39
Figure 22. Top Width Results (Project Stationing).....	39
Figure 23. HEC-RAS Lateral Structure Location.....	41
Figure 24. 100-year Flood Inundation Limits and Breakout Locations Near Hot Springs.....	41
Figure 25. 100-Year Flood Inundation at Glen Ivy Road.....	42
Figure 26. 2-Year Flood Inundation at Glen Ivy Road.....	43
Figure 27. Invert Change.....	46
Figure 28. Sediment Throughput.....	47
Figure 29. Hydraulic Model Validation Upstream of I-15.....	49
Figure 30. Hydraulic Model Validation at Temescal Canyon Road.....	49
Figure 31. HEC-RAS Sediment vs. Channel Topographic Difference.....	51
Figure 32. Channel Banks Spatial Summary.....	53
Figure 33. Station Alignment and Reference Cross-Sections.....	54
Figure 34. Left Bank Lateral Change (1948 – 2014).....	55
Figure 35. Right Bank Lateral Change (1948 – 2014).....	56
Figure 36. Selected Reach Left Bank Lateral Change (1948 – 2014).....	57
Figure 37. Selected Reach Right Bank Lateral Change (1948 – 2014).....	58
Figure 38. Longitudinal Profile for the Study Reach.....	63
Figure 39 - Google Earth Imagery Dated 4/2014.....	65
Figure 40. Stable Slope Projection	80
Figure 41. Required Armoring Size for 2010 Event.....	82
Figure 42. Depth to Armor for 2010 Event	82
Figure 43. Depth to Armor for Specified Flow Recurrences as a % of 2010 Event Depth to Armor.....	83

Figure 44. Bank Erosivity Hazard Index Results.	84
Figure 45. Volume Change between 2009 and 2015 along CCW (vertical extents limited to show detail where results are valid)	87
Figure 46. HEC-RAS Volume Change vs Observed Volume Change (vertical extents limited to show detail where results are valid)	88
Figure 47. 100-Year Sediment Transport Results.	89
Figure 48. 50 Year Sequence Invert Change.	90
Figure 49. 50 Year Sequence Cover Layer D_{50}	91
Figure 50. Probability-Weighted Sediment Throughput.....	93
Figure 51. Equilibrium Sediment Transport Results.	97
Figure 52. Study Reaches.	100
Figure 53. 2017 Single Event Erosion at Tom's Farms	102

List of Tables

Table 1. Hydrologic Modeling parameters.	12
Table 2. NOAA Atlas 14 Point Precipitation Depth.	13
Table 3. Peak Discharge Hydrology by Duration at Trilogy Confluence.....	14
Table 4. 6-Hour Peak Discharge	14
Table 5. Sediment Sample Grain Size Distribution – Bucket Samples.	22
Table 6. Sediment Sample Grain Size Distribution – Pebble Count Samples.....	23
Table 7. Grain Size Distributions for Current Study.	27
Table 8. Sediment Gradation Reaches.	28
Table 9. Roughness Coefficients.	32
Table 10. Modeled Bridges and Culverts.	33
Table 11. Hydraulic Structure Performance.....	40
Table 12. Downstream Lateral Weir Performance.	44
Table 13. Lateral Migration Change Summary.....	59
Table 14. Average Annual Lateral Migration Distances by Reach.	62
Table 15. Vertical Change Trend Analysis Summary.....	64
Table 16. Channel Pattern Analysis Results.	68
Table 17. Channel Pattern Analysis Results, cont.	69
Table 18. Channel Geometry Regime Equation Results.	76
Table 19. Equilibrium Slope Results.	96

Appendices

Appendix A – Digital Data Submittal

Appendix B – Flood Hazard Exhibit

5 HYDRAULIC AND SEDIMENT TRANSPORT MODELING

Numerical modeling of Coldwater Canyon Wash was performed to understand and quantify both the hydraulic performance of the wash as well as the geomorphic response of the wash to specific flow events. Hydraulic and sediment transport modeling was conducted using the Hydrologic Engineering Center River Analysis System (HEC-RAS) version 5.0.3 developed by the US Army Corps of Engineers. The results of these models were both directly used to assess CCW as well as aid in other analytical approaches used in this study.

5.1 MODEL DEVELOPMENT

The following sections below outline the development of the hydraulic and sediment transport model.

5.1.1 Hydraulic Model

Specific elements of the hydraulic model development are discussed below. As the hydraulic model was developed concurrently with the sediment transport model, sediment specific elements of the model are discussed in Section 5.1.2.

5.1.1.1 Cross-Section Alignment and Geometry

Alignment of cross-sections in HEC-RAS was based on aerial imagery, field reconnaissance, and elevation data. Care was taken in the alignment configuration to ensure that lower magnitude flows (10-year and less) were captured with the appropriate cross-section geometry; for sediment transport modeling minor changes in velocity and depth for more frequent events can substantially alter results. A total of 333 cross-sections were included in this model, and they were located approximately every 40 feet along the channel thalweg. Cross-section geometry was extracted from the 2015 and 2016 topographic datasets provided by the RCFCWCD. **Figure 15** through **Figure 17** below depict the location and orientation of the cross-sections used in the model.

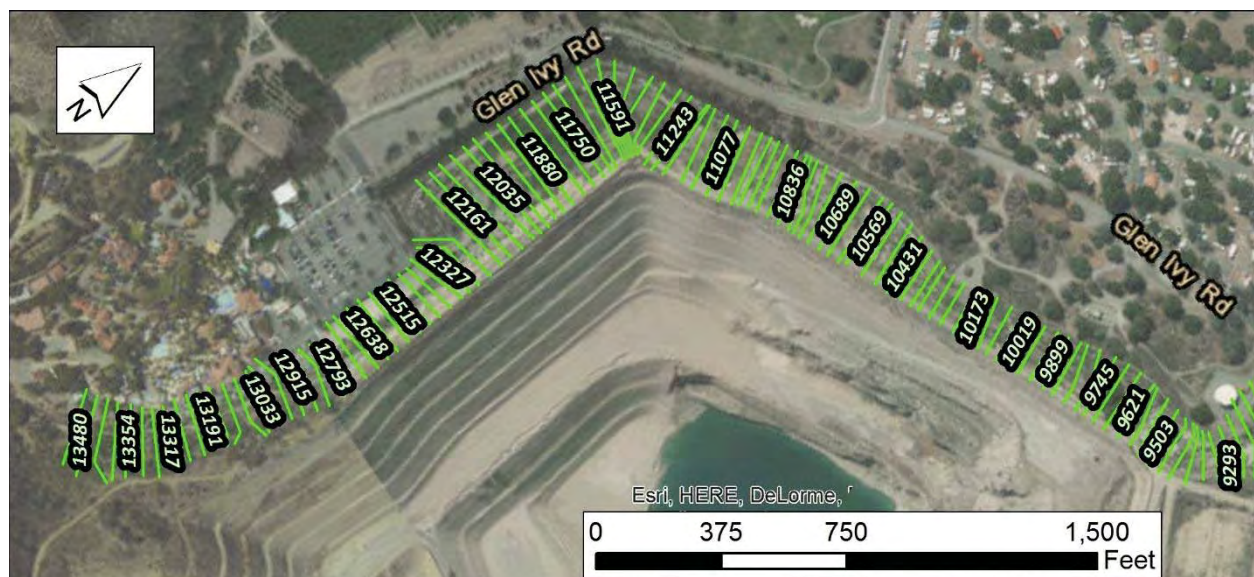


Figure 15. HEC-RAS Cross-Section Locations.



Figure 16. HEC-RAS Cross-Section Locations, cont.



Figure 17. HEC-RAS Cross-Section Locations, cont.

5.1.1.2 Hydraulic Roughness

Manning *n*-values were estimated for the left and right overbanks as well as the channel. **Table 9** below lists the values used on the model based on surface conditions. Land uses in the study reach were delineated manually using 2015 aerial mapping.

The channel bottom was mostly characterized as gravel with low to medium vegetation. The highly-vegetated reach downstream of I-15 was designated with a Dense Vegetation land use. Asphalt and concrete comprised the pavement land use. The fine-gravel land use was mostly found on roadway shoulders and parking lots. The grass/tree land used was primarily used to characterize overbank flow

areas, and the riprap land use was used to establish roughness in select areas where large riprap was present (e.g., I-15 grade control).

Table 9. Roughness Coefficients.

Land Use	<i>n</i> -value
Gravel – Low Vegetation	0.047
Gravel – Medium Vegetation	0.065
Smooth Gravel	0.032
Grass with Intermittent Trees	0.060
Dense Vegetation	0.090
Pavement	0.018
Riprap	0.074

Limited calibration data is available within the project corridor with which to calibrate *n*-values to actual flow events. The best available calibration data is associated with the December 2010 flood event; YouTube video from the event and site photos from Tom’s Farms were the only calibration data available for use. Comparisons with these data sources indicated the Manning’s values are appropriate for the discharge observed.

5.1.1.3 Inflow Hydrology

Recurrence interval peak discharge was used for the steady state hydrologic inflow (**Table 4**). Two inflow locations were included: the upstream boundary of the model (the outlet of Coldwater Canyon) and the outlet of the Trilogy development (RS 6402). The peak discharge for the 2010 event was computed using the spreadsheet model outlined above. A single inflow location was used at the upstream end of the model for this event.

5.1.1.4 Boundary Conditions

Both upstream and downstream boundary conditions utilized normal depth condition types. The upstream slope was measured as 0.049 ft/ft based on the topographic dataset, and the downstream boundary slope was set to 0.005 ft/ft.

5.1.1.5 Culverts and Bridges

Several bridges and culverts are present within the study reach, and they are listed below in **Table 10**. Field measurements were used to characterize the culvert dimensions and inverts. Record set as-builts from Caltrans were used to obtain the measurements for the Interstate-15 bridges. The Squaw Mountain bridge geometry was obtained from a District-provided scour analysis previously performed at this location.

The culverts were modeled in HEC-RAS using the bridge/culvert routine. Roadway profiles were established using the 2015 topographic dataset. The three bridges were modeled using a cross-section / lid approach. The sediment transport routine has known instability issues surrounding the pier hydraulics, and initial iterations of this modeling exercised exhibited significant and unrealistic oscillations in bed elevations near the piers. Following recommendations in the HEC-RAS User’s Manual,

the bridges were replaced with cross-sections. The piers were modeled with station/elevation data, and the roadway was modeled with a lid.

Table 10. Modeled Bridges and Culverts.

Project Control Station	HEC-RAS Station	Description	Feature Type	HEC-RAS Structure Type
608	771	Dawson Canyon Road	Culvert (2 – 7' x 16' RCBC)	Culvert / Roadway
987	1206	Rinker Plant Entrance	Culvert (4 – 60" CMP)	Culvert / Roadway
4290	4784	I-15 Northbound	Bridge / Pier	Lidded Cross-section
4452	4961	I-15 Southbound	Bridge / Pier	Lidded Cross-section
6327	6896	Squaw Mountain Road	Bridge / Pier	Lidded Cross-section
8237	8925	Glen Ivy Road	Culvert (5 – 24" RCP)	Culvert / Roadway

5.1.1.6 Lateral Weirs

Initial iterations of hydraulic modeling suggested there was containment of the 100-year discharge for most of the study reach, and that no significant breakouts exist for the upstream portion of the reach. Downstream of I-15, and adjacent to the Rinker plant, the existing channel becomes narrower and shallower. Moving in the downstream direction, the channel begins to lose containment of the 100-year discharge at RAS Station 2487 along the right bank. **Figure 18** depicts the general flow paths outside of the main channel.

A lateral weir was applied in HEC-RAS to allow for flow to spill into the Rinker plant pad. The topography of the plant was examined to ensure that flow entering would not return to CCW, rather it would pond and eventually flow directly into Temescal Wash. This lateral weir extends approximately 1,900 feet and terminates downstream at Dawson Canyon Road. At that point, containment along the right bank is achieved for the downstream extent of the model. This is in part due to a higher bank elevation relative to the channel, but also because a significant volume of water is diverted into the Rinker plant pad prior to reaching this point.

The discharge in CCW also begins to lose containment on the left side of the wash starting around RAS Station 1359. Flow that crests the bank and roadway (Temescal Canyon Road) is limited, however, to one-dimensional flow as it is constrained further to the left by topographical features. This flow is further constrained by a building which consolidates flow at RAS Station 885. Based on the topography, flow on the roadway as well as all flow to the left at this longitudinal point would continue down the roadway and out of the model. Given the limitations of the one-dimensional model, this flow was not removed and was retained in the channel. A bank station was applied at the point in RS 885 where this break would occur to quantify the overestimated discharge. The 100-year discharge at this point is 3,307 cfs, and the discharge in the left overbank is 520 cfs. While this results in a 19% overestimation of flow downstream of RAS Station 885, the results for the 10-year flow indicate less than 1% of the flow is overestimated. This compromise is valid considering the primary effects of overestimation of flow

downstream will be sediment-related, and that sediment modeling is primarily focused on smaller events.

A second lateral weir was applied at RAS Station 600 to model the overflow along the left bank. The topography was examined to ensure that flow entering this overbank does not return to CCW. Flow exiting through this structure is routed toward Temescal Wash through an existing driving range.

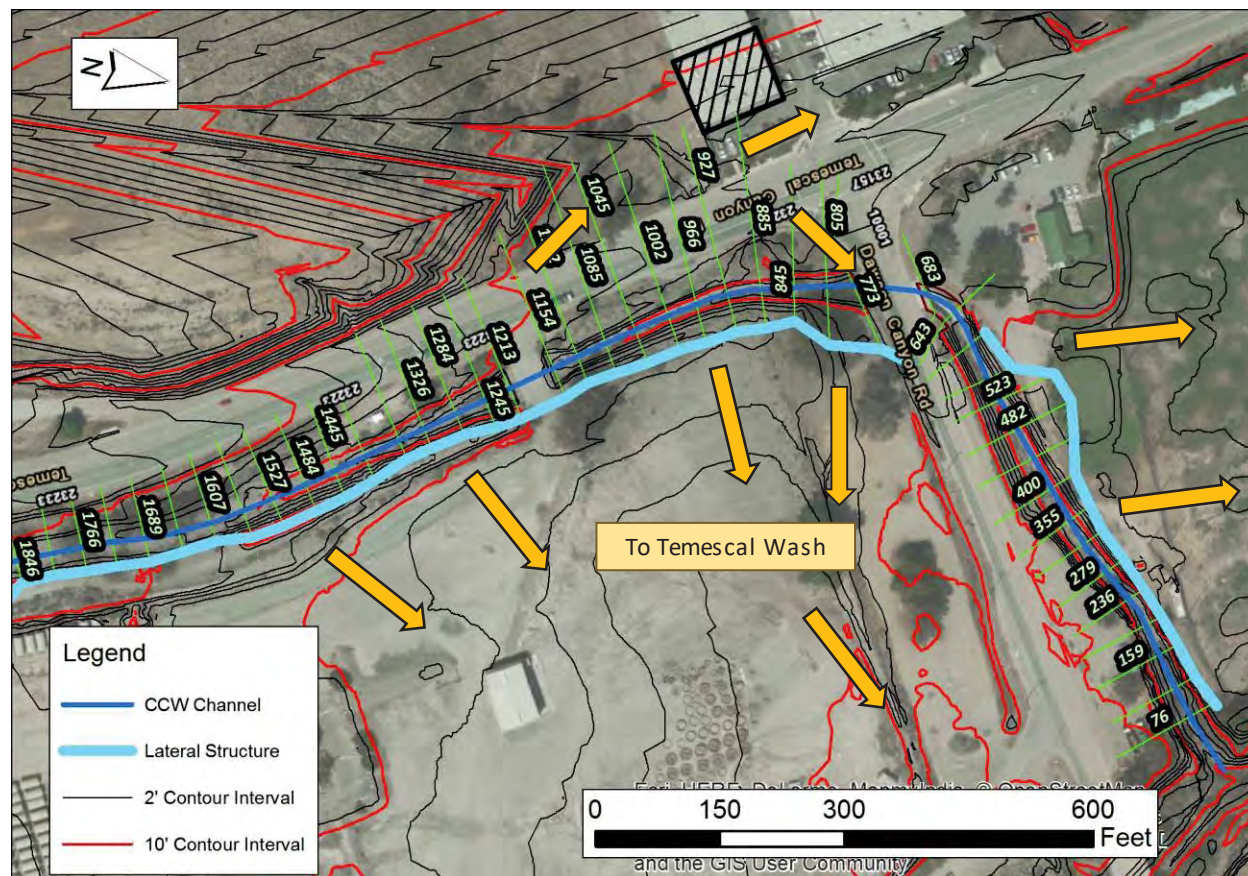


Figure 18. Downstream Lateral Weirs.

5.1.1.7 Levees and Ineffective Flow

The use of levees in this model were primarily limited to model structures that would retain or divert flow (e.g., flood walls). Two such walls (located between RAS Station 13561 and 13275 as well as between Ras Station 12677 and 12327), located near the Glen Ivy Hot Springs were included. For a FEMA floodplain study, additional levee features would need to be identified and modeled per FEMA guidelines.

Ineffective flow areas were applied throughout the model. The crossing of CCW over Glen Ivy Road and Temescal Canyon Road presented several challenges, as the flow pattern is highly two-dimensional both in flow direction as well as water surface elevation. Ineffective flows were assigned liberally in this area in order constrain flow to paths that were tracked longitudinally upstream to downstream, and this exercise was done for all recurrence intervals.

5.1.2 Sediment Transport Model

The most recent release of HEC-RAS introduced the ability to model sediment transport with unsteady hydraulics, in addition to the previously-available quasi-unsteady method. While the quasi-unsteady hydraulic approach does not conserve volume, it is more suited for situations where unsteady hydraulic modeling would likely yield numerical instability (e.g., steep slopes, high velocities, or high energy). Further, the HEC-1 modeling performed in this study included routing from the mouth of Coldwater Canyon to the confluence with the Trilogy development to allow for hydrologic flow attenuation through flow routing. The 6-hour 100-year results suggest minimal attenuation, as the peak discharge is reduced by only 1% (3,455 cfs to 3,425 cfs, which is well within the rounding error for planning purposes). Little attenuation is expected, as there is sufficient containment of the 100-year event in the main channel with the only exception at the intersection of Glen Ivy Road and Temescal Canyon Road. The full containment assumption, however, does not account for bank stability and erosion resistance. Given the lack of anticipated attenuation coupled with the high slope and low channel uniformity, quasi-unsteady hydraulic modeling was selected for use in the sediment transport modeling in this study.

5.1.2.1 Inflow Hydrology

The following hydrologic sequences were used in the sediment transport modeling task:

- 2-Year, 5-Year, 10-Year and 100-Year individual events
- 2-Year with extended peak discharge
- 50 year probable storm sequence
- 2010 storm event

The 2-, 5-, and 10-year events were modeled to computationally derive the dominant discharge, and the 100-year event was modeled to assess the response of the wash to a large, single flooding event. The analysis performed in **Section 7.1** indicates the 2-year hydrograph yielded the greatest amount of sediment transport “work”. The peak of this event was then extended for a duration of 400 hours to provide a comparison for the equilibrium slope analysis performed in this study. The 50-year probable storm sequence represents a statistically probable series of events over a 50-year period. This sequence includes fifteen 2-year events, five 5-year events, three 10-year events, one 25-year event, and one 50-year event. The temporal distribution of these events was based on random sampling. Lastly, the 2010 storm event was modeled to provide comparison between model results and measurable changes in the channel geometry before and after the event.

Flood hydrographs were taken from the spreadsheet modeling (see Section 3.1) and discretized into 0.25 hour intervals while preserving the peak discharge of each hydrograph. The computational interval was set to 3.75 minutes for flows less than 100 cfs. For larger flows the computational interval was set to 0.9375 minutes to provide higher temporal resolution to the sediment transport computations.

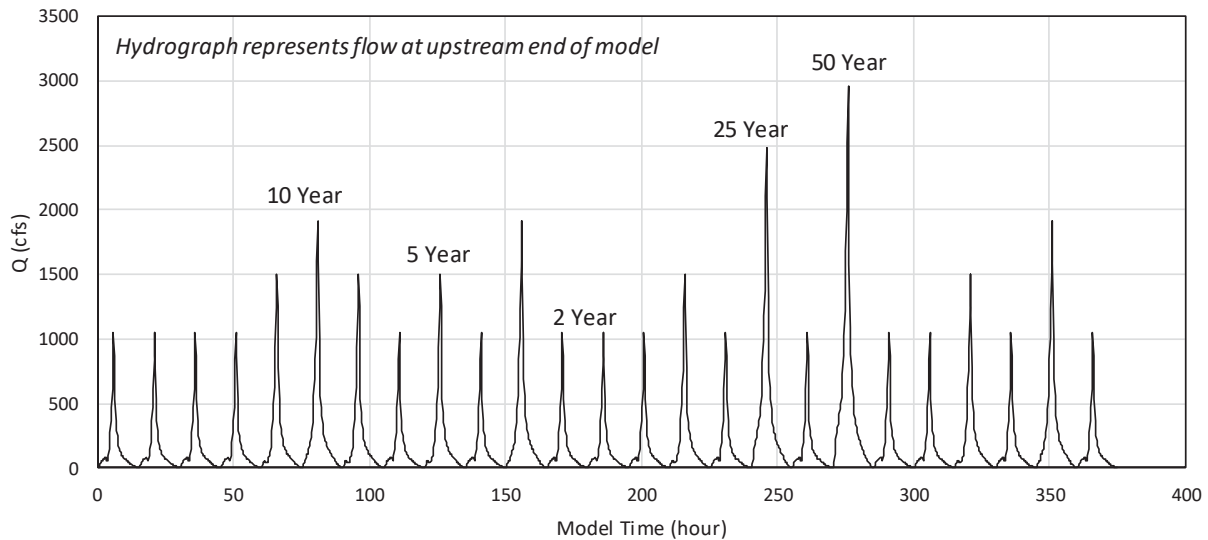


Figure 19. 50 Year Probable Storm Sequence.

5.1.2.2 Sediment Transport Potential/Function

In the context of HEC-RAS, sediment transport potential is the transportable mass of a particular grain class in response to hydraulic characteristics of a cross-section. HEC-RAS includes the option to select from eight transport functions. The HEC-RAS hydraulic reference manual provides descriptions of each transport function and the applicability of it to riverine systems based on sediment composition. Based on these descriptions, only four methods are applicable to Coldwater Canyon Wash (Laursen-Copeland, Meyer-Peter Müller, Yang, and Wilcock). A more comprehensive comparison of these four methods was made using the SAM Hydraulic Design Package developed by the US Army Corps of Engineers (Thomas et al., 2002). The software package SAM-AID assess given hydraulic and sediment parameters and returns the first, second and third most applicable transport function. The criteria for determining the results are detailed in the supporting documentation of the software. Data representing average hydraulic and sediment data in Coldwater Canyon Wash (Velocity: 5 – 10 fps, Width: 100 – 300 feet, D_{50} : 18 – 44 mm, S : 0.025 ft/ft, Depth: 1 – 7 feet). Sensitivity to each parameter was tested, and it was found that the D_{50} was the driving force behind the selection of the optimal methodology. The highest rated transport function available in HEC-RAS is the Yang methodology, and this approach was used for the entirety of this study for both HEC-RAS sediment transport modeling as well as equilibrium slope analyses.

5.1.2.3 Sorting Methodology

Bed sorting routines in HEC-RAS tracks the distribution of the sediment gradation at each cross-section. The dynamic gradation is used to compute grain class-specific transport capacities as well as to simulate armoring processes which directly affect sediment supply. Armoring of the stream bed occurs when a coarser particle layer covers the full bed gradation or as finer, transportable sediment particles are preferentially removed from the bed material and larger material remains. Bed mixing algorithms divide the bed into horizontal layers, often an active and inactive layer. Three options are available for use in

HEC-RAS. The Thomas (Ex5) approach was selected for use in this study, as the other two approaches were developed for more specialized cases, including sand bed rivers (Copeland Ex7) and for use with the Wilcock and Crowe transport methodology (Active Layer). In addition, the Thomas approach has been shown to appropriately model armoring development, and it is the default method in HEC-6 and earlier version of HEC-RAS.

5.1.2.4 Fall Velocity

The fall velocity of a sediment particle controls how fast particles can drop out of the water column and deposit. Five algorithms for computing the sediment fall velocity are available for use in HEC-RAS. The Rubey method was selected as it has been shown to be adequate for silt, sand, and gravel grains. Further, the example hand calculations of the Yang transport method in the HEC-RAS Hydraulic Reference Manual include the Rubey approach for computing fall velocity.

5.1.2.5 Temperature

Sediment transport mechanics are sensitive to temperature, and a time series of temperature can be specified in the model. Given the general nature of this modeling approach (i.e., years as compared to hours), a temperature of 63°F was used and held constant throughout all simulations. This value represents the mean annual temperature of Corona, CA (Western Regional Climate Center 042031, www.wrcc.dri.edu) which is approximately 15 miles north of the project location.

5.1.2.6 Sediment Inflow

The sediment transport modeling exercise is primarily intended to inform on potential changes to the wash downstream of Glen Ivy Road, which is more than 4,000 ft downstream of the upper boundary of the model. The equilibrium load boundary condition was used to quantify the sediment inflow into the model, which directs HEC-RAS to compute the equilibrium transport capacity for each time step and grain class at the upstream-most cross-section. This was determined to be an appropriate estimate for sediment inflow given the large degree of hydraulic non-uniformity between the boundary condition and Glen Ivy Road.

5.1.2.7 Lateral Weir Considerations

Two lateral weirs are defined in the HEC-RAS geometry. In both cases, the overflow elevation is considerably higher than the channel invert, therefore higher than the zone of bed load transport. The flow weighted approach was selected to route sediment out of the main channel, however only grain classes finer than medium sand was diverted. Flow optimization to account for the feedbacks between flow diversion and water level was selected.

5.2 MODEL RESULTS

Results from the HEC-RAS modeling exercise includes longitudinal hydraulic properties of CCW, flooding inundation, as well as sediment transport results. This section outlines the significant results.

5.2.1 Steady State Hydraulic Results

The results of the hydraulic modeling indicate that the study reach is primarily dominated by subcritical flow, with the exception of a handful of distinct locations, most often occurring at drops. Starting at the upstream boundary, the flow is contained where it then enters the first infiltration basin. At this point, the flow spreads out laterally and the energy slope drops dramatically. Throughout this reach of infiltration basins there exists a pattern of slow, deep flow alternating with concentrated swift flow transitioning from one basin to the next. Flow is contained for the 100-year discharge throughout the infiltration basin reach. Upon exiting from this reach the flow widens and splits across Glen Ivy Road and Temescal Canyon Road. Downstream toward I-15 the flow is confined within the channel banks entirely. The flow gradually transitions into narrow and deeper flow as well as slightly swifter. Downstream of I-15 the depth increases significantly for the 100-year discharge, which is mostly due to the high degree of roughness imposed by the thick vegetation in this reach. Thereafter the 100-year depth gradually decreases as flow is lost to the left and right from lack of confinement.

5.2.1.1 Longitudinal hydraulic properties

Key hydraulic results by cross-section are shown below in **Figure 20** through **Figure 22**.

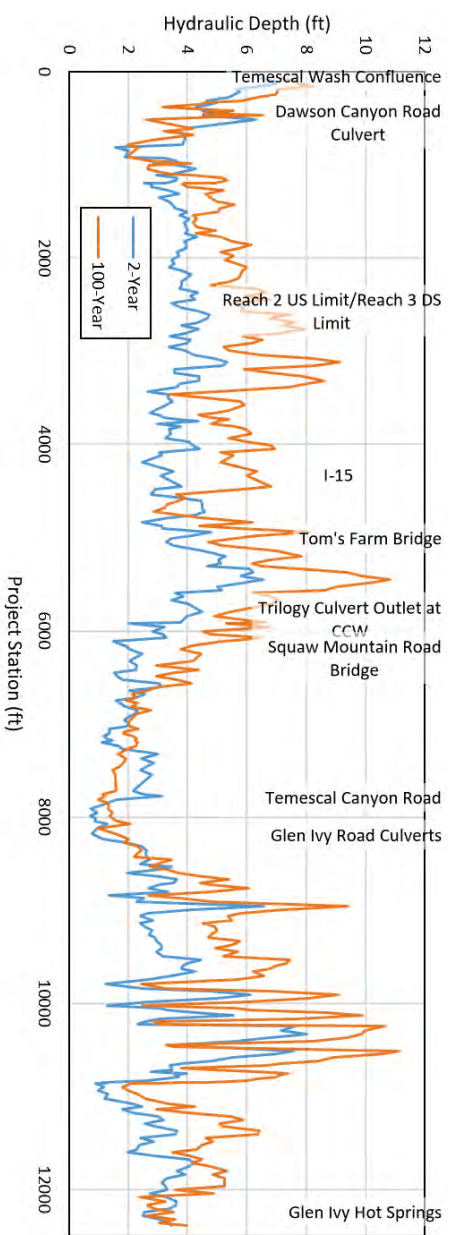


Figure 20. Hydraulic Depth Results (Project Stationing).

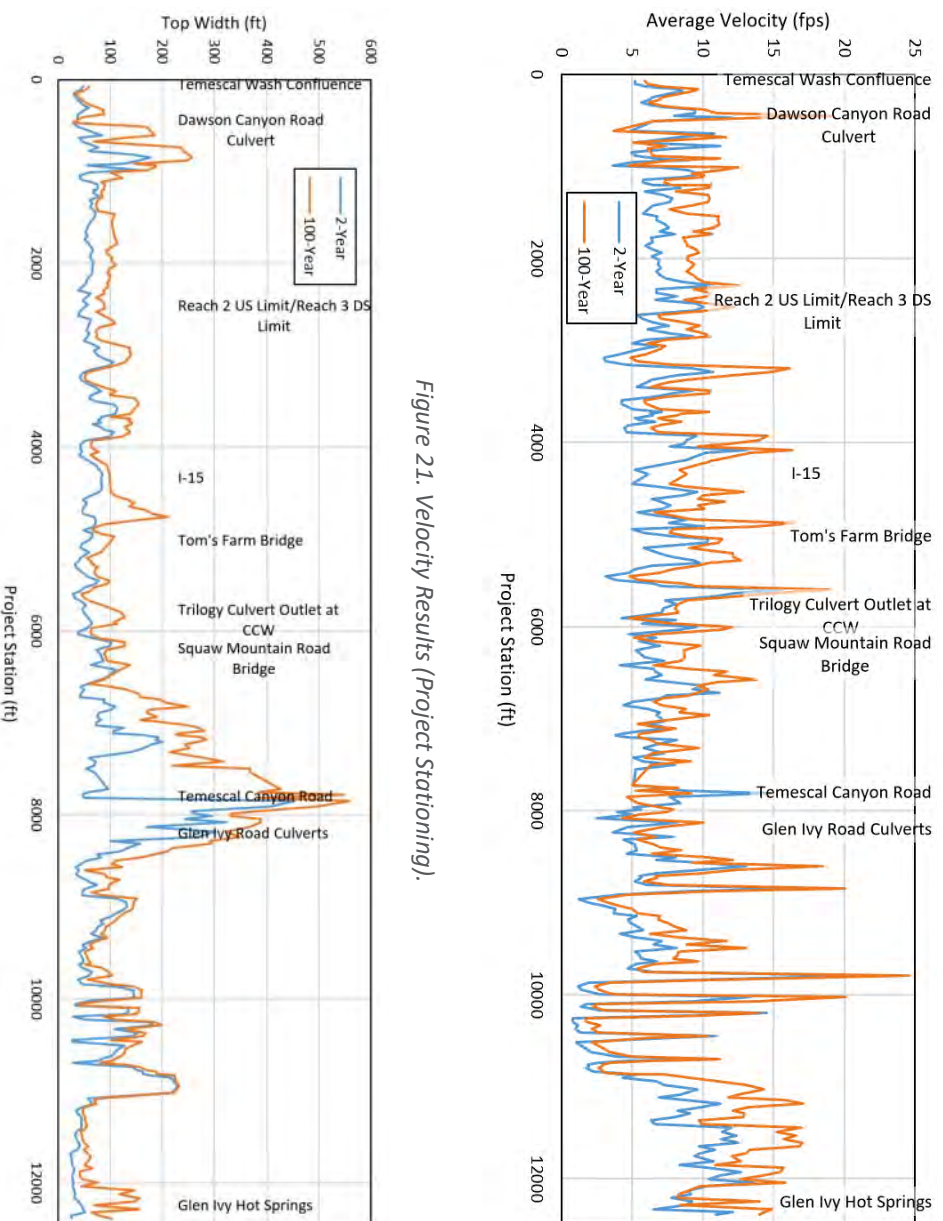


Figure 21. Velocity Results (Project Stationing).

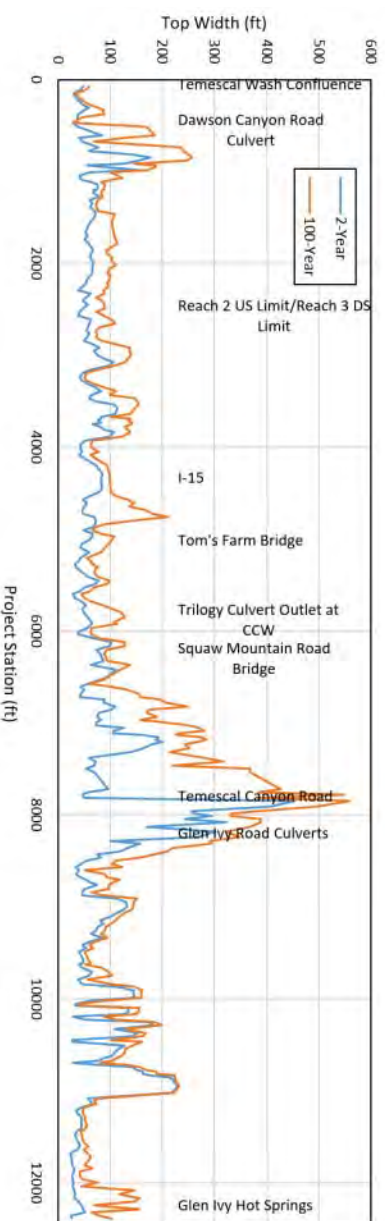


Figure 22. Top Width Results (Project Stationing).

5.2.1.2 Structure Performance

The six structures included in this modeled were assessed for their hydraulic performance. **Table 11** below lists the structures as well the flow rate through each. While the three bridges were not explicitly modeled as bridges in HEC-RAS, the water surface elevation results relative to the cross-section lid were used to assess whether or not capacity had been met. The results show substantial issues with regards to insufficient hydraulic capacity at the culvert locations.

The Glen Ivy Road culvert array has capacity to convey only 11% of the 2-year discharge. Based on this, this culvert was able to convey about a quarter of the peak flow caused by the 2010 event. The backwater caused flow to spill to the right which caused the inundation of the adjacent streets. The Rinker plant entrance culvert has a higher capacity, however it is still only able to convey 45% of the peak 2-year discharge (albeit the peak at this location is about 500 cfs higher than at Glen Ivy Road). The most downstream culvert, located at Dawson Canyon Road, is able to fully convey the 2-year discharge without overtopping, however the performance is insufficient for the 5-year discharge and greater events; only 69% of the 10-year discharge is conveyed by the culvert.

Table 11. Hydraulic Structure Performance.

	Type	Structure Discharge (cfs) and Percentage of Inflow (%) Conveyed by Structure											
		2-Year		5-Year		10-Year		25-Year		50-Year		100-Year	
Glen Ivy Road	RCP	120	11%	125	8%	128	7%	131	5%	134	5%	136	4%
Squaw Mountain Road	Bridge/Pier	1,052	100%	1,509	100%	1,917	100%	2,490	100%	2,963	100%	3,455	100%
I-15 Southbound	Bridge/Pier	1,595	100%	2,344	100%	2,957	100%	3,822	100%	4,526	100%	5,247	100%
I-15 Northbound	Bridge/Pier	1,595	100%	2,344	100%	2,957	100%	3,822	100%	4,526	100%	5,247	100%
Rinker plant entrance	CMP	715	45%	708	30%	733	25%	755	20%	768	17%	771	15%
Dawson Canyon Road	RCBC	1,595	100%	2,023	86%	2,032	69%	1,990	52%	1,902	42%	1,828	35%

5.2.1.3 Flood Inundation

The entirety of the 100-year discharge is confined to the main channel and overbanks for much of the study reach. The exceptions to this are discussed in this section.

Near Glen Ivy Hot Springs, the 100-year flow break out of the channel along the left bank in several locations. In the vicinity of the most expansive breakout location, a lateral structure was defined within the HEC-RAS model to determine the magnitude of discharge leaving the channel at this location; see **Figure 23** for a graphical depiction of the lateral structure location. For the 100-year discharge, approximately 320 cfs enters the Hot Springs property from the channel at this location. **Figure 24** shows the location of the wider breakout as well as two smaller breakout locations downstream. A wall, built along the interior edge of the Hot Springs maintenance road appears to intercept the middle of the three breakouts, however, engineering for the wall was not available for this study and the wall has not been assumed to be suitable for flood protection. After exiting the channel, breakout flows are anticipated to travel through the Hot Springs property and down Glen Ivy Road.



Figure 23. HEC-RAS Lateral Structure Location

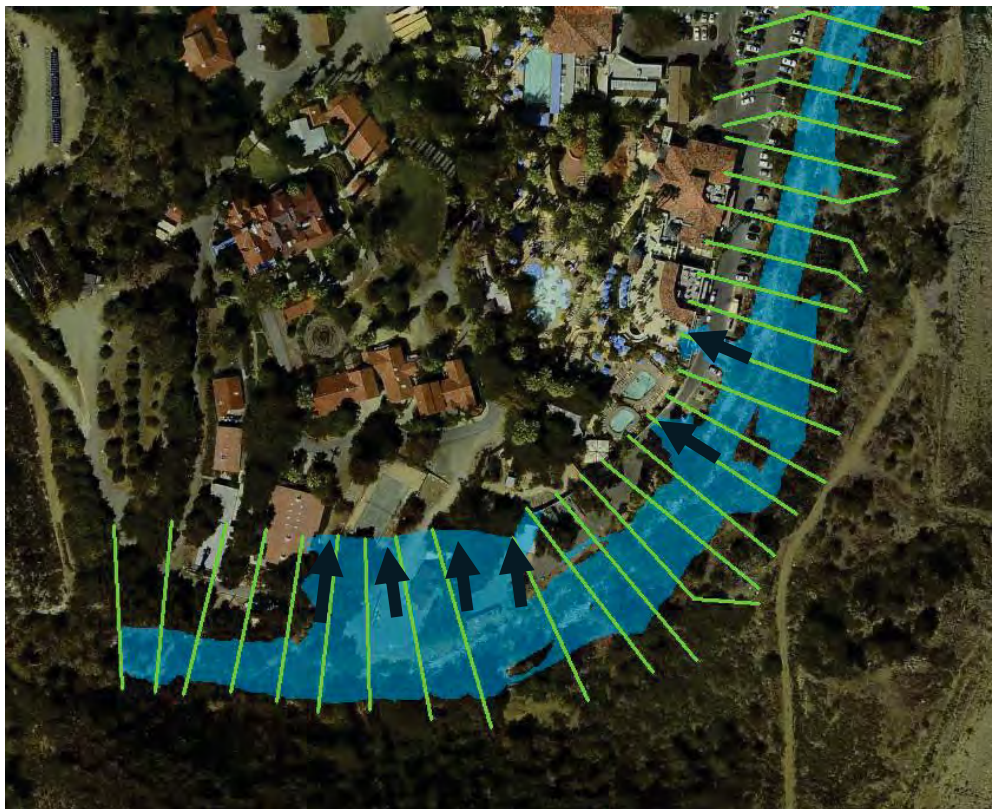


Figure 24. 100-year Flood Inundation Limits and Breakout Locations Near Hot Springs

As flow exits from the infiltration basins near Glen Ivy Road, flow becomes highly two dimensional (**Figure 25**). While there is a culvert under Glen Ivy Road, it is undersized for even the 2-year event and the vegetation-choked channel immediately upstream further reduces the efficacy of the culvert array. In addition, there is poor confinement of flow at the approach to this structure, and a large percentage of flow is routed around the eastern side of the structure toward Temescal Canyon Road where it then flows to the north along the road adjacent to an existing structure and then back into the channel approximately 250 feet north of Glen Ivy Road. Some flow remains in the channel downstream of the structure where it is directed to the same point in the channel as the roadway drainage, however during larger flood events (10-year and greater) flow in this area also spills to the left across open grassland. Historical channel landforms guide this flow to the north where it spills over Temescal Canyon Road and re-joins CCW approximately 500 feet downstream of the primary spillover point from the roadway into CCW. Ultimately, there is about a 1,500-foot-long corridor of CCW in this area where inadequate confinement exists for the 100-year event. The 2-year event routed through this reach also results in two-dimensional flow along Glen Ivy Road and Temescal Canyon Road (**Figure 26**). It can be concluded from this that both the undersized culvert at Glen Ivy Road as well as the lack of confinement upstream of the culvert promote excess flood inundation for even low flow events.

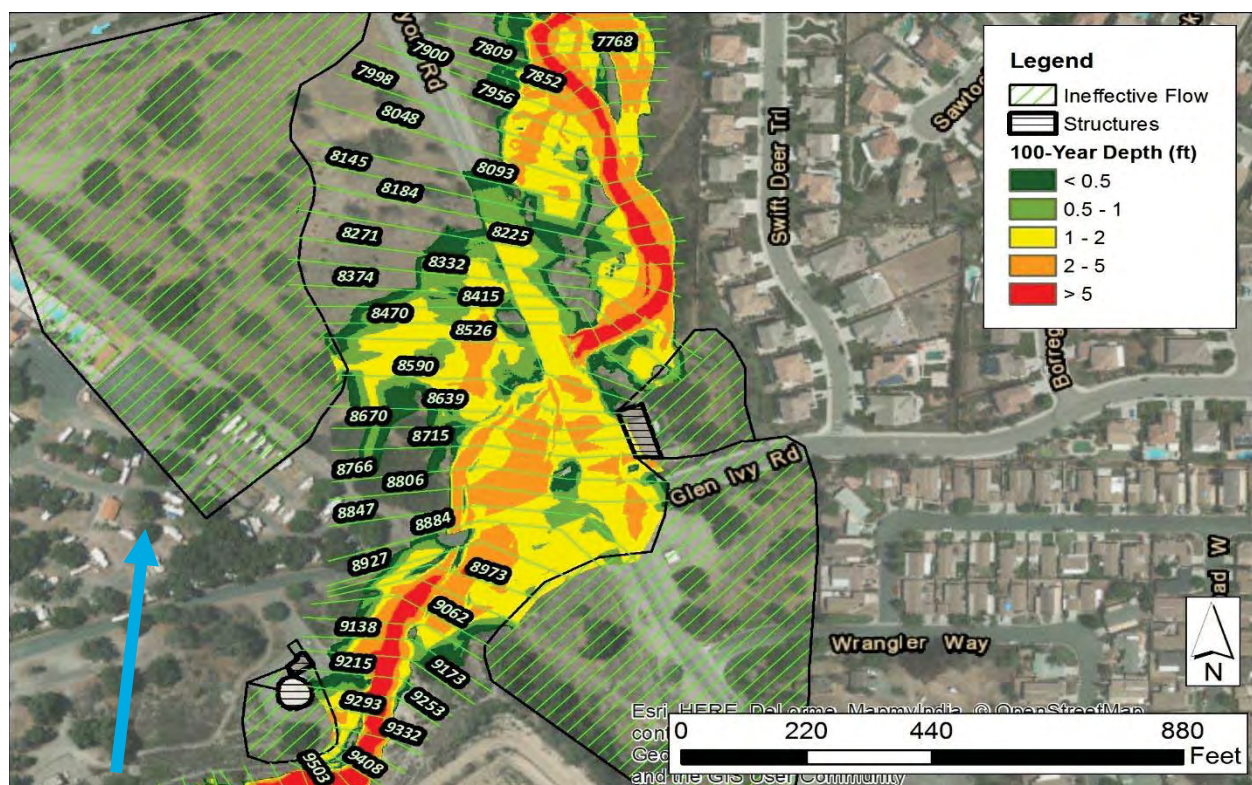


Figure 25. 100-Year Flood Inundation at Glen Ivy Road.

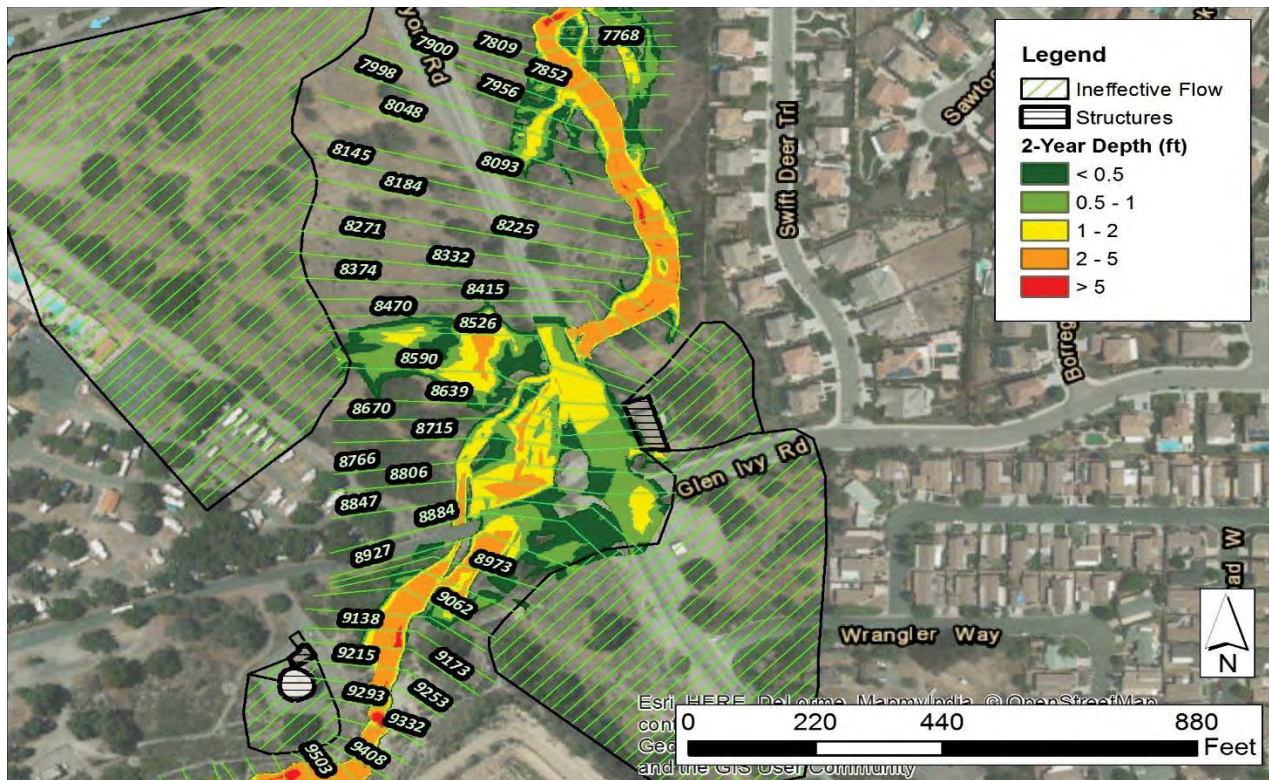


Figure 26. 2-Year Flood Inundation at Glen Ivy Road.

The third area of notable inundation is near the Rinker plant and Dawson Canyon Road. The lateral weir routine in HEC-RAS was used to estimate the amount of flow leaving the model due to lack of channel containment in the area. Two weirs were modeled, one being upstream of Dawson Canyon Road, and the other between the roadway crossing and Temescal Wash, since flow exits to the right upstream of the roadway and to the left downstream of the roadway. **Table 12** below lists the performance of each weir based on recurrence interval. Based on these results, the 2-year discharge has full containment throughout this reach. Approximately 19% (567 cfs) of the inflow to this reach from the 10-year event spills out into the Rinker plant, and an additional 3% (94 cfs) spills into the driving range downstream of Dawson Canyon Road. Nearly half of the entire inflow (2,362 cfs) for the 100-year event is diverted to the Rinker plant. This would likely inundate much of the plant given the relatively flat, graded slope of the plant. Taken together, the results presented in **Table 12** suggest that significant inundation outside of the channel would occur during even relatively minor flow events.

Table 12. Downstream Lateral Weir Performance.

	Upstream of Rinker Plant		Dawson Canyon Road		Temescal Wash	
	RS 2606		RS 773		RS 76	
Recurrence Interval	Q (cfs)	Remaining	Q (cfs)	Remaining	Q (cfs)	Remaining
2 - Year	1,595	100%	1,595	100%	1,595	100%
5 - Year	2,344	100%	2,145	92%	2,129	91%
10 - Year	2,957	100%	2,390	81%	2,296	78%
25 - Year	3,822	100%	2,649	69%	2,450	64%
50 - Year	4,526	100%	2,790	62%	2,523	56%
100 - Year	5,247	100%	2,885	55%	2,561	49%



Figure 32. Channel Banks Spatial Summary.

FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 2 OF 7



RIVERSIDE COUNTY, CALIFORNIA AND INCORPORATED AREAS

COMMUNITY NAME	NUMBER	COMMUNITY NAME	NUMBER
Agua Caliente Band of Cahuilla Indian Reservation	060763	City of Lake Elsinore	060636
City of Banning	060246	City of Menifee	060176
City of Beaumont	060247	City of Moreno Valley	065074
City of Blythe	060248	City of Murrieta	060751
City of Calimesa	060740	City of Norco	060256
City of Canyon Lake	060753	City of Palm Desert	060629
City of Cathedral City	060704	City of Palm Springs	060257
City of Coachella	060249	City of Perris	060258
City of Corona	060250	City of Rancho Mirage	060259
City of Desert Hot Springs	060251	City of Riverside	060260
City of Eastvale	060155	City of San Jacinto	065056
City of Hemet	060253	City of Temecula	060742
City of Indian Wells	060254	City of Wildomar	060221
City of Indio	060255	Colorado River Indian Reservation	060069
City of Jurupa Valley	060286	Riverside County, Unincorporated Areas	060245
City of La Quinta	060709		

REVISED:

March 6, 2018

FLOOD INSURANCE STUDY NUMBER
06065CV002D

Version Number 2.3.3.2



FEMA

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Stetson Avenue Channel	At Hemet Storm Channel	2.5	500	*	850	1,100	2,600
Stetson Avenue Channel	At Palm Avenue	2.1	450	*	700	950	2,200
Stetson Avenue Channel	At State Street	1.9	400	*	650	850	2,000
Stetson Avenue Channel	At San Jacinto Street	1.3	300	*	490	650	1,500
Stovepipe Canyon Creek	At State Highway 71	1.3	150	*	460	750	1,700
Stream A	At 2S./5E.-29 NW. corner	0.6	440	*	620	740	970
Taylor Avenue Drain	At Cota Street	1.5	280	*	590	850	1,900
Taylor Avenue Drain	At Riverside Freeway	1.4	260	*	550	800	1,800
Taylor Avenue Drain	At Grand Boulevard	1.3	220	*	500	750	1,700
Taylor Avenue Drain	At Olive Avenue	0.9	160	*	370	550	1,200
Taylor Avenue Drain	At Citron Avenue	0.8	150	*	340	500	1,100
Taylor Avenue Drain	At Ontario Avenue	0.7	130	*	300	450	1,000
Temecula Creek	At mouth	370.0	7,500	*	27,000	36,000	58,000
Temescal Wash	Below confluence with Arlington Channel	170.9	2,345	*	14,500	29,000	69,150
Temescal Wash	Above confluence with Arlington Channel	*	1,970	*	12,180	24,000	58,090
Temescal Wash	At Magnolia Avenue	134.0	1,800	*	11,700	22,000	52,000
Tequesquite Arroyo	At Tequesquite Avenue	4.89 ¹²	1,972	*	*	2,880	*

Appendix B

Coldwater Creek Hydraulics



Coldwater Canyon Wash Re-Alignment
Cross Sections Location Map
Rick Engineering Company
JN-18602 09/24/2021
Not to Scale
N
↑

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	E.G. Slope (ft/ft)	Mann Wld Chnl	Val Left (fts)	Val Chnl (fts)	Val Right (fts)	Vel Total (fts)	Top Width (ft)	Froude # Chl	Max Chl Dpth (ft)	Shear LOB (lb/sq ft)	Shear Chan (lb/sq ft)	Shear ROB (lb/sq ft)
PROP ALIGN 8_19	4400	100 YR	CCW_Proposed_Velocity	5250.00	989.75	998.08	0.021808	0.050	8.56	16.82	7.34	11.70	121.28	1.07	8.33	3.71	10.21	2.94
			CCW_Proposed_Maintained	5250.00	989.75	998.08	0.021808	0.050	8.56	16.82	7.34	11.70	121.28	1.07	8.33	3.71	10.21	2.94
PROP ALIGN 8_19	4300.06°	100 YR	CCW_Proposed_Velocity	5250.00	987.54	993.33	0.045092	0.050	10.78	19.63	12.58	15.33	103.10	1.48	5.79	6.28	15.44	7.92
			CCW_Proposed_Maintained	5250.00	987.54	993.33	0.045092	0.050	10.78	19.63	12.58	15.33	103.10	1.48	5.79	6.28	15.44	7.92
PROP ALIGN 8_19	4200	100 YR	CCW_Proposed_Velocity	5250.00	986.85	994.24	0.013142	0.050	8.70	12.33	4.67	9.81	138.18	0.83	7.39	3.35	5.65	1.31
			CCW_Proposed_Maintained	5250.00	986.85	994.24	0.013142	0.050	8.70	12.33	4.67	9.81	138.18	0.83	7.39	3.35	5.65	1.31
PROP ALIGN 8_19	4119.98°	100 YR	CCW_Proposed_Velocity	5250.00	984.45	993.39	0.005420	0.050	3.31	8.47	4.57	6.92	154.79	0.54	8.94	0.63	2.58	1.02
			CCW_Proposed_Maintained	5250.00	984.45	993.39	0.005420	0.050	3.31	8.47	4.57	6.92	154.79	0.54	8.94	0.63	2.58	1.02
PROP ALIGN 8_19	4039.96°	100 YR	CCW_Proposed_Velocity	5250.00	982.98	991.36	0.014348	0.050	6.49	12.61	4.99	10.72	112.48	0.86	8.38	2.20	5.97	1.48
			CCW_Proposed_Maintained	5250.00	982.98	991.36	0.014348	0.050	6.49	12.61	4.99	10.72	112.48	0.86	8.38	2.20	5.97	1.48
PROP ALIGN 8_19	3960	100 YR	CCW_Proposed_Velocity	5250.00	979.97	988.16	0.026598	0.050	5.08	15.56	4.84	14.78	78.22	1.12	8.29	1.78	9.55	1.66
			CCW_Proposed_Maintained	5250.00	979.97	988.16	0.026598	0.050	5.08	15.56	4.84	14.78	78.22	1.12	8.29	1.78	9.55	1.66
PROP ALIGN 8_19	3886.62°	100 YR	CCW_Proposed_Velocity	5250.00	976.83	988.77	0.009521	0.050	3.95	11.11	4.89	10.35	60.19	0.61	11.94	0.87	4.12	1.20
			CCW_Proposed_Maintained	5250.00	976.83	988.77	0.009521	0.050	3.95	11.11	4.89	10.35	60.19	0.61	11.94	0.87	4.12	1.20
PROP ALIGN 8_19	3813.24°	100 YR	CCW_Proposed_Velocity	5250.00	973.90	986.26	0.013935	0.050	7.47	15.79	5.52	13.65	104.67	0.86	12.36	2.70	8.31	1.72
			CCW_Proposed_Maintained	5250.00	973.90	986.26	0.013935	0.050	7.47	15.79	5.52	13.65	104.67	0.86	12.36	2.70	8.31	1.72
PROP ALIGN 8_19	3740	100 YR	CCW_Proposed_Velocity	5250.00	971.11	981.45	0.040397	0.050	7.51	20.84	10.71	19.24	51.74	1.39	10.34	3.56	16.44	6.05
			CCW_Proposed_Maintained	5250.00	971.11	981.45	0.040397	0.050	7.51	20.84	10.71	19.24	51.74	1.39	10.34	3.56	16.44	6.05
PROP ALIGN 8_19	3653.21°	100 YR	CCW_Proposed_Velocity	5250.00	969.54	979.52	0.039291	0.050	2.26	16.90	14.09	16.32	66.56	1.34	9.98	0.58	11.92	9.08
			CCW_Proposed_Maintained	5250.00	969.54	979.52	0.039291	0.050	2.26	16.90	14.09	16.32	66.56	1.34	9.98	0.58	11.92	9.08
PROP ALIGN 8_19	3566.42°	100 YR	CCW_Proposed_Velocity	5250.00	967.69	977.48	0.031696	0.050	1.41	13.59	10.51	13.17	96.99	1.17	9.79	0.27	8.14	5.54
			CCW_Proposed_Maintained	5250.00	967.69	977.48	0.031696	0.050	1.41	13.59	10.51	13.17	96.99	1.17	9.79	0.27	8.14	5.54
PROP ALIGN 8_19	3480	100 YR	CCW_Proposed_Velocity	5250.00	966.16	978.08	0.004194	0.050	3.41	7.85	5.48	7.30	101.67	0.48	11.92	0.62	2.16	1.26
			CCW_Proposed_Maintained	5250.00	966.16	977.93	0.004467	0.050	3.45	8.01	5.61	7.46	101.03	0.49	11.77	0.64	2.26	1.32
PROP ALIGN 8_19	3423	100 YR	CCW_Proposed_Velocity	5250.00	966.12	975.06	0.004987	0.025	1.46	15.47	7.01	13.85	60.58	1.00	8.94	0.12	2.20	1.26
			CCW_Proposed_Maintained	5250.00	966.12	974.97	0.007164	0.030	1.63	15.33	8.35	13.63	60.21	1.00	8.85	0.16	3.13	1.79
PROP ALIGN 8_19	3341.72°	100 YR	CCW_Proposed_Velocity	5250.00	964.06	968.19	0.027072	0.025	9.61	24.65	10.02	22.40	66.71	2.17	4.13	3.09	6.77	3.29
			CCW_Proposed_Maintained	5250.00	964.06	968.24	0.036518	0.030	11.25	24.04	11.72	22.12	66.89	2.11	4.18	4.21	9.23	4.48
PROP ALIGN 8_19	3260	100 YR	CCW_Proposed_Velocity	5250.00	962.16	964.43	0.061018	0.025	10.36	24.93	10.57	24.06	103.30	2.95	2.27	4.23	8.43	4.36
			CCW_Proposed_Maintained	5250.00	962.16	964.61	0.067247	0.030	11.40	22.94	11.61	22.22	104.03	2.62	2.45	5.00	10.02	5.15
PROP ALIGN 8_19	3209.68°	100 YR	CCW_Proposed_Velocity	5250.00	960.99	963.47	0.040699	0.025	8.86	21.92	9.44	21.11	105.76	2.46	2.48	3.03	6.28	3.32
			CCW_Proposed_Maintained	5250.00	960.99	963.79	0.038203	0.030	9.27	19.21	9.84	18.54	107.08	2.03	2.80	3.19	6.67	3.48
PROP ALIGN 8_19	3160	100 YR	CCW_Proposed_Velocity	5250.00	959.74	962.45	0.031173	0.025	8.40	20.23	8.59	19.42	106.44	2.18	2.71	2.61	5.21	2.70
			CCW_Proposed_Maintained	5250.00	959.74	962.65	0.027868	0.030	8.63	17.46	8.81	16.80	108.02	1.76	3.11	2.65	5.34	2.73
PROP ALIGN 8_19	3084.93°	100 YR	CCW_Proposed_Velocity	5250.00	959.19	962.56	0.014357	0.025	6.58	16.00	6.64	15.24	109.11	1.54	3.37	1.49	3.02	1.51
			CCW_Proposed_Maintained	5250.00	959.19	964.49	0.004357	0.030	4.80	9.93	4.83	9.34	116.80	0.76	5.30	0.69	1.44	0.70
PROP ALIGN 8_19	3009.87°	100 YR	CCW_Proposed_Velocity	5250.00	958.82	963.85	0.003669	0.025	4.26	10.56	4.28	9.88	144.10	0.83	7.28	0.55	1.15	0.56
			CCW_Proposed_Maintained	5250.00	958.82	964.22	0.004056	0.030	4.69	9.71	4.90	9.15	157.31	0.74	7.65	0.65	1.37	0.70
PROP ALIGN 8_19	2934.8°	100 YR	CCW_Proposed_Velocity	5250.00	958.44	963.21	0.004578	0.025	4.60	11.38		11.01	124.07	0.92	4.77	0.66	1.36	
			CCW_Proposed_Maintained	5250.00	958.44	963.56	0.005125	0.030	5.10	10.53		10.21	128.26	0.82	5.12	0.79	1.64	
PROP ALIGN 8_19	2860	100 YR	CCW_Proposed_Velocity	5250.00	958.07	963.14	0.003563	0.025	4.24	10.49	4.28	9.80	159.06	0.82	7.88	0.54	1.13	0.55
			CCW_Proposed_Maintained	5250.00	958.07	963.37	0.004339	0.030	4.79	9.92	4.84	9.33	160.46	0.76	8.11	0.69	1.44	0.70
PROP ALIGN 8_19	2786.64	100 YR	CCW_Proposed_Velocity	5250.00	957.70	963.00	0.003053	0.025	4.02	9.99	3.93	9.33	192.05	0.76	11.02	0.48	1.01	0.47
			CCW_Proposed_Maintained	5250.00	957.70	963.11	0.004033	0.030	4.68	9.69	4.57	9.12	192.71	0.73	11.13	0.65	1.36	0.63
PROP ALIGN 8_19	2727.95	100 YR	CCW_Proposed_Velocity	5250.00	957.41	962.87	0.006059	0.038	5.78	9.44	5.68	9.02	221.18	0.71	12.05	0.99	2.07	0.97

HEC-RAS River: COLDWATER CREEK Reach: PROP ALIGN 8.19 Profile: 100 YR (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S.Elev (ft)	E.G.Slope (ft/ft)	Mann Wld Cml	Vel Left (ft/s)	Vel Chnl (ft/s)	Vel Right (ft/s)	Vel Total (ft/s)	Top Width (ft)	Froude # Chl	Max Chl Dpth (ft)	Shear LOB (lb/sq ft)	Shear Chan (lb/sq ft)	Shear ROB (lb/sq ft)
PROP ALIGN 8.19	2727.95	100 YR	CCW_Proposed_Maintained	5250.00	957.41	962.97	0.006059		5.78	9.44	5.68	9.02	221.18	0.71	12.05	0.99	2.07	0.97
PROP ALIGN 8.19	2713.28	100 YR	CCW_Proposed_Velocity	5250.00	957.33	962.75	0.006265		5.84	9.54	5.76	9.12	219.03	0.72	12.08	1.01	2.12	0.99
PROP ALIGN 8.19	2713.28	100 YR	CCW_Proposed_Maintained	5250.00	957.33	962.75	0.006265		5.84	9.54	5.76	9.12	219.03	0.72	12.08	1.01	2.12	0.99
PROP ALIGN 8.19	2698.6	100 YR	CCW_Proposed_Velocity	5250.00	957.26	962.63	0.006455		5.89	9.63	5.81	9.20	216.91	0.73	12.19	1.04	2.16	1.01
PROP ALIGN 8.19	2698.6	100 YR	CCW_Proposed_Maintained	5250.00	957.26	962.63	0.006455		5.89	9.63	5.81	9.20	216.91	0.73	12.19	1.04	2.16	1.01
PROP ALIGN 8.19	2683.93	100 YR	CCW_Proposed_Velocity	5250.00	957.19	961.70	0.006266		3.50	11.97	3.46	11.14	209.94	0.99	11.50	0.39	0.80	0.38
PROP ALIGN 8.19	2683.93	100 YR	CCW_Proposed_Maintained	5250.00	957.19	961.70	0.006266		3.50	11.97	3.46	11.14	209.94	0.99	11.50	0.39	0.80	0.38
PROP ALIGN 8.19	2669.26	100 YR	CCW_Proposed_Velocity	5250.00	957.01	961.17	0.003900		3.83	13.10	3.83	12.24	191.51	1.14	11.19	0.48	0.98	0.48
PROP ALIGN 8.19	2669.26	100 YR	CCW_Proposed_Maintained	5250.00	957.01	961.17	0.003751		3.82	13.05	3.81	12.19	191.64	1.13	11.21	0.47	0.97	0.47
PROP ALIGN 8.19	2619.37	100 YR	CCW_Proposed_Velocity	5250.00	953.82	956.49	0.017264		6.20	20.70	6.31	19.74	172.99	2.25	6.64	1.43	2.84	1.47
PROP ALIGN 8.19	2619.37	100 YR	CCW_Proposed_Maintained	5250.00	953.82	956.49	0.017247		6.20	20.70	6.31	19.73	173.00	2.25	6.64	1.43	2.84	1.47
PROP ALIGN 8.19	2569.49	100 YR	CCW_Proposed_Velocity	5250.00	950.62	952.94	0.028068		7.26	23.98	7.44	22.96	163.55	2.80	3.49	2.04	4.00	2.12
PROP ALIGN 8.19	2569.49	100 YR	CCW_Proposed_Maintained	5250.00	950.62	952.94	0.028050		7.25	23.97	7.44	22.95	163.55	2.80	3.49	2.04	4.00	2.12
PROP ALIGN 8.19	2519.6	100 YR	CCW_Proposed_Velocity	5250.00	947.43	949.57	0.037017		7.90	26.07	8.22	25.02	104.04	3.17	2.14	2.49	4.86	2.64
PROP ALIGN 8.19	2519.6	100 YR	CCW_Proposed_Maintained	5250.00	947.43	949.57	0.037003		7.90	26.07	8.22	25.02	104.04	3.17	2.14	2.48	4.86	2.64
PROP ALIGN 8.19	2469.72	100 YR	CCW_Proposed_Velocity	5250.00	944.22	946.27	0.044153		8.30	27.49	8.80	26.42	103.63	3.43	2.05	2.80	5.50	3.06
PROP ALIGN 8.19	2469.72	100 YR	CCW_Proposed_Maintained	5250.00	944.22	946.27	0.044144		8.30	27.49	8.80	26.42	103.63	3.43	2.05	2.80	5.50	3.06
PROP ALIGN 8.19	2420	100 YR	CCW_Proposed_Velocity	5250.00	941.02	943.01	0.048619		8.61	28.48	9.22	27.39	103.35	3.62	1.99	3.05	5.97	3.37
PROP ALIGN 8.19	2420	100 YR	CCW_Proposed_Maintained	5250.00	941.02	943.01	0.049608		8.61	28.47	9.22	27.38	103.35	3.62	1.99	3.05	5.97	3.37
PROP ALIGN 8.19	2376.9	100 YR	CCW_Proposed_Velocity	5250.00	938.26	940.22	0.053159		8.70	29.07	9.36	27.99	103.18	3.73	1.96	3.15	6.26	3.51
PROP ALIGN 8.19	2376.9	100 YR	CCW_Proposed_Maintained	5250.00	938.26	940.22	0.053147		8.70	29.07	9.35	27.99	103.18	3.73	1.96	3.15	6.26	3.51
PROP ALIGN 8.19	2362.54	100 YR	CCW_Proposed_Velocity	5250.00	938.19	940.16	0.046604		7.20	27.96	7.41	26.83	103.50	3.52	1.97	2.96	5.72	3.09
PROP ALIGN 8.19	2362.54	100 YR	CCW_Proposed_Maintained	5250.00	938.19	940.16	0.046595		7.20	27.96	7.41	26.83	103.50	3.52	1.97	2.96	5.72	3.09
PROP ALIGN 8.19	2348.17	100 YR	CCW_Proposed_Velocity	5250.00	938.12	940.20	0.229001		16.46	25.77	16.85	25.26	103.99	3.15	2.08	15.19	29.78	15.74
PROP ALIGN 8.19	2348.17	100 YR	CCW_Proposed_Maintained	5250.00	938.12	940.20	0.228955		16.46	25.77	16.85	25.26	103.99	3.15	2.08	15.19	29.78	15.74
PROP ALIGN 8.19	2333.8	100 YR	CCW_Proposed_Velocity	5250.00	938.04	945.51	0.002875		4.06	6.76	4.10	6.36	125.50	0.44	7.47	0.62	1.34	0.63
PROP ALIGN 8.19	2333.8	100 YR	CCW_Proposed_Maintained	5250.00	938.04	945.59	0.002769		4.01	6.68	4.05	6.29	125.83	0.43	7.55	0.61	1.30	0.62
PROP ALIGN 8.19	2319.44	100 YR	CCW_Proposed_Velocity	5250.00	937.97	945.43	0.000949		2.76	6.99	2.78	6.37	125.49	0.45	7.46	0.21	0.44	0.21
PROP ALIGN 8.19	2319.44	100 YR	CCW_Proposed_Maintained	5250.00	937.97	945.54	0.001270		3.22	6.80	3.25	6.27	125.91	0.44	7.57	0.28	0.60	0.28
PROP ALIGN 8.19	2276.34	100 YR	CCW_Proposed_Velocity	5250.00	937.75	945.42	0.000862		2.66	6.78	2.68	6.18	126.31	0.43	7.67	0.19	0.41	0.19
PROP ALIGN 8.19	2276.34	100 YR	CCW_Proposed_Maintained	5250.00	937.75	945.51	0.001164		3.12	6.62	3.14	6.10	126.65	0.42	7.76	0.26	0.56	0.26
PROP ALIGN 8.19	2218.88	100 YR	CCW_Proposed_Velocity	5250.00	937.47	945.42	0.000754		2.54	6.50	3.03	5.96	130.26	0.41	7.95	0.17	0.37	0.22
PROP ALIGN 8.19	2218.88	100 YR	CCW_Proposed_Maintained	5250.00	937.47	945.48	0.001029		2.98	6.36	3.57	5.91	130.51	0.40	8.01	0.24	0.51	0.31
PROP ALIGN 8.19	2162	100 YR	CCW_Proposed_Velocity	5250.00	937.18	945.36	0.000725		2.55	6.49	4.26	6.14	130.91	0.40	8.18	0.17	0.37	0.37
PROP ALIGN 8.19	2162	100 YR	CCW_Proposed_Maintained	5250.00	937.18	945.39	0.001012		3.02	6.41	5.05	6.11	140.05	0.39	8.21	0.24	0.52	0.52
PROP ALIGN 8.19	2148.66	100 YR	CCW_Proposed_Velocity	5250.00	937.11	945.18	0.000889			7.12		7.12	136.65	0.44	8.07		0.45	
PROP ALIGN 8.19	2148.66	100 YR	CCW_Proposed_Maintained	5250.00	937.11	945.19	0.001272			7.11		7.11	136.71	0.44	8.08		0.64	
PROP ALIGN 8.19	2135.32	100 YR	CCW_Proposed_Velocity	5250.00	937.05	944.99	0.001085			7.79		7.79	133.05	0.49	7.95		0.54	
PROP ALIGN 8.19	2135.32	100 YR	CCW_Proposed_Maintained	5250.00	937.05	945.00	0.001558			7.78		7.78	133.08	0.49	7.96		0.77	
PROP ALIGN 8.19	2121.97	100 YR	CCW_Proposed_Velocity	5250.00	936.98	944.72	0.003221			8.68		8.68	129.09	0.55	7.74		1.56	
PROP ALIGN 8.19	2121.97	100 YR	CCW_Proposed_Maintained	5250.00	936.98	944.72	0.003221			8.68		8.68	129.09	0.55	7.74		1.56	
PROP ALIGN 8.19	2109	100 YR	CCW_Proposed_Velocity	5250.00	936.91	944.24	0.004623			10.02		10.02	124.63	0.65	7.33		2.11	
PROP ALIGN 8.19	2109	100 YR	CCW_Proposed_Maintained	5250.00	936.91	944.24	0.004623			10.02		10.02	124.63	0.65	7.33		2.11	
PROP ALIGN 8.19	2099.02	100 YR	CCW_Proposed_Velocity	5250.00	936.81	943.47	0.007495			11.92		11.92	111.63	0.82	6.66		3.09	
PROP ALIGN 8.19	2099.02	100 YR	CCW_Proposed_Maintained	5250.00	936.81	943.47	0.007495			11.92		11.92	111.63	0.82	6.66		3.09	

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S.Elev (ft)	E.G.Slope (ft/ft)	Mann Wld Chnl	Val Left (fts)	Val Chnl (fts)	Val Right (fts)	Val Total (fts)	Top Width (ft)	Froude # Chl	Max Chl Dpth (ft)	Shear LOB (lb/sq ft)	Shear Chan (lb/sq ft)	Shear ROB (lb/sq ft)
PROP ALIGN 8_19	2088	100 YR	CCW_Proposed_Velocity	5250.00	936.61	943.68	0.006143	0.038	9.70	11.05	8.29	10.71	93.43	0.74	6.87	2.16	2.63	1.71
PROP ALIGN 8_19	2088	100 YR	CCW_Proposed_Maintained	5250.00	936.61	943.68	0.006143	0.038	9.70	11.05	8.29	10.71	93.43	0.74	6.87	2.16	2.63	1.71
PROP ALIGN 8_19	2075.66	100 YR	CCW_Proposed_Velocity	5250.00	936.76	943.53	0.009437	0.045	7.01	11.48	6.99	10.55	87.12	0.78	6.77	1.90	3.99	1.90
PROP ALIGN 8_19	2075.66	100 YR	CCW_Proposed_Maintained	5250.00	936.76	943.53	0.009437	0.045	7.01	11.48	6.99	10.55	87.12	0.78	6.77	1.90	3.99	1.90
PROP ALIGN 8_19	2063.31	100 YR	CCW_Proposed_Velocity	5250.00	936.70	943.24	0.010627	0.045	7.23	11.91	7.25	10.98	86.19	0.82	6.54	2.06	4.34	2.06
PROP ALIGN 8_19	2063.31	100 YR	CCW_Proposed_Maintained	5250.00	936.70	943.24	0.010627	0.045	7.23	11.91	7.25	10.98	86.19	0.82	6.54	2.06	4.34	2.06
PROP ALIGN 8_19	2051	100 YR	CCW_Proposed_Velocity	5250.00	936.51	942.47	0.015696	0.045	8.18	13.42	8.42	12.45	83.50	0.98	5.96	2.72	5.73	2.85
PROP ALIGN 8_19	2051	100 YR	CCW_Proposed_Maintained	5250.00	936.51	942.47	0.015696	0.045	8.18	13.42	8.42	12.45	83.50	0.98	5.96	2.72	5.73	2.85
PROP ALIGN 8_19	2042.65	100 YR	CCW_Proposed_Velocity	5250.00	934.27	938.74	0.050062	0.045	12.09	19.94	12.26	18.70	72.31	1.67	4.47	6.54	13.86	6.68
PROP ALIGN 8_19	2042.65	100 YR	CCW_Proposed_Maintained	5250.00	934.27	938.74	0.050062	0.045	12.09	19.94	12.26	18.70	72.31	1.67	4.47	6.54	13.86	6.68
PROP ALIGN 8_19	2035	100 YR	CCW_Proposed_Velocity	5250.00	932.62	936.73	0.068670	0.045	13.69	22.21	13.75	20.83	70.02	1.93	4.11	8.53	17.63	8.58
PROP ALIGN 8_19	2035	100 YR	CCW_Proposed_Maintained	5250.00	932.62	936.73	0.068670	0.045	13.69	22.21	13.75	20.83	70.02	1.93	4.11	8.53	17.63	8.58
PROP ALIGN 8_19	2020.45	100 YR	CCW_Proposed_Velocity	5250.00	932.55	936.28	0.068539	0.045	12.72	20.79	12.88	19.79	79.07	1.90	3.73	7.64	15.96	7.78
PROP ALIGN 8_19	2020.45	100 YR	CCW_Proposed_Maintained	5250.00	932.55	936.28	0.068539	0.045	12.72	20.79	12.88	19.79	79.07	1.90	3.73	7.64	15.96	7.78
PROP ALIGN 8_19	2005.91	100 YR	CCW_Proposed_Velocity	5250.00	932.48	936.00	0.062114	0.045	11.60	19.06	11.73	18.30	88.88	1.79	3.52	6.49	13.67	6.60
PROP ALIGN 8_19	2005.91	100 YR	CCW_Proposed_Maintained	5250.00	932.48	936.00	0.062114	0.045	11.60	19.06	11.73	18.30	88.88	1.79	3.52	6.49	13.67	6.60
PROP ALIGN 8_19	1991.358	100 YR	CCW_Proposed_Velocity	5250.00	932.40	939.73	0.003781	0.045	4.56	7.66	4.59	7.16	115.68	0.50	7.33	0.79	1.73	0.80
PROP ALIGN 8_19	1991.358	100 YR	CCW_Proposed_Maintained	5250.00	932.40	939.73	0.003781	0.045	4.56	7.66	4.59	7.16	115.68	0.50	7.33	0.79	1.73	0.80
PROP ALIGN 8_19	1977	100 YR	CCW_Proposed_Velocity	5250.00	932.33	939.80	0.000947	0.025	2.78	6.99	2.76	6.37	125.42	0.45	7.46	0.21	0.44	0.20
PROP ALIGN 8_19	1977	100 YR	CCW_Proposed_Maintained	5250.00	932.33	939.80	0.000947	0.030	3.24	6.80	3.22	6.27	125.85	0.44	7.57	0.28	0.60	0.28
PROP ALIGN 8_19	1886.584	100 YR	CCW_Proposed_Velocity	5250.00	931.92	939.76	0.000825	0.025	2.66	6.74	2.74	6.11	137.29	0.42	7.84	0.19	0.40	0.20
PROP ALIGN 8_19	1886.584	100 YR	CCW_Proposed_Maintained	5250.00	931.92	939.83	0.001120	0.030	3.12	6.58	3.23	6.04	137.62	0.41	7.91	0.26	0.55	0.27
PROP ALIGN 8_19	1817	100 YR	CCW_Proposed_Velocity	5250.00	931.52	939.72	0.000753	0.025	2.63	6.54	4.30	6.18	138.77	0.40	8.20	0.18	0.37	0.38
PROP ALIGN 8_19	1817	100 YR	CCW_Proposed_Maintained	5250.00	931.52	939.75	0.001023	0.030	3.12	6.46	5.10	6.15	138.92	0.40	8.23	0.25	0.53	0.53
PROP ALIGN 8_19	1803.04*	100 YR	CCW_Proposed_Velocity	5250.00	931.45	939.53	0.000903	0.025	3.08	7.19	3.22	7.19	136.17	0.45	8.08	0.46	0.46	0.46
PROP ALIGN 8_19	1803.04*	100 YR	CCW_Proposed_Maintained	5250.00	931.45	939.54	0.001292	0.030	3.12	7.17	3.23	7.17	136.23	0.44	8.09	0.77	0.65	0.65
PROP ALIGN 8_19	1789.09*	100 YR	CCW_Proposed_Velocity	5250.00	931.38	939.35	0.001092	0.025	2.83	7.83	3.23	7.83	132.78	0.49	7.97	0.54	0.54	0.54
PROP ALIGN 8_19	1789.09*	100 YR	CCW_Proposed_Maintained	5250.00	931.38	939.36	0.001567	0.030	3.12	7.82	3.23	7.82	132.82	0.49	7.98	0.78	0.78	0.78
PROP ALIGN 8_19	1775.14*	100 YR	CCW_Proposed_Velocity	5250.00	931.31	939.08	0.003208	0.038	8.68	12.29	8.68	12.29	88.12	0.73	7.77	1.70	2.54	1.14
PROP ALIGN 8_19	1775.14*	100 YR	CCW_Proposed_Maintained	5250.00	931.31	939.08	0.003208	0.038	8.68	12.29	8.68	12.29	88.12	0.73	7.77	1.70	2.54	1.14
PROP ALIGN 8_19	1759	100 YR	CCW_Proposed_Velocity	5250.00	931.25	938.63	0.004501	0.038	9.94	9.94	9.94	9.94	125.21	0.65	7.38	2.07	2.07	2.07
PROP ALIGN 8_19	1759	100 YR	CCW_Proposed_Maintained	5250.00	931.25	938.63	0.004501	0.038	9.94	9.94	9.94	9.94	125.21	0.65	7.38	2.07	2.07	2.07
PROP ALIGN 8_19	1746.83*	100 YR	CCW_Proposed_Velocity	5250.00	931.19	937.71	0.007974	0.038	12.19	12.19	12.19	12.19	109.26	0.84	6.52	3.25	3.25	3.25
PROP ALIGN 8_19	1746.83*	100 YR	CCW_Proposed_Maintained	5250.00	931.19	937.71	0.007974	0.038	12.19	12.19	12.19	12.19	109.26	0.84	6.52	3.25	3.25	3.25
PROP ALIGN 8_19	1736	100 YR	CCW_Proposed_Velocity	5250.00	931.12	938.04	0.005879	0.038	8.33	10.88	6.39	10.22	88.12	0.73	6.92	1.70	2.54	1.14
PROP ALIGN 8_19	1736	100 YR	CCW_Proposed_Maintained	5250.00	931.12	938.04	0.005879	0.038	8.33	10.88	6.39	10.22	88.12	0.73	6.92	1.70	2.54	1.14
PROP ALIGN 8_19	1725.14*	100 YR	CCW_Proposed_Velocity	5250.00	931.07	937.69	0.007274	0.038	7.21	11.75	6.95	10.84	86.48	0.81	6.62	1.44	3.00	1.37
PROP ALIGN 8_19	1725.14*	100 YR	CCW_Proposed_Maintained	5250.00	931.07	937.69	0.007274	0.038	7.21	11.75	6.95	10.84	86.48	0.81	6.62	1.44	3.00	1.37
PROP ALIGN 8_19	1714.28*	100 YR	CCW_Proposed_Velocity	5250.00	931.01	937.53	0.008148	0.039	7.28	11.99	7.37	11.05	86.06	0.83	6.52	1.57	3.31	1.60
PROP ALIGN 8_19	1714.28*	100 YR	CCW_Proposed_Maintained	5250.00	931.01	937.53	0.008148	0.039	7.28	11.99	7.37	11.05	86.06	0.83	6.52	1.57	3.31	1.60
PROP ALIGN 8_19	1703	100 YR	CCW_Proposed_Velocity	5250.00	930.96	936.84	0.011740	0.039	8.16	13.44	8.54	12.45	83.52	0.98	5.88	2.04	4.31	2.18
PROP ALIGN 8_19	1703	100 YR	CCW_Proposed_Maintained	5250.00	930.96	936.84	0.011740	0.039	8.16	13.44	8.54	12.45	83.52	0.98	5.88	2.04	4.31	2.18
PROP ALIGN 8_19	1690.09*	100 YR	CCW_Proposed_Velocity	5250.00	927.56	932.00	0.060227	0.045	12.72	21.47	12.82	20.14	69.37	1.82	4.44	7.39	16.22	7.48
PROP ALIGN 8_19	1690.09*	100 YR	CCW_Proposed_Maintained	5250.00	927.56	932.00	0.060227	0.045	12.72	21.47	12.82	20.14	69.37	1.82	4.44	7.39	16.22	7.48

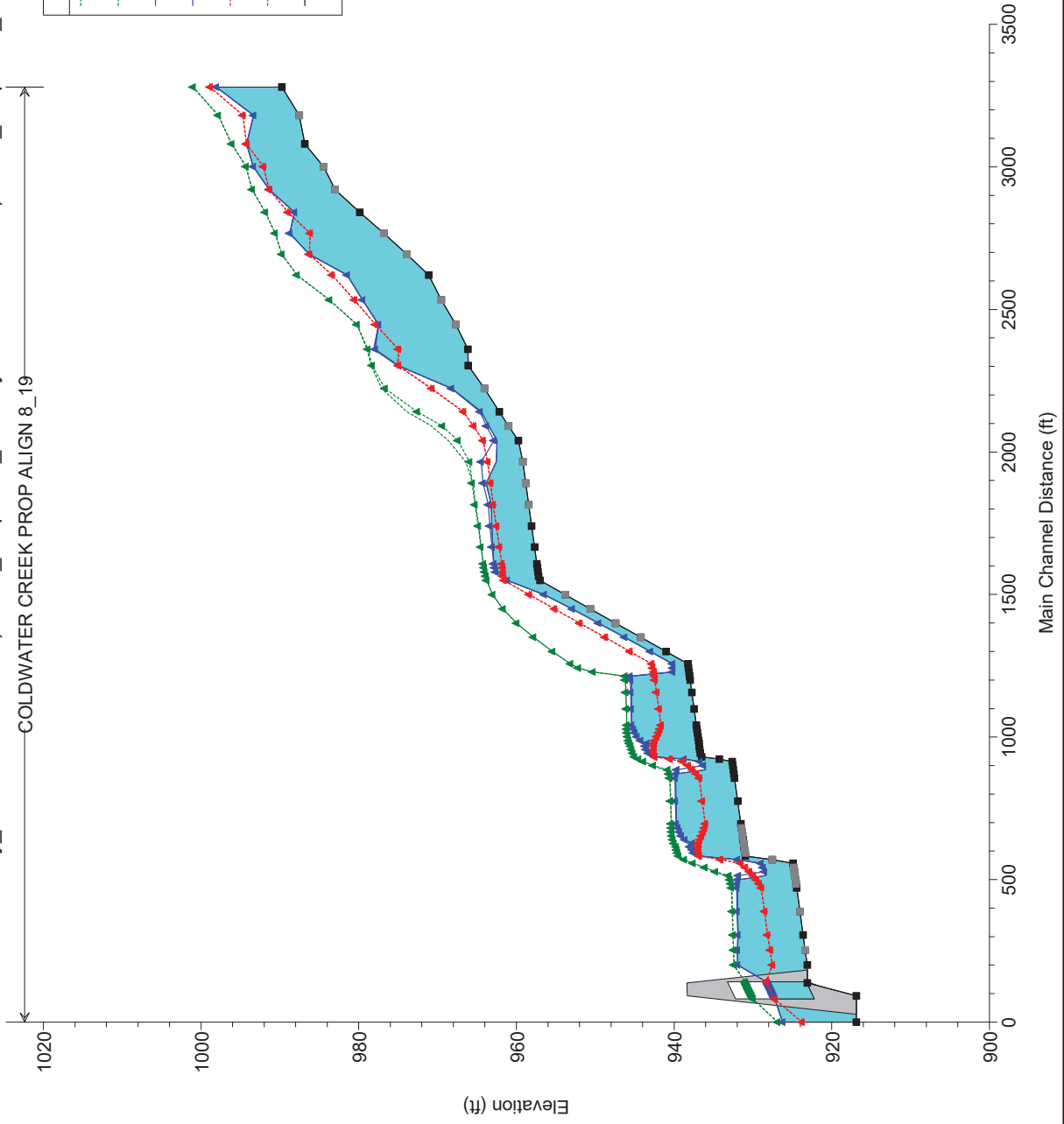
HEC-RAS River: COLDWATER CREEK Reach: PROP ALIGN 8_19 Profile: 100 YR (Continued)

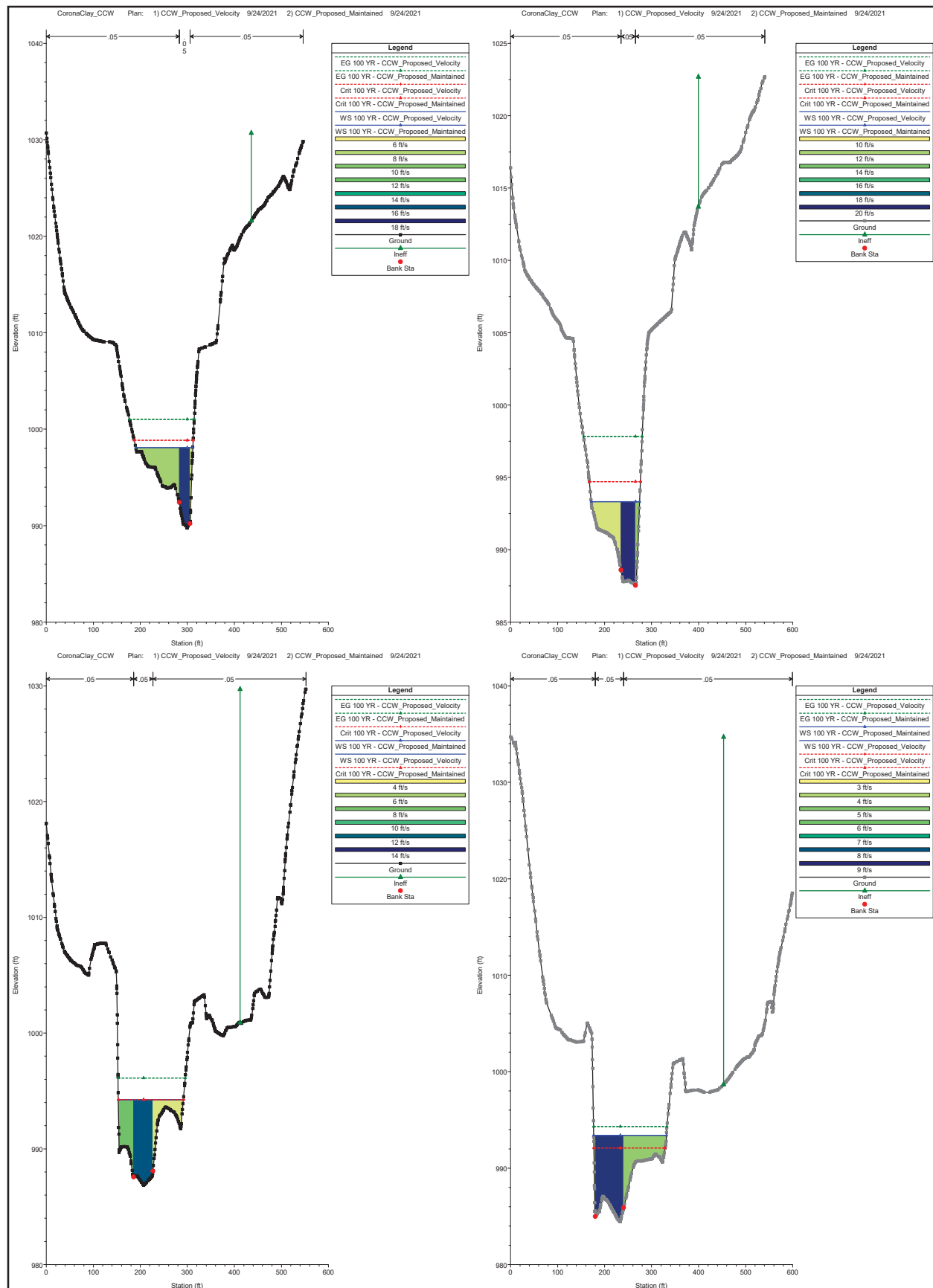
Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S.Elev (ft)	E.G.Slope (ft/ft)	Mann Wld Chnl	Vel Left (ft/s)	Vel Chnl (ft/s)	Vel Right (ft/s)	Vel Total (ft/s)	Top Width (ft)	Froude # Chl	Max Chl Dpth (ft)	Shear LOB (lb/sq ft)	Shear Chan (lb/sq ft)	Shear ROB (lb/sq ft)
PROP ALIGN 8_19	1677	100 YR	CCW_Proposed_Velocity	5250.00	924.90	929.02	0.083092	0.045	15.31	24.46	15.41	22.78	64.52	2.12	4.12	10.58	21.36	10.69
PROP ALIGN 8_19	1677	100 YR	CCW_Proposed_Maintained	5250.00	924.90	929.02	0.083092	0.045	15.31	24.46	15.41	22.78	64.52	2.12	4.12	10.58	21.36	10.69
PROP ALIGN 8_19	1682.74*	100 YR	CCW_Proposed_Velocity	5250.00	924.83	928.72	0.075963	0.045	14.11	22.53	14.23	21.24	71.58	2.01	3.89	9.15	18.47	9.27
PROP ALIGN 8_19	1682.74*	100 YR	CCW_Proposed_Maintained	5250.00	924.83	928.72	0.075963	0.045	14.11	22.53	14.23	21.24	71.58	2.01	3.89	9.15	18.47	9.27
PROP ALIGN 8_19	1648.48*	100 YR	CCW_Proposed_Velocity	5250.00	924.75	928.53	0.065947	0.045	12.85	20.55	12.77	19.55	79.03	1.87	3.78	7.68	15.53	7.61
PROP ALIGN 8_19	1648.48*	100 YR	CCW_Proposed_Maintained	5250.00	924.75	928.53	0.065947	0.045	12.85	20.55	12.77	19.55	79.03	1.87	3.78	7.68	15.53	7.61
PROP ALIGN 8_19	1634.22*	100 YR	CCW_Proposed_Velocity	5250.00	924.68	928.40	0.055624	0.045	11.64	18.68	11.37	17.88	86.72	1.71	3.72	6.34	12.90	6.12
PROP ALIGN 8_19	1634.22*	100 YR	CCW_Proposed_Maintained	5250.00	924.68	931.85	0.005607	0.045	5.58	9.18	5.50	8.51	100.99	0.61	7.17	1.19	2.51	1.16
PROP ALIGN 8_19	1619.86*	100 YR	CCW_Proposed_Velocity	5250.00	924.61	931.85	0.004464	0.045	4.99	8.25	4.88	7.70	109.24	0.54	7.24	0.95	2.02	0.92
PROP ALIGN 8_19	1619.86*	100 YR	CCW_Proposed_Maintained	5250.00	924.61	931.96	0.004239	0.045	4.91	8.12	4.80	7.57	109.68	0.53	7.35	0.91	1.94	0.88
PROP ALIGN 8_19	1605.70*	100 YR	CCW_Proposed_Velocity	5250.00	924.53	931.93	0.003495	0.045	4.46	7.40	4.32	6.94	117.81	0.48	7.40	0.75	1.61	0.72
PROP ALIGN 8_19	1605.70*	100 YR	CCW_Proposed_Maintained	5250.00	924.53	932.03	0.003327	0.045	4.40	7.29	4.25	6.83	118.24	0.47	7.50	0.73	1.55	0.69
PROP ALIGN 8_19	1592	100 YR	CCW_Proposed_Velocity	5250.00	924.46	931.96	0.009948	0.025	2.82	7.00	2.68	6.38	125.00	0.45	7.50	0.21	0.44	0.20
PROP ALIGN 8_19	1592	100 YR	CCW_Proposed_Maintained	5250.00	924.46	932.07	0.001253	0.030	3.28	6.80	3.12	6.27	125.46	0.44	7.61	0.29	0.60	0.27
PROP ALIGN 8_19	1509.05*	100 YR	CCW_Proposed_Velocity	5250.00	924.04	931.94	0.000789	0.025	2.66	6.61	2.70	5.96	133.05	0.42	7.90	0.19	0.39	0.19
PROP ALIGN 8_19	1509.05*	100 YR	CCW_Proposed_Maintained	5250.00	924.04	932.03	0.001063	0.030	3.11	6.44	3.17	5.89	136.35	0.40	7.99	0.25	0.53	0.26
PROP ALIGN 8_19	1425	100 YR	CCW_Proposed_Velocity	5250.00	923.64	931.88	0.000720	0.025	2.58	6.50	4.28	6.14	143.82	0.40	8.24	0.17	0.37	0.37
PROP ALIGN 8_19	1425	100 YR	CCW_Proposed_Maintained	5250.00	923.64	931.93	0.001000	0.030	3.05	6.41	5.06	6.10	144.01	0.39	8.29	0.24	0.52	0.52
PROP ALIGN 8_19	1372.76*	100 YR	CCW_Proposed_Velocity	5250.00	923.38	931.95	0.000559	0.025	2.32	5.88	2.43	5.15	142.39	0.35	8.57	0.14	0.30	0.15
PROP ALIGN 8_19	1372.76*	100 YR	CCW_Proposed_Maintained	5250.00	923.38	931.98	0.000764	0.030	2.72	5.75	2.84	5.13	142.58	0.35	8.60	0.19	0.41	0.20
PROP ALIGN 8_19	1321	100 YR	CCW_Proposed_Velocity	5250.00	923.12	931.94	0.000514	0.025	2.29	5.75	2.38	5.03	141.08	0.34	8.82	0.13	0.28	0.14
PROP ALIGN 8_19	1321	100 YR	CCW_Proposed_Maintained	5250.00	923.12	931.96	0.000705	0.030	2.68	5.62	2.79	5.02	141.20	0.33	8.84	0.18	0.39	0.19
PROP ALIGN 8_19	1200		Culvert															
PROP ALIGN 8_19	1120	100 YR	CCW_Proposed_Velocity	5250.00	916.89	926.24	0.002894	0.039		6.35		6.35	150.28	0.46	9.35		0.98	
PROP ALIGN 8_19	1120	100 YR	CCW_Proposed_Maintained	5250.00	916.89	926.24	0.002894	0.039		6.35		6.35	150.28	0.46	9.35		0.98	

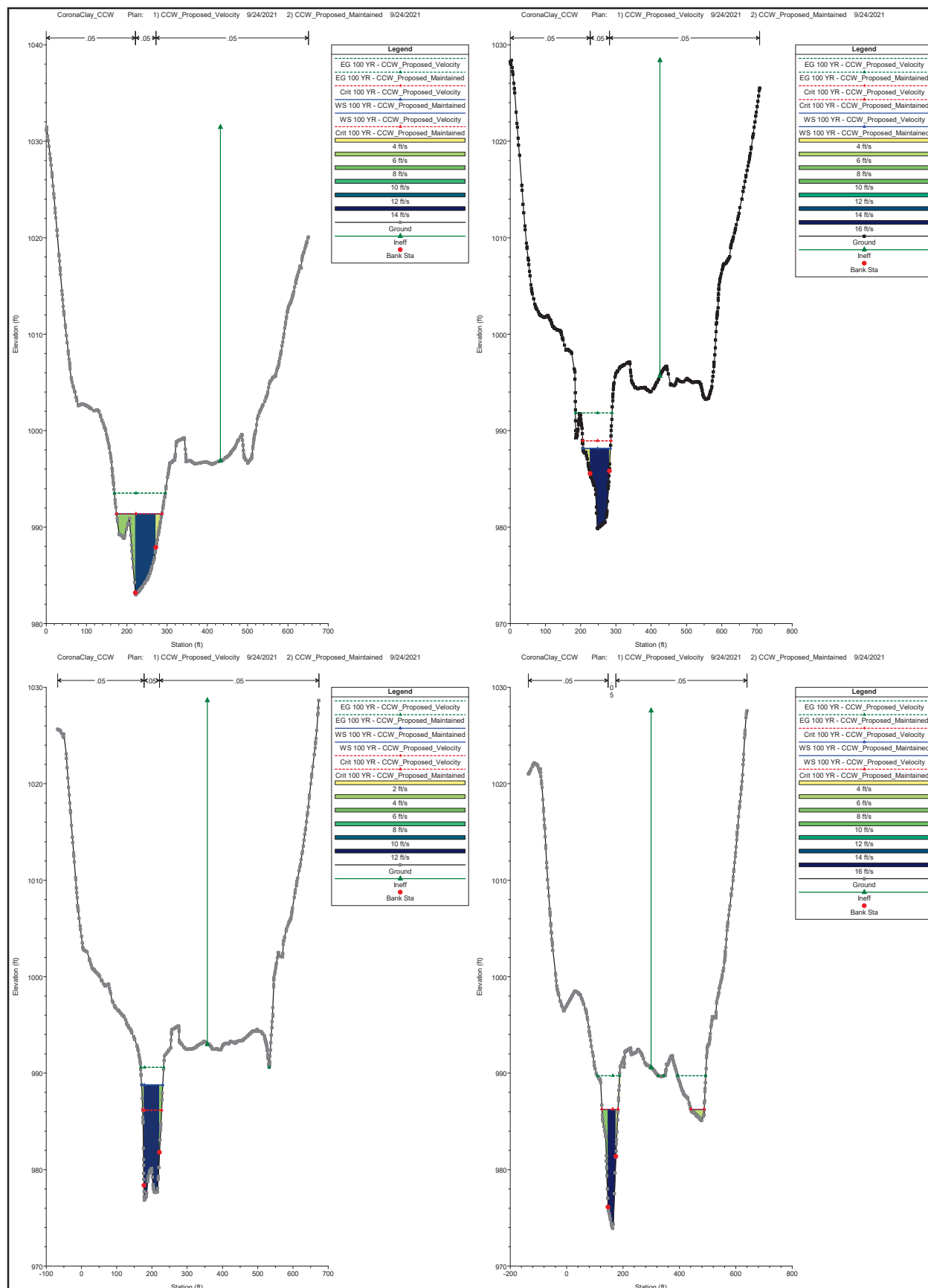
CoronaClay_CCW Plan: 1) CCW_Proposed_Velocity 9/24/2021 2) CCW_Proposed_Maintained 9/24/2021

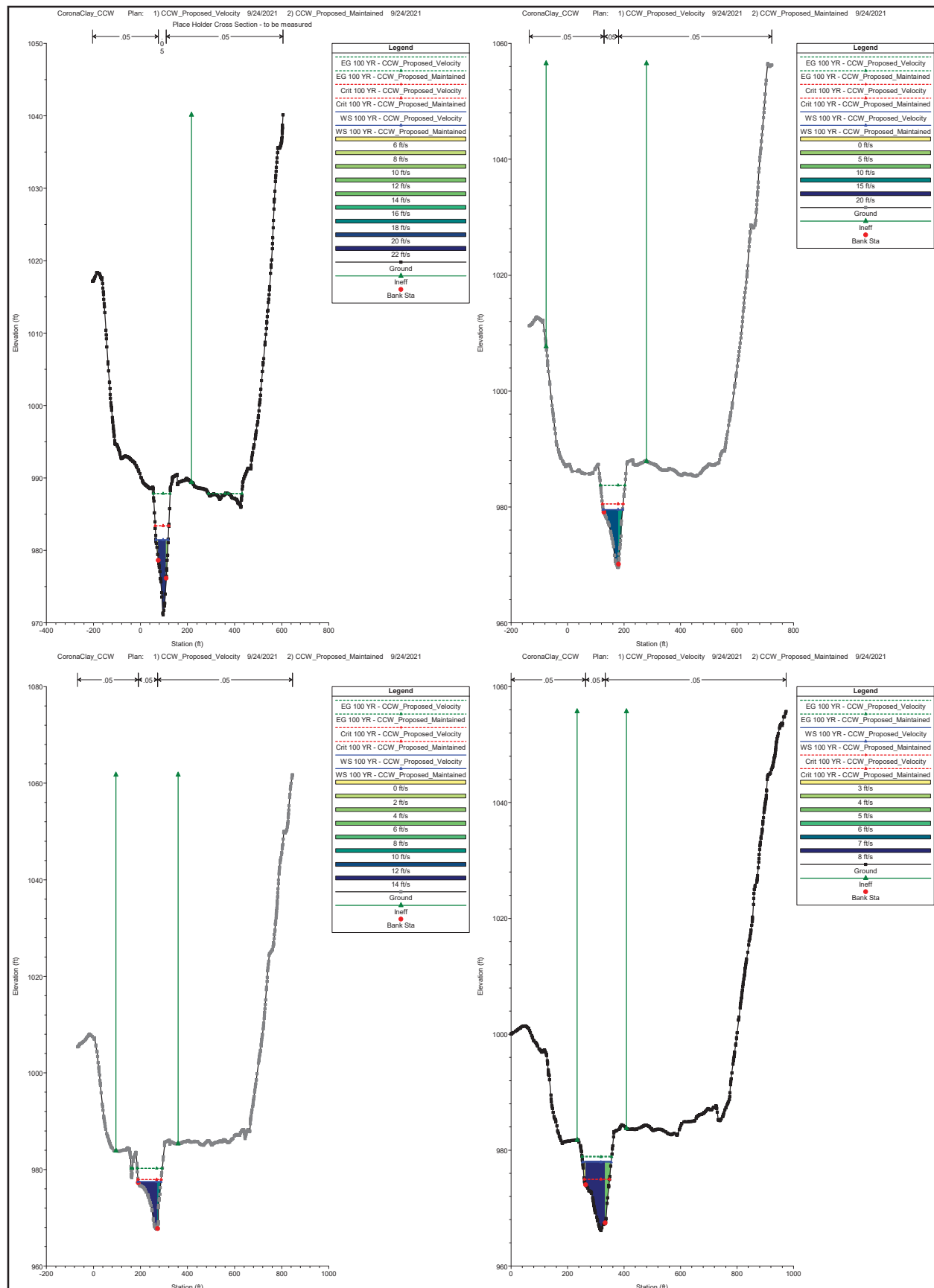
COLDWATER CREEK PROP ALIGN 8_19

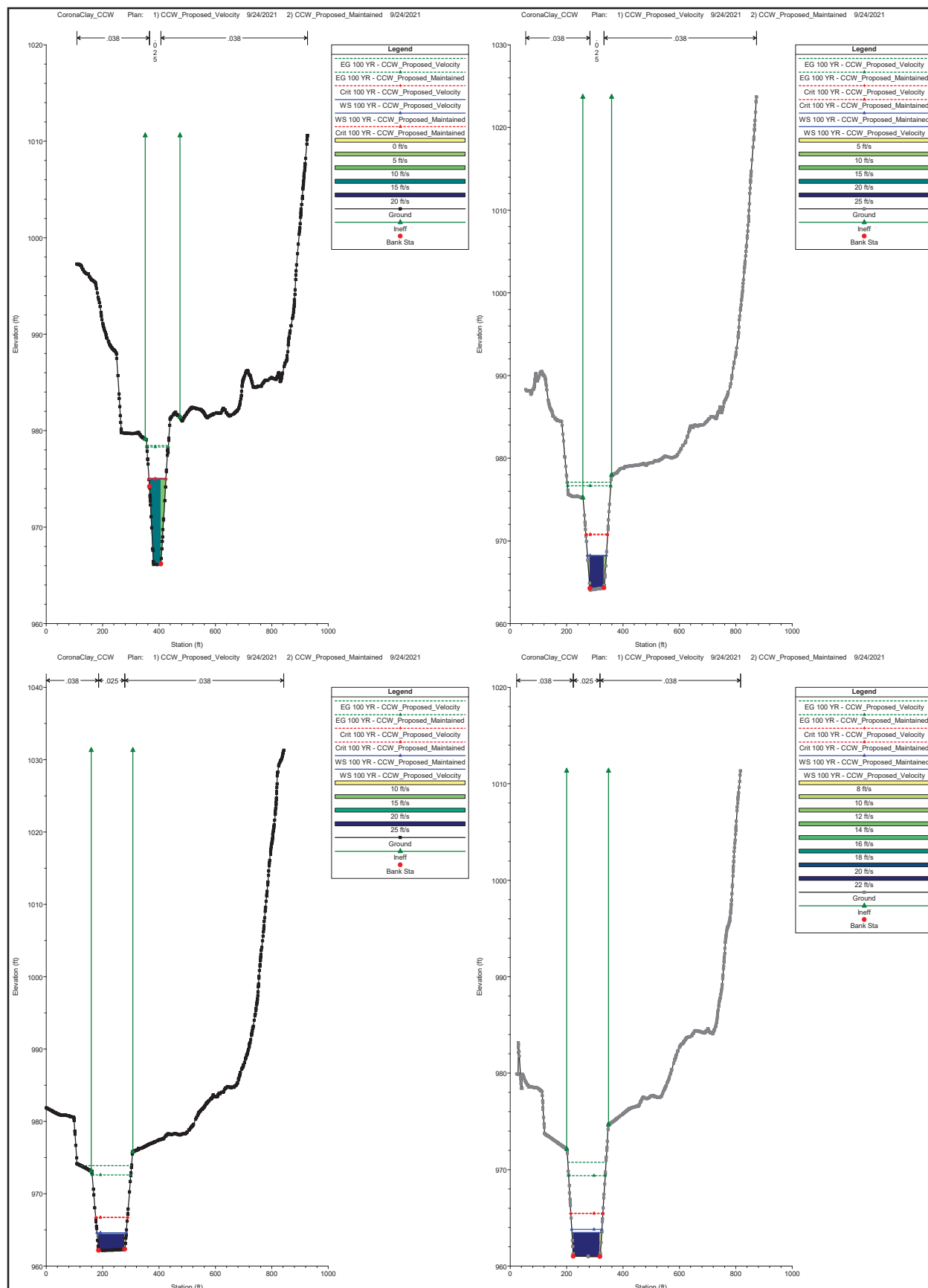
Legend	
EG 100 YR - CCW_Proposed_Velocity	
EG 100 YR - CCW_Proposed_Maintained	
WS 100 YR - CCW_Proposed_Maintained	
WS 100 YR - CCW_Proposed_Velocity	
Crit 100 YR - CCW_Proposed_Velocity	
Crit 100 YR - CCW_Proposed_Maintained	
Ground	

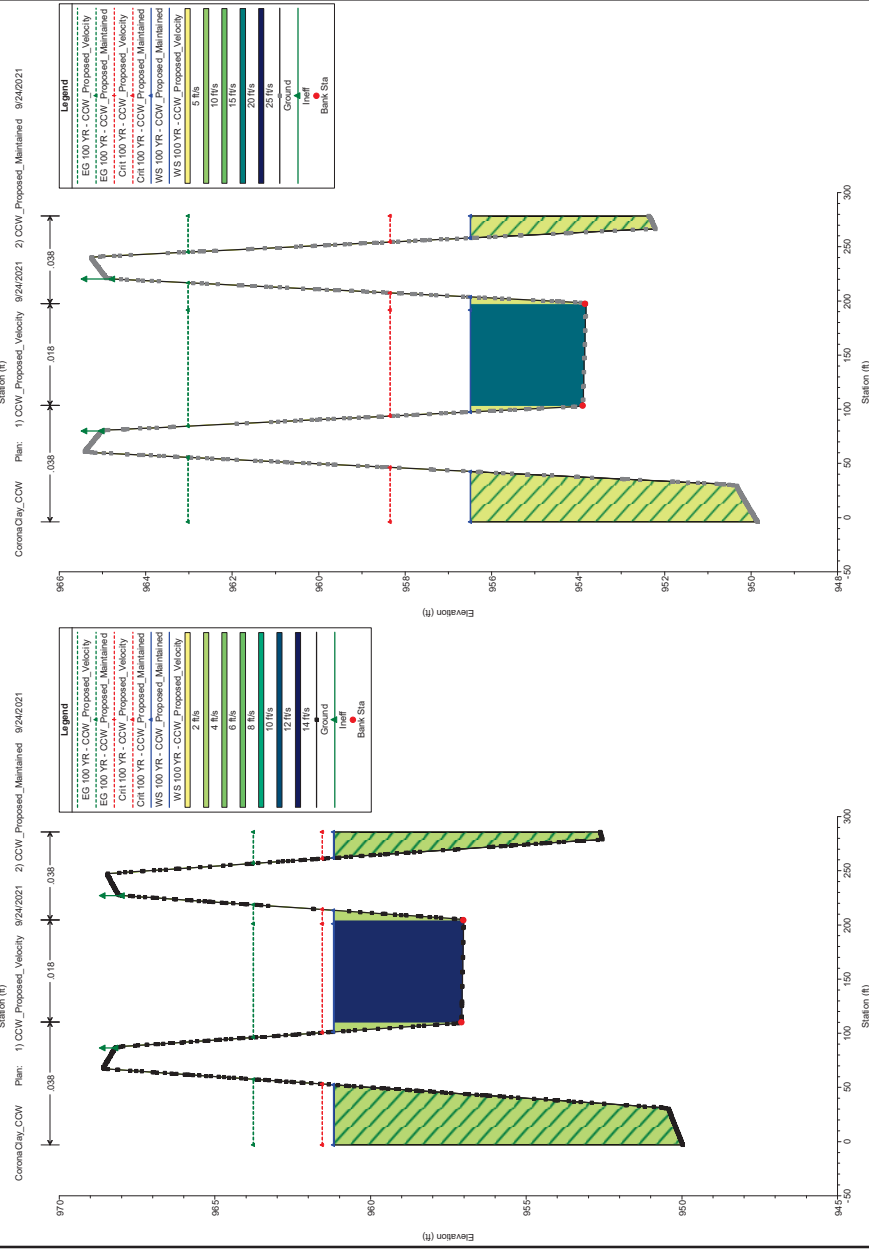
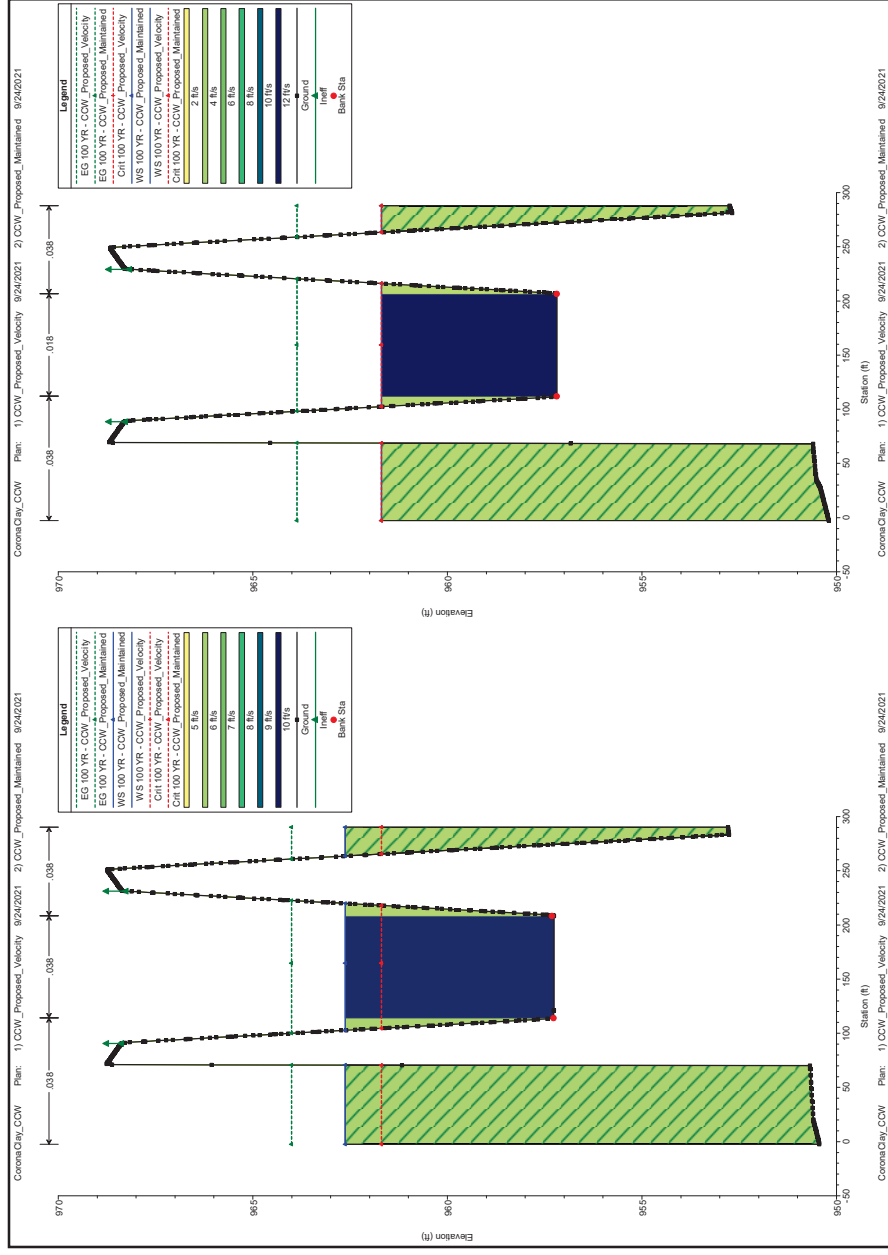


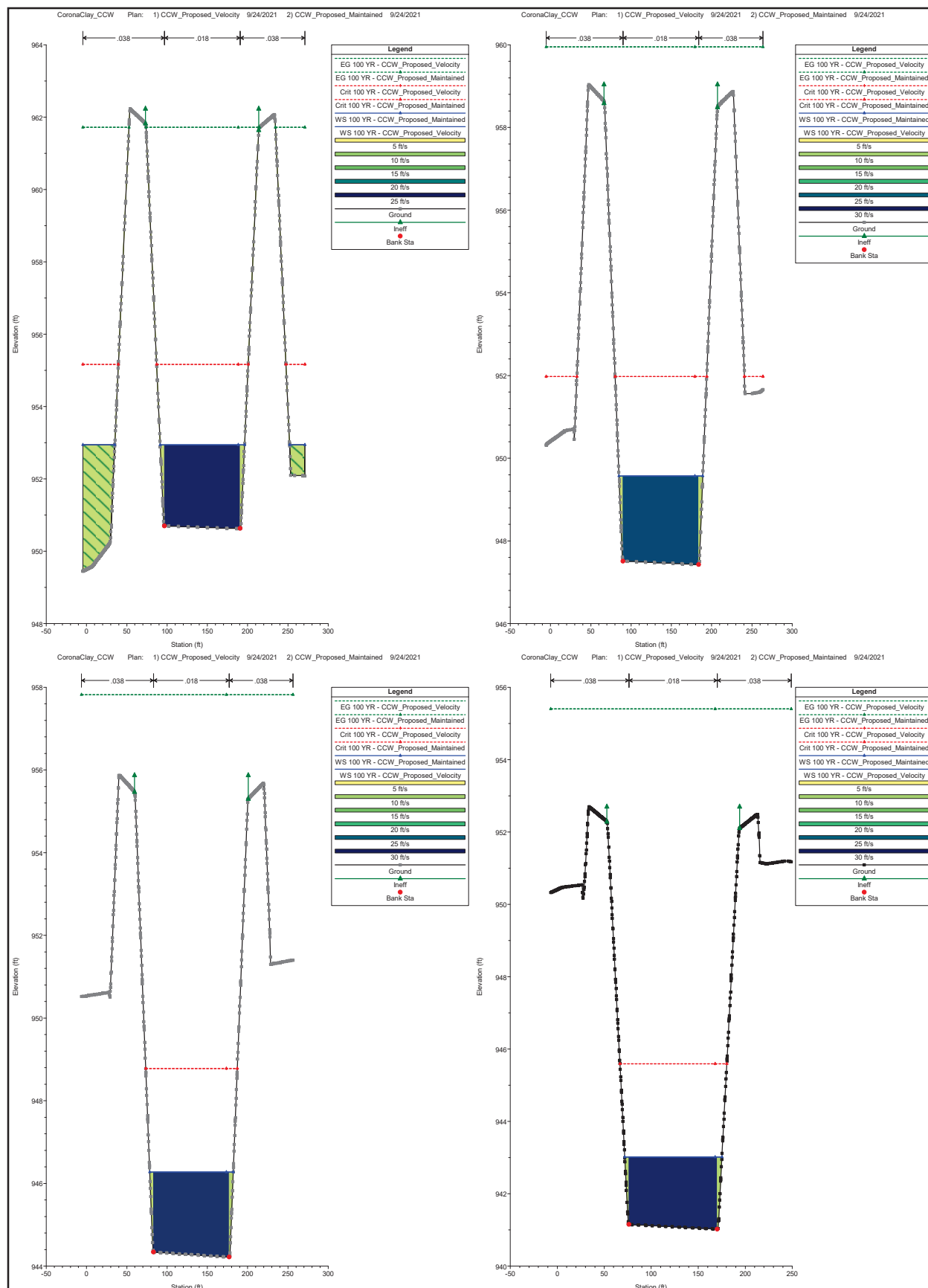


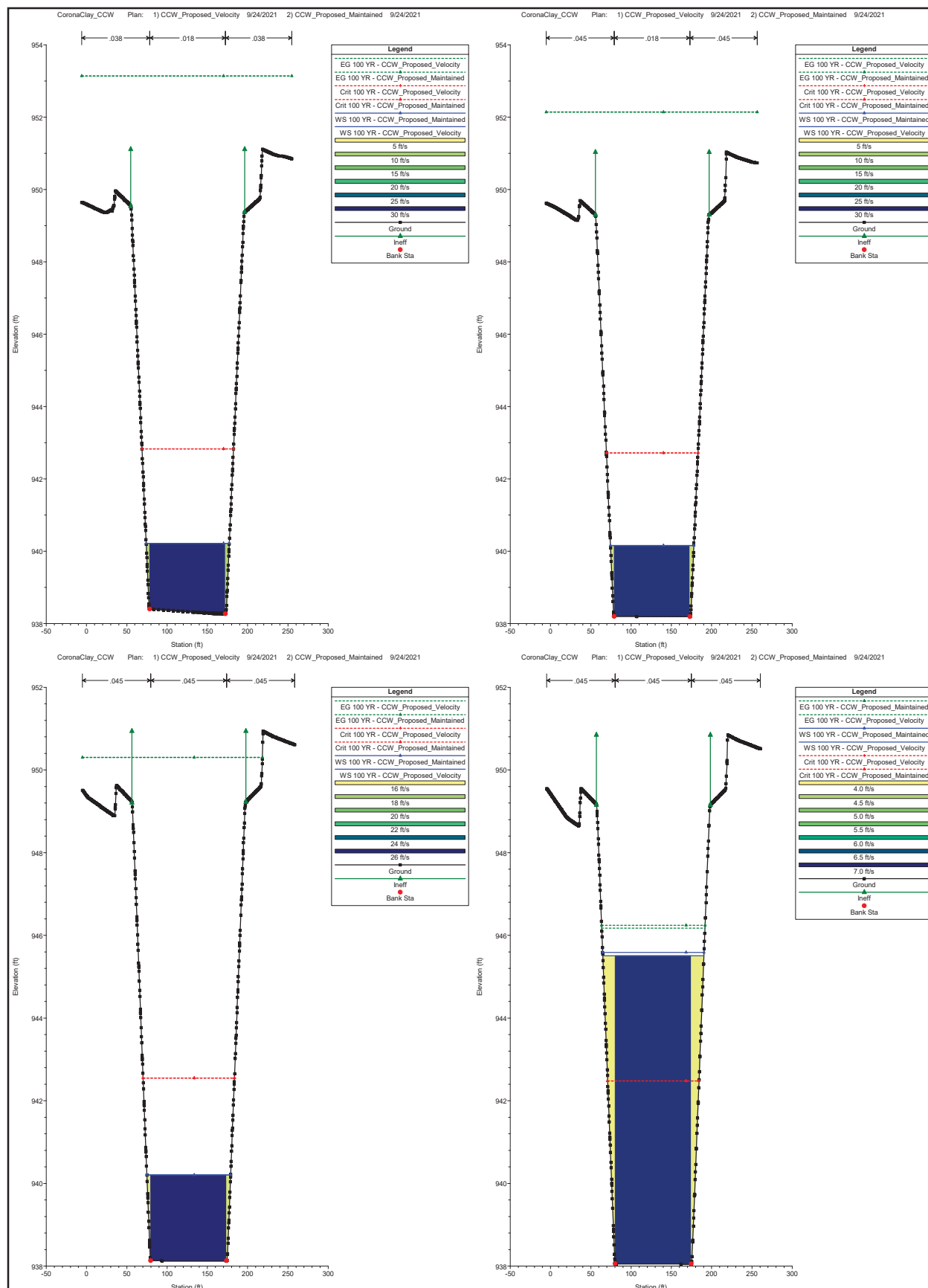


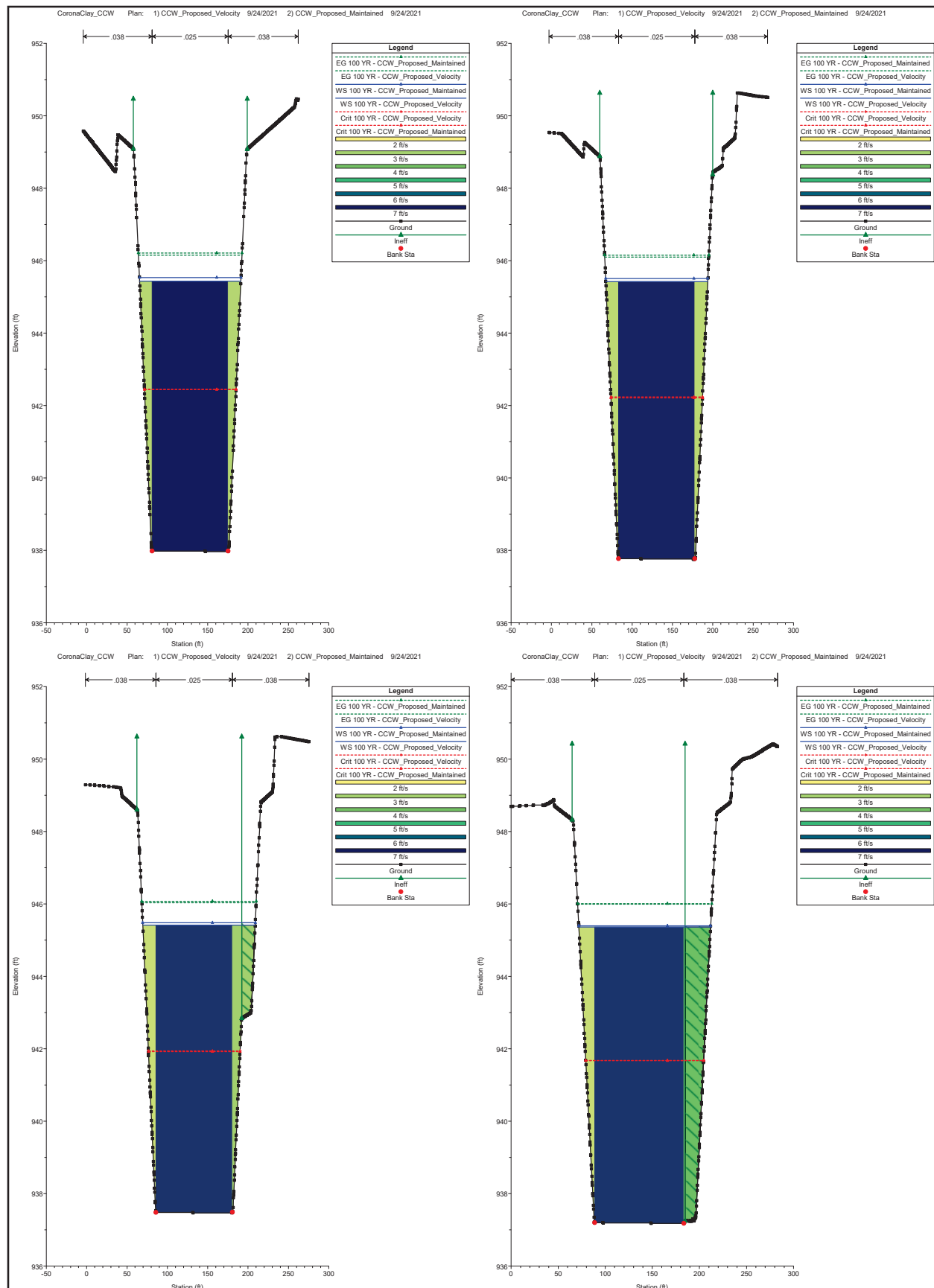


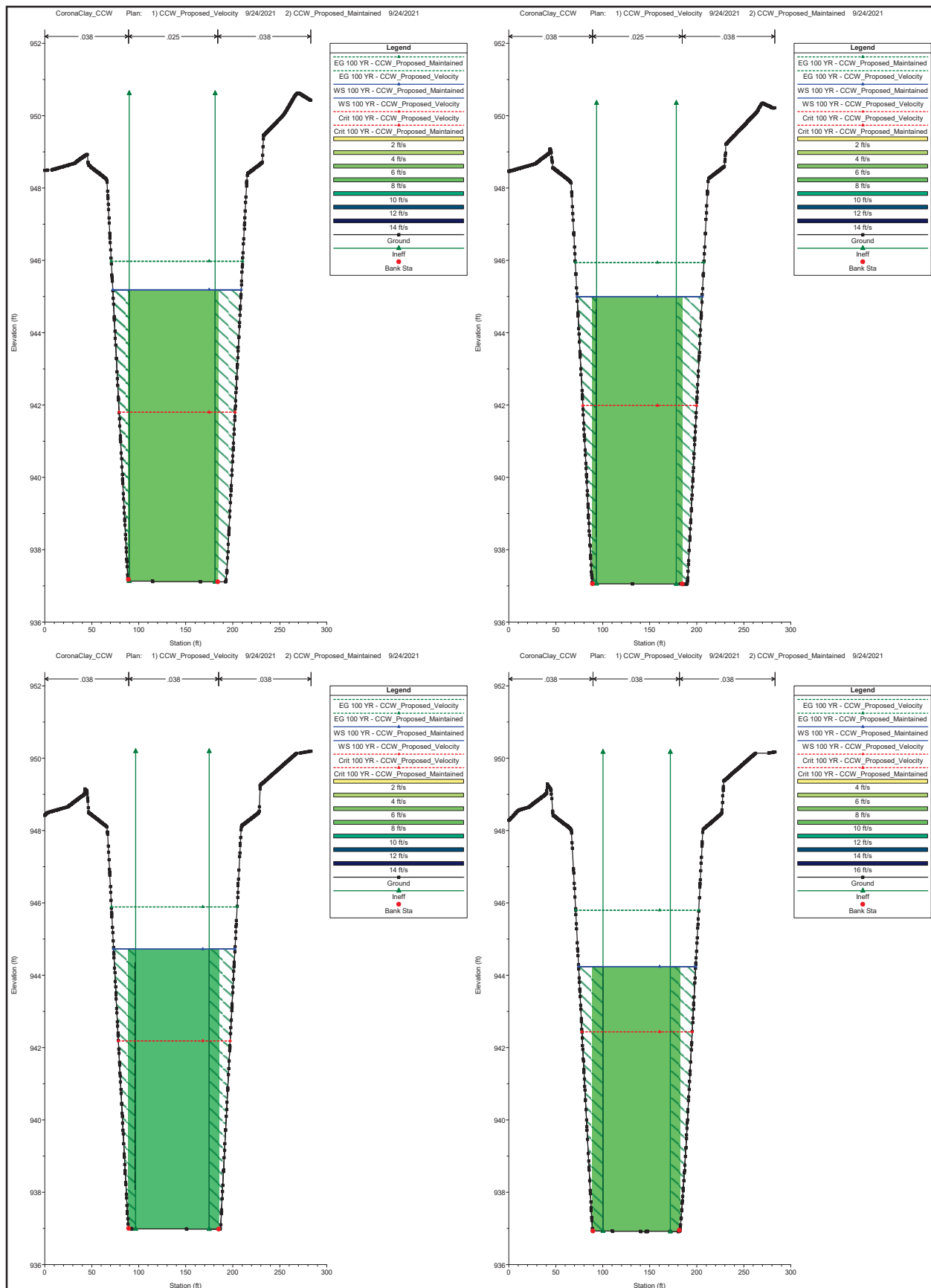


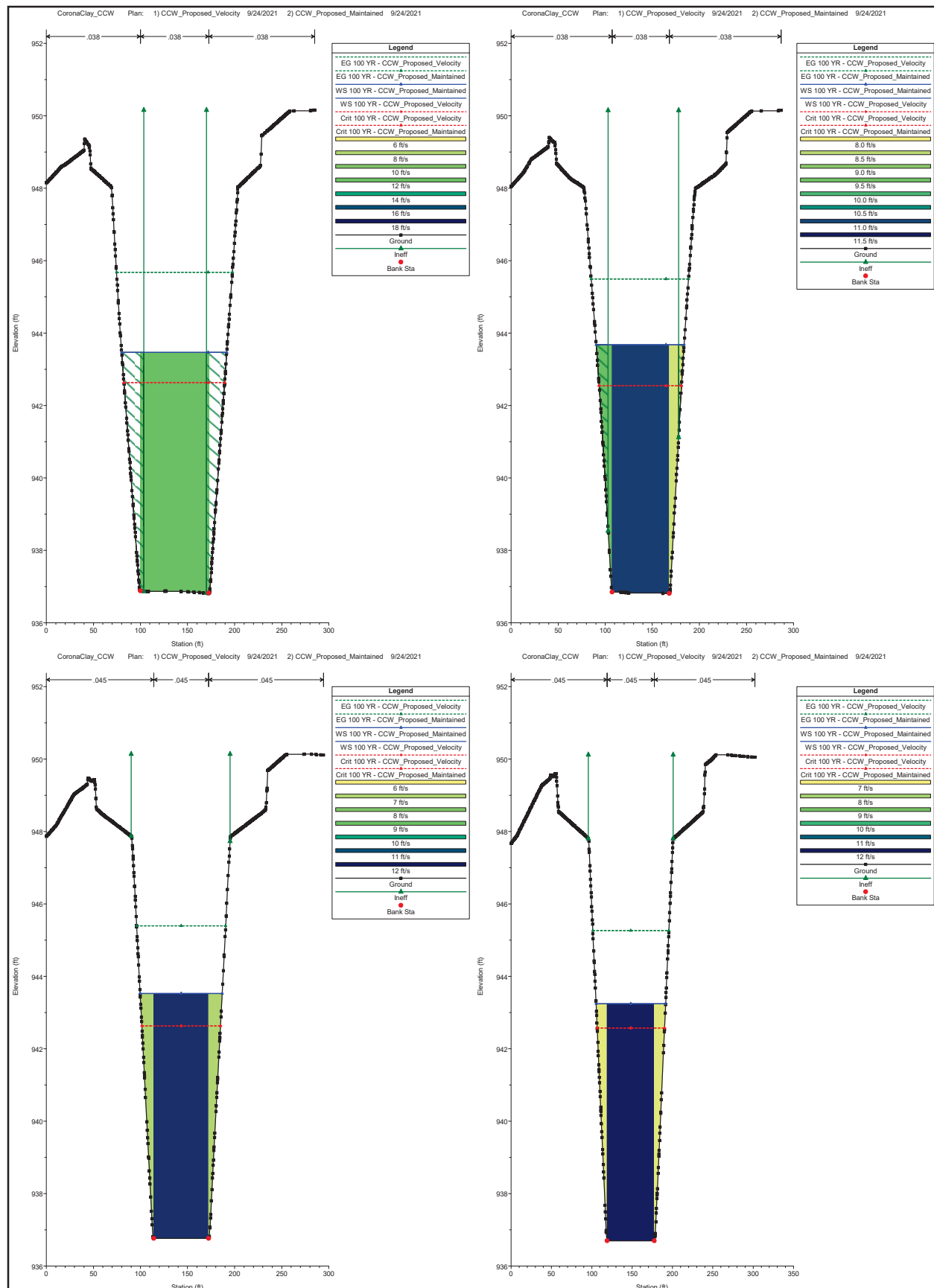


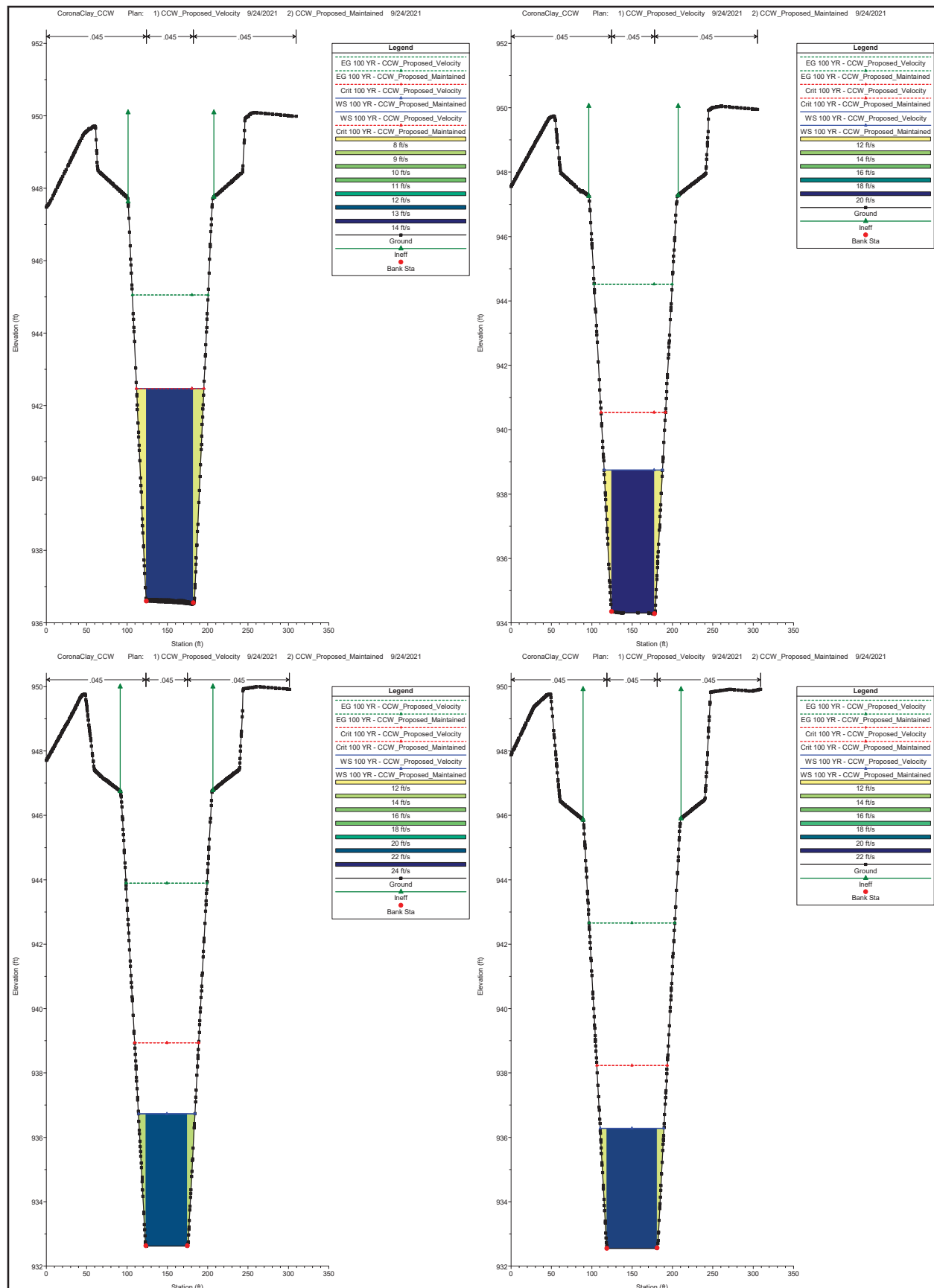


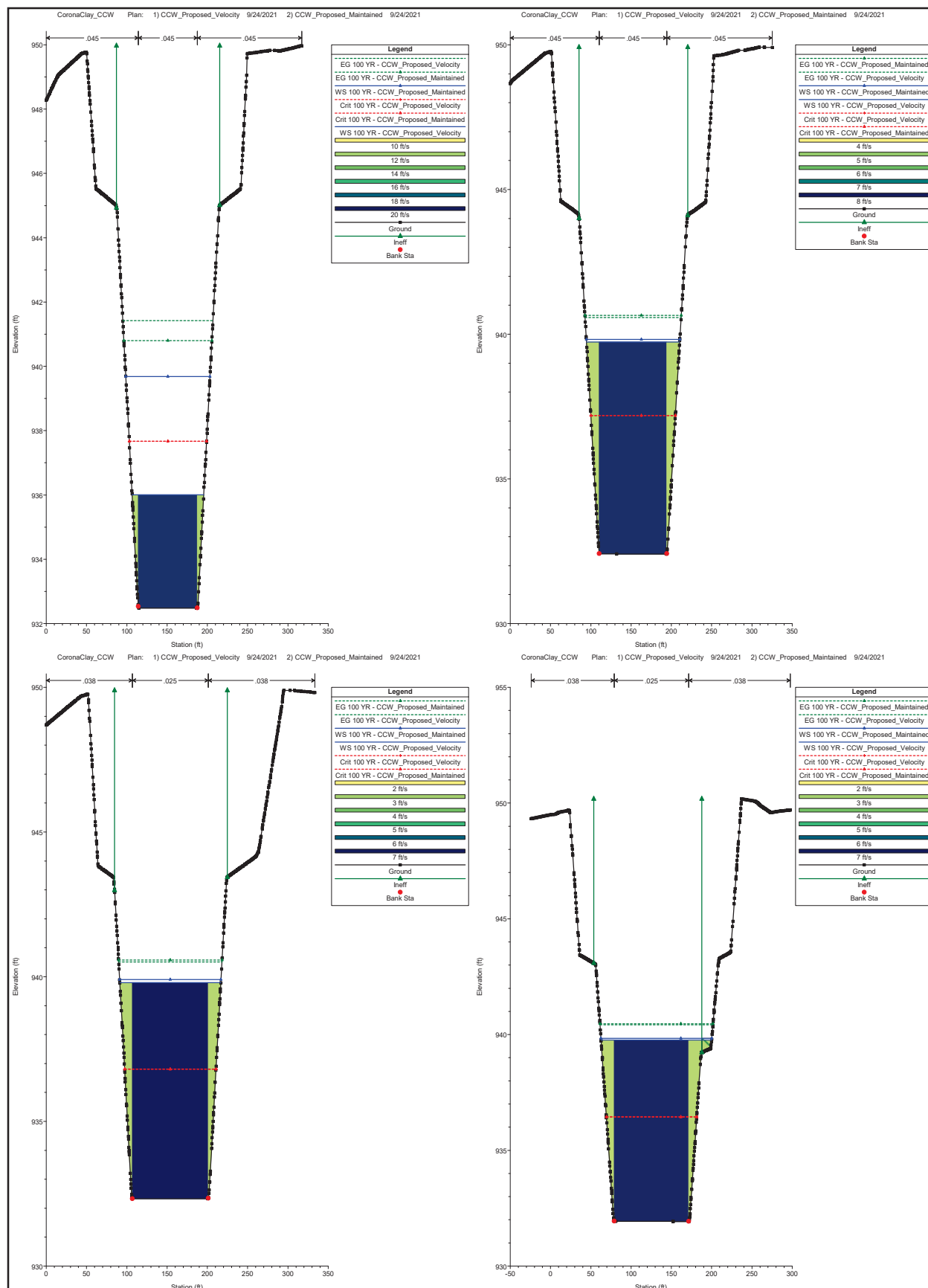


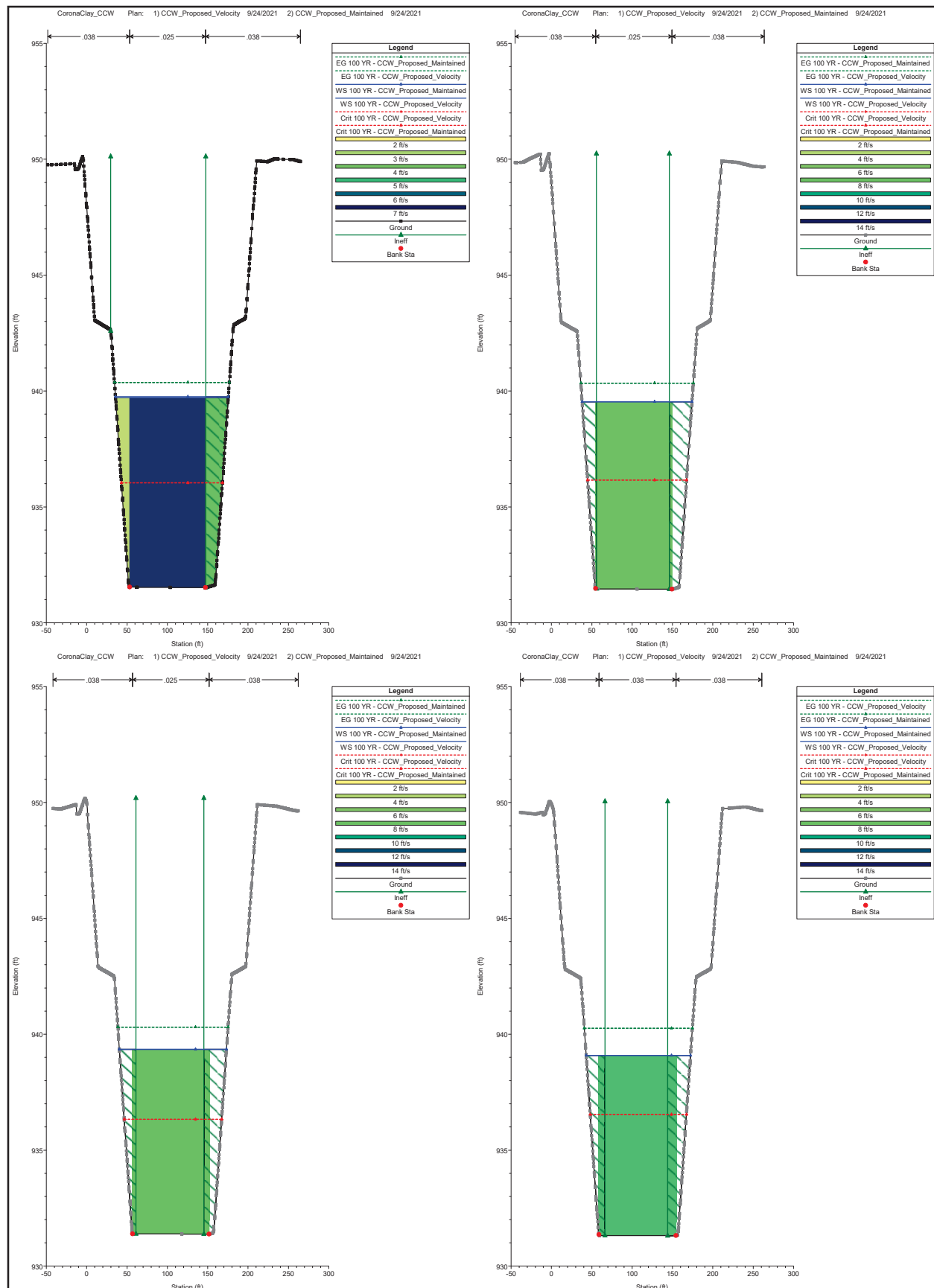


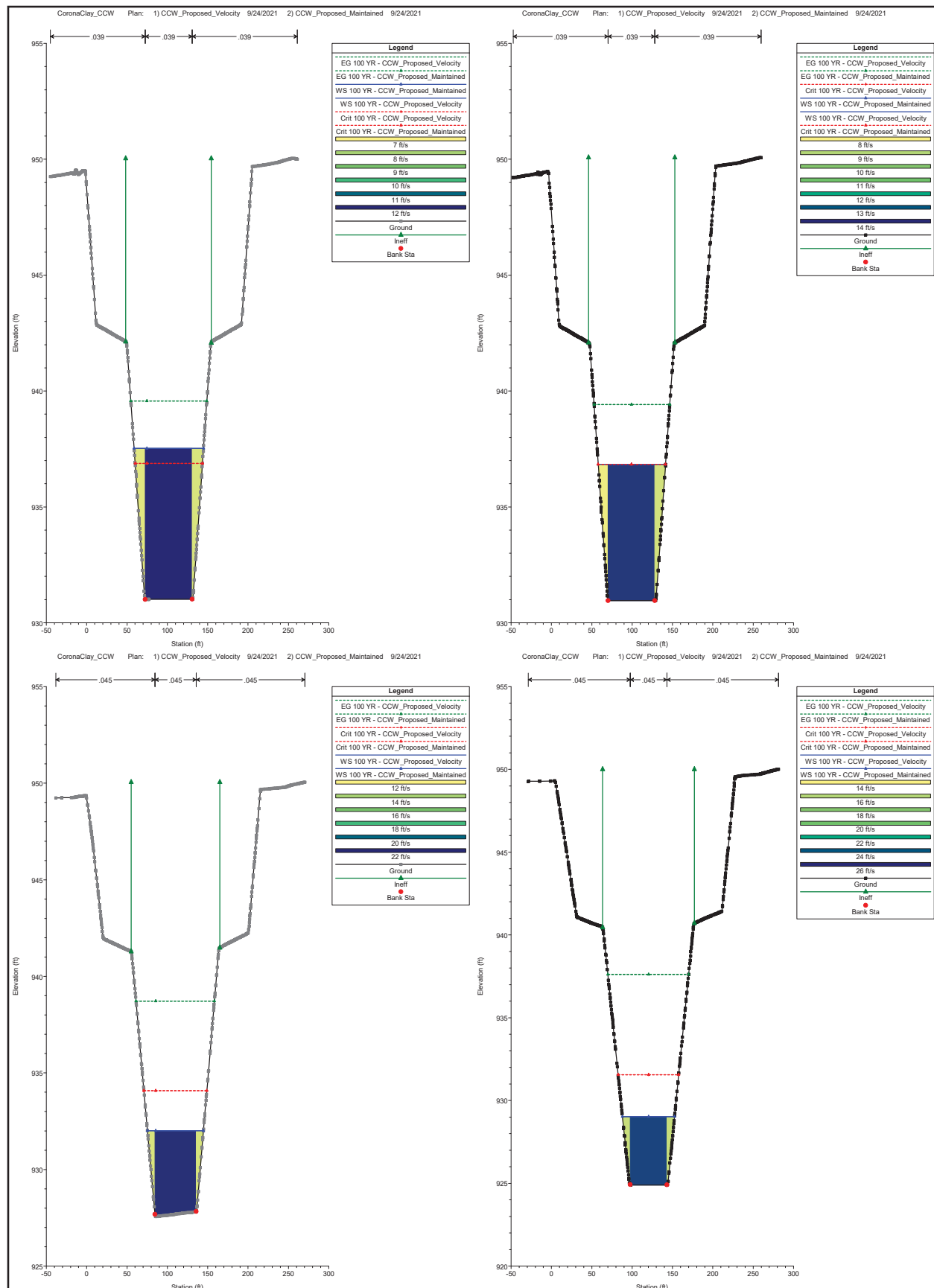


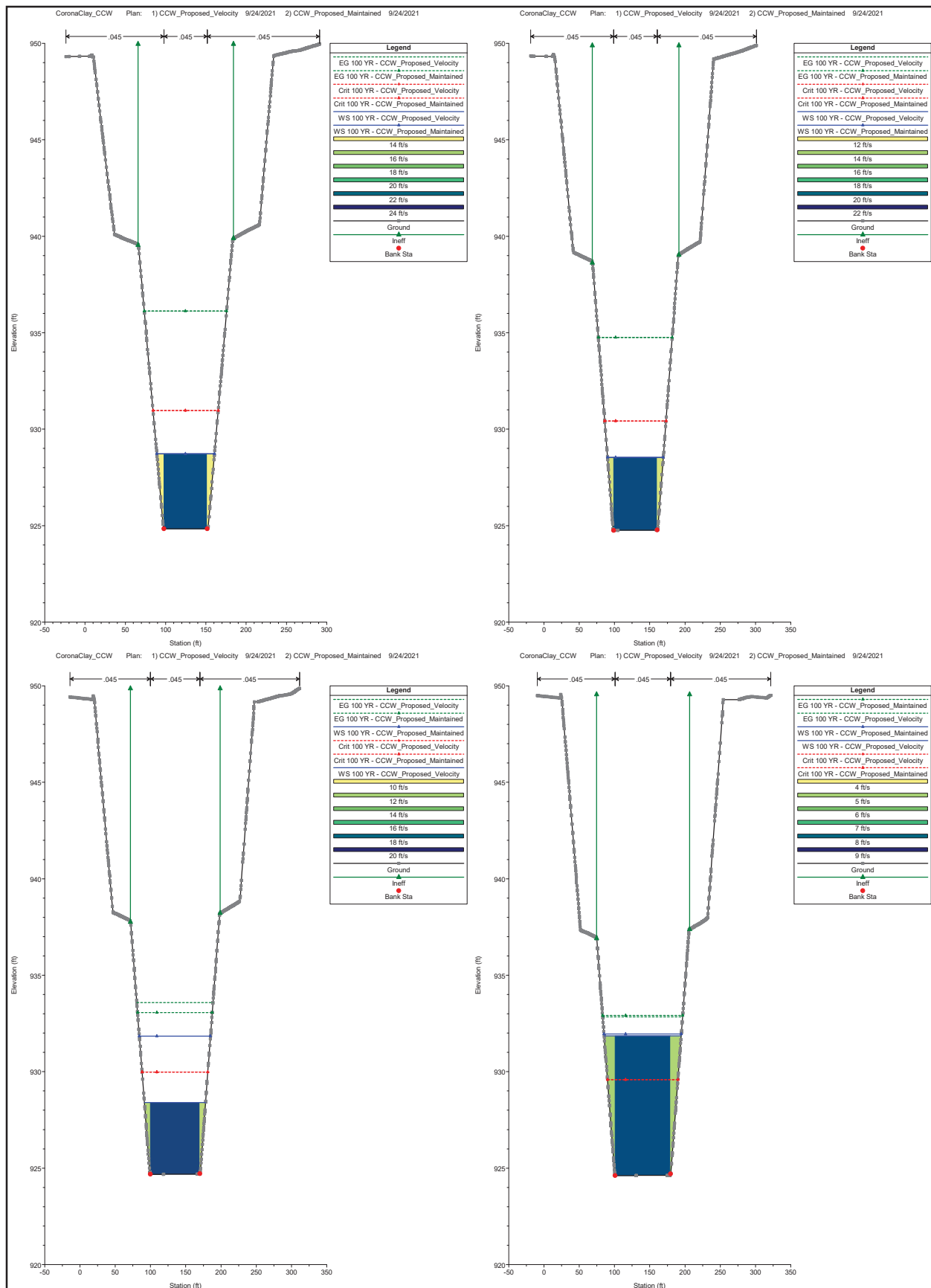


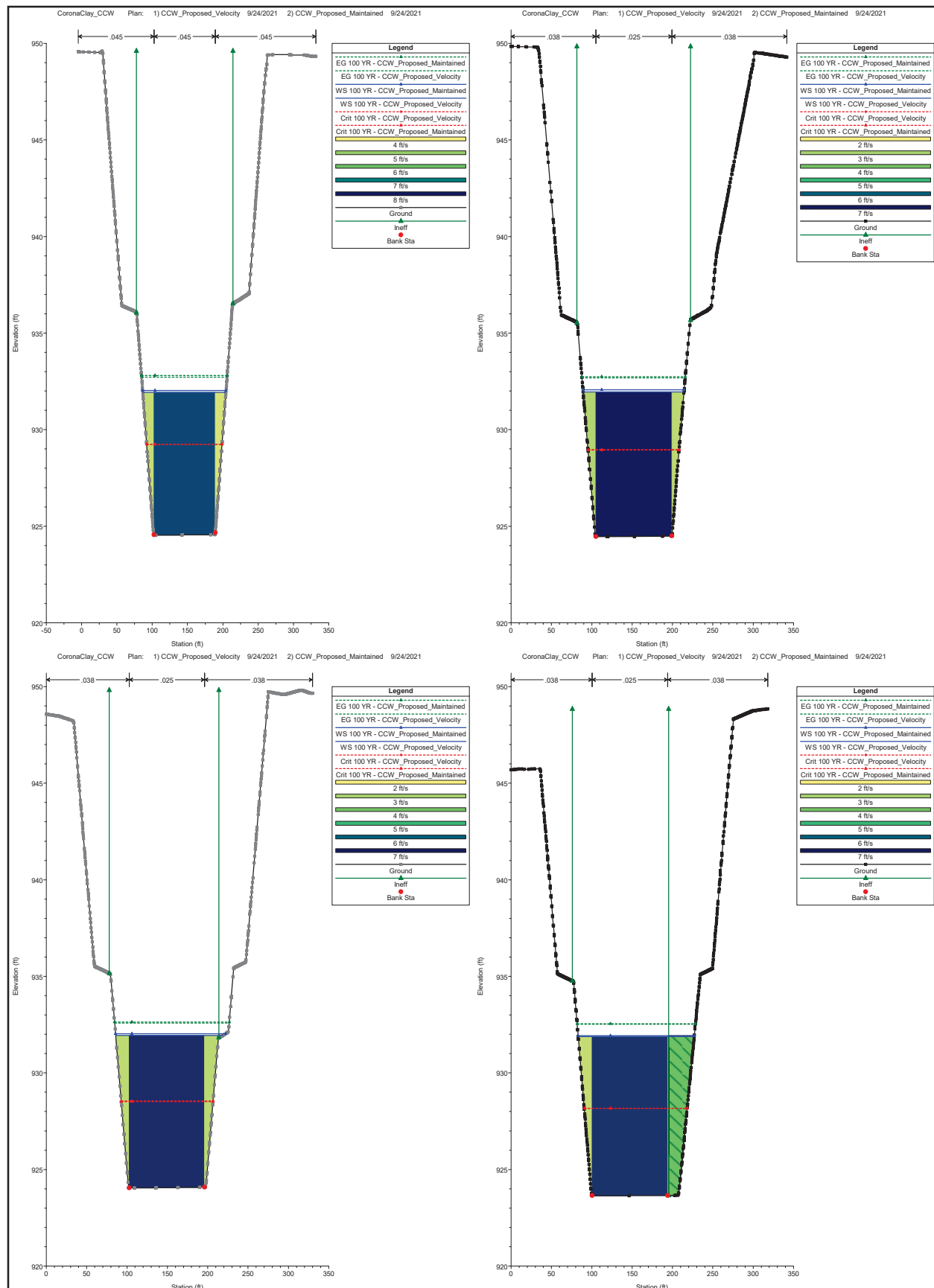


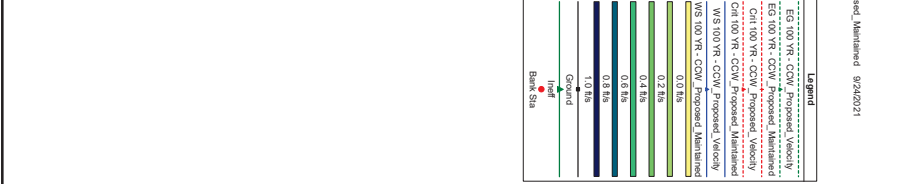
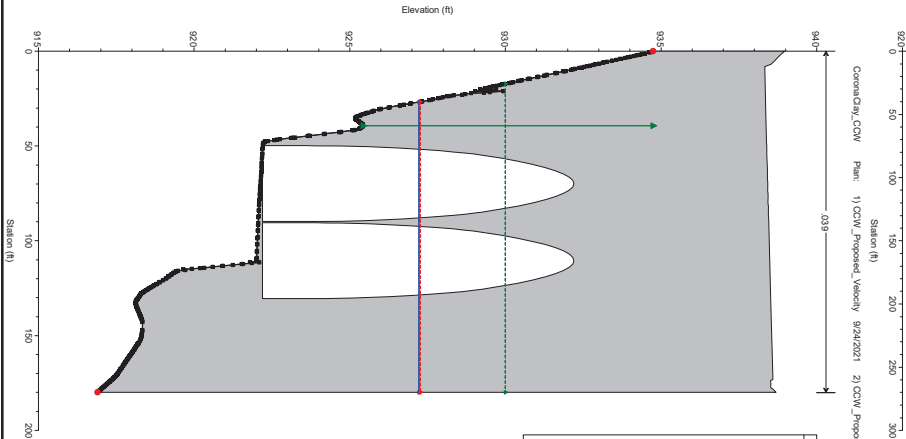
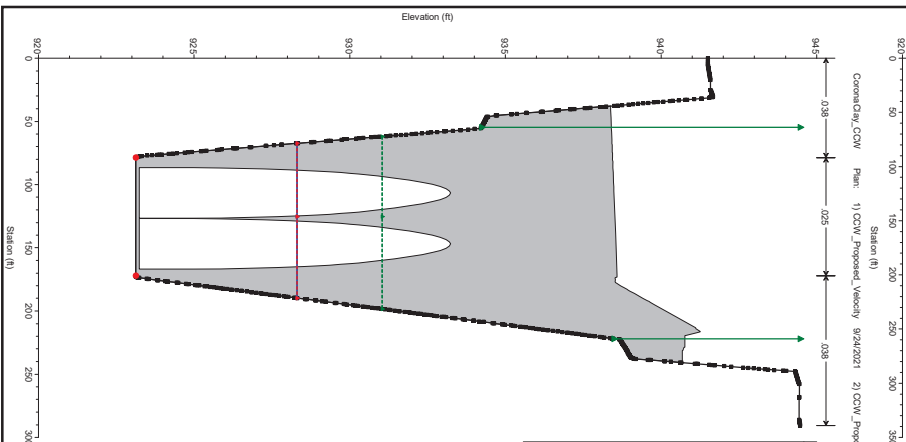
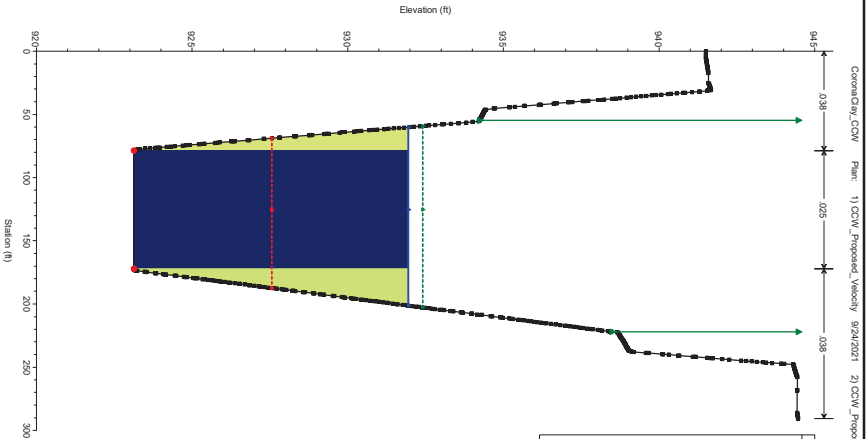
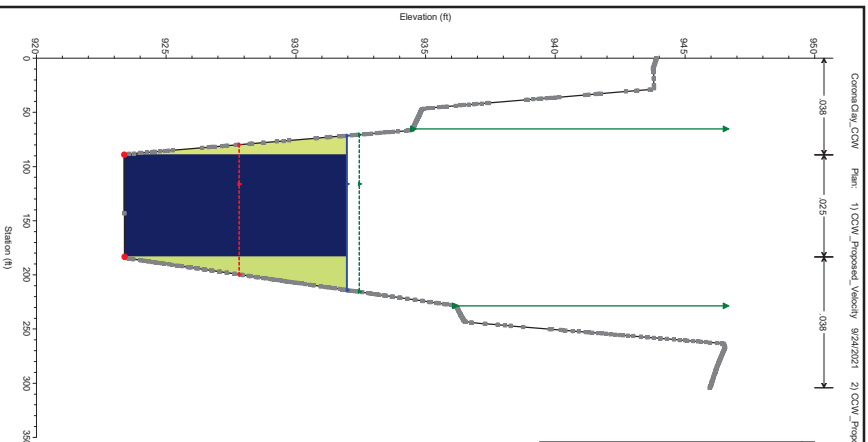


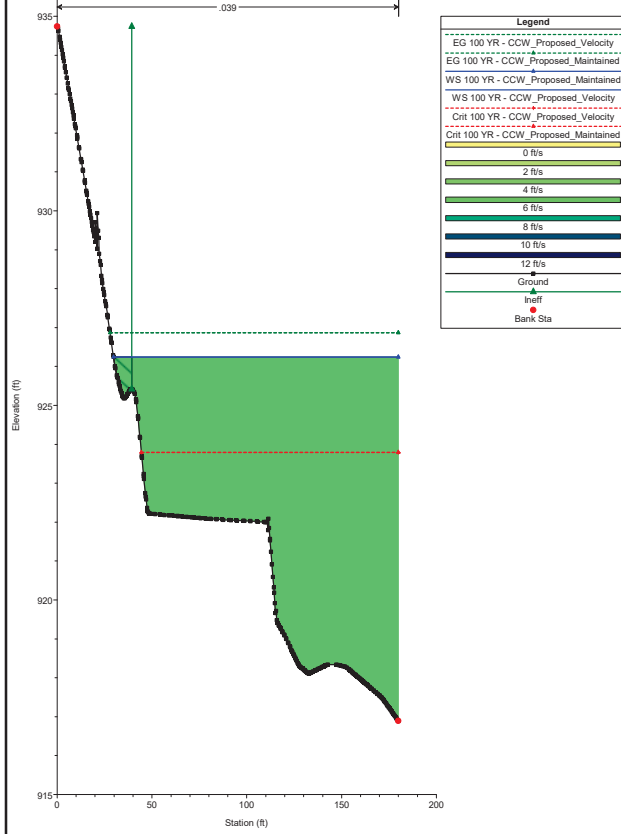












Appendix C

Temescal Wash Hydraulics



Temescal Wash
Cross Sections Location Map
Rick Engineering Company
JN-18602 09/24/2021

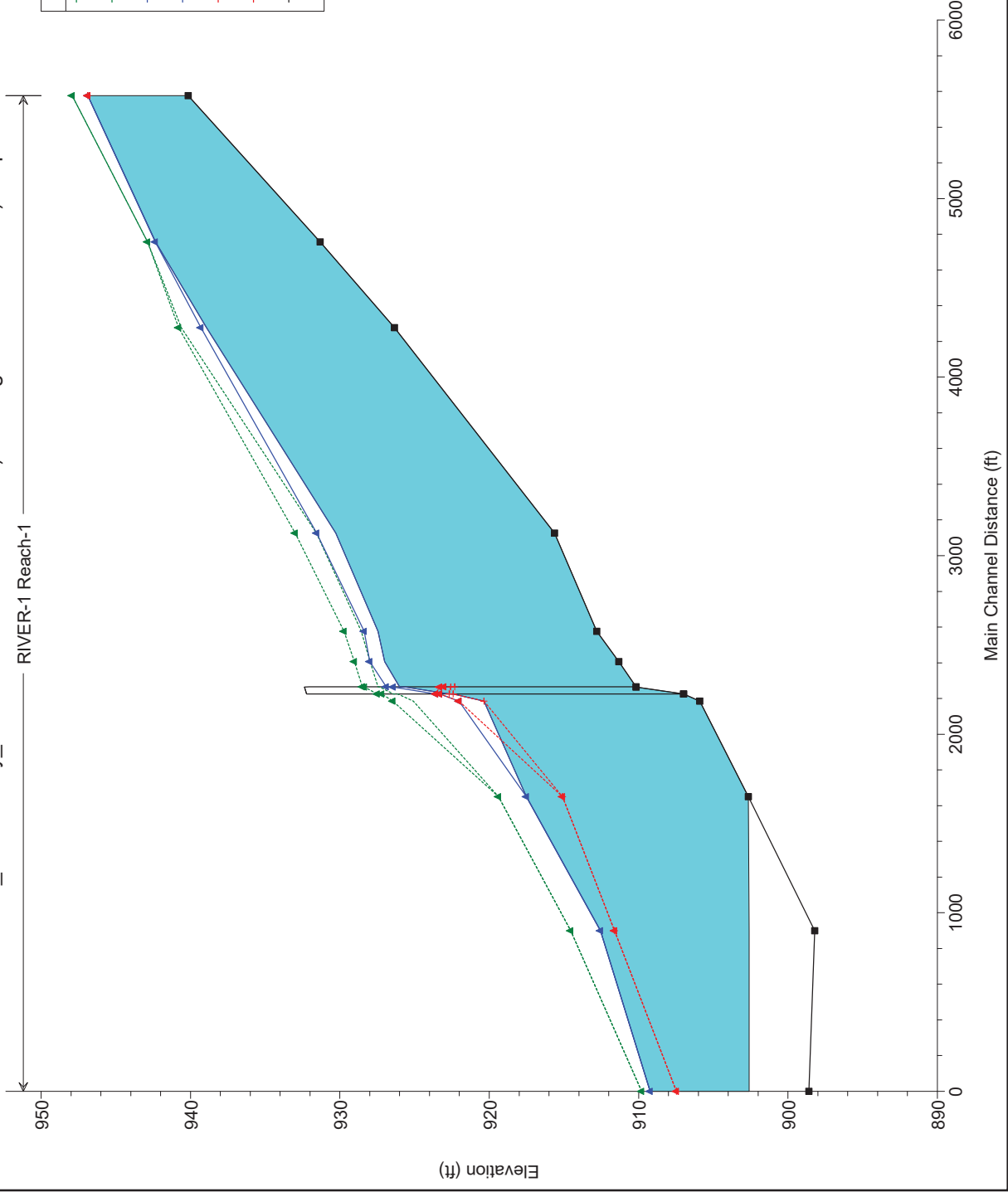
↑ N
Not to Scale

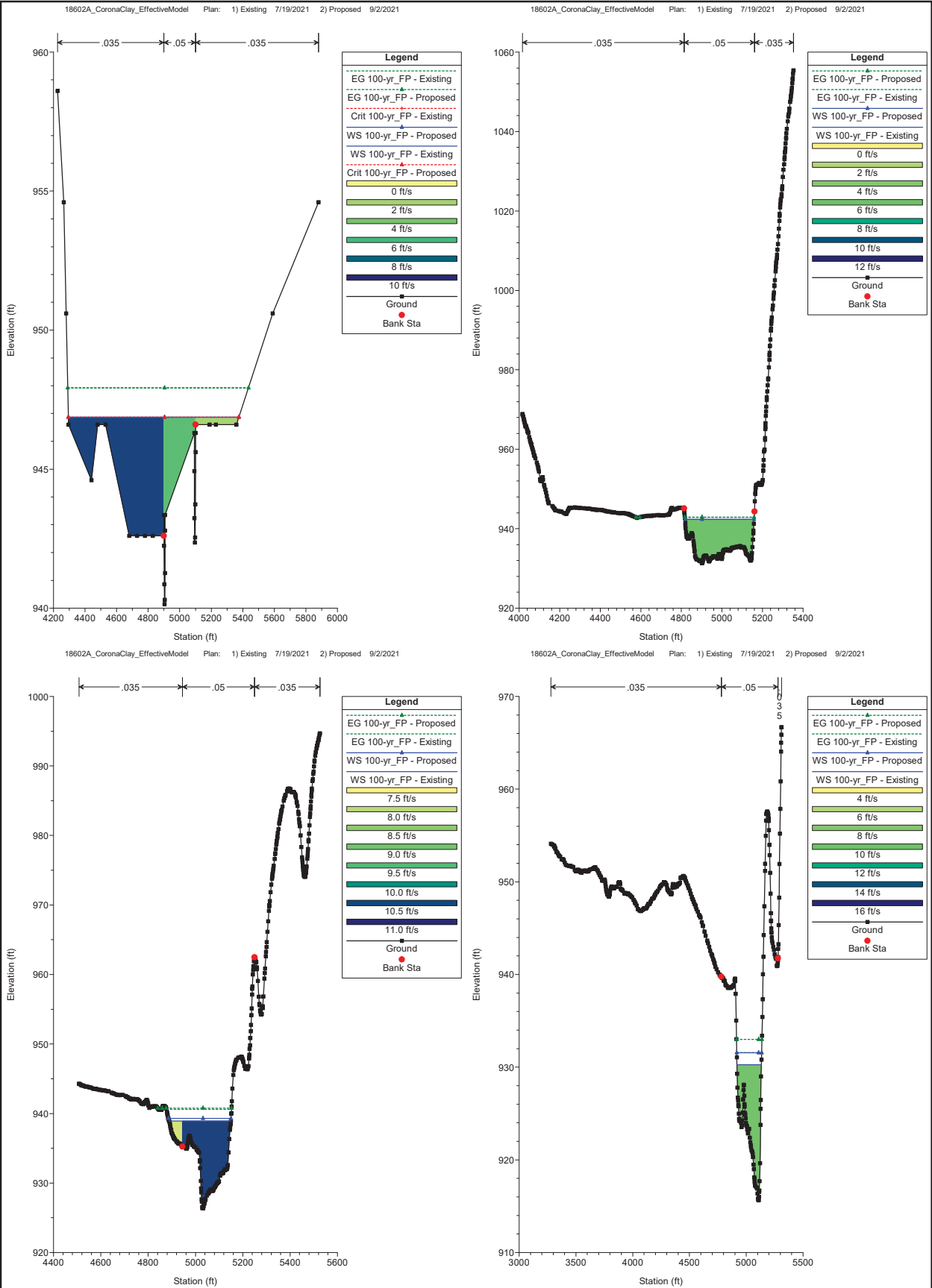
Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	E.G. Slope (ft/ft)	Mann Wtd Chnl	Vel Left (ft/s)	Vel Chnl (ft/s)	Vel Right (ft/s)	Vel Total (ft/s)	Top Width (ft)	Froude # Chl	Max Ch Dpth (ft)	Shear LOB (lb/sq ft)	Shear Chan (lb/sq ft)	Shear ROB (lb/sq ft)
Reach-1	73193	100-yr_FP	Existing	15900.00	940.15	946.87	0.012254	0.050	8.70	5.48	1.92	7.76	1081.48	0.65	6.72	1.93	1.64	0.20
		100-yr_FP	Proposed	15900.00	940.15	946.87	0.012254	0.050	8.70	5.48	1.92	7.76	1081.48	0.65	6.72	1.93	1.64	0.20
		25-yr	Proposed	5700.00	940.15	945.07	0.012873	0.050	7.82	3.50		7.08	479.00	0.59	4.92	1.51	0.85	
Reach-1	72643	100-yr_FP	Existing	15900.00	931.32	942.34	0.002483	0.050		5.84				0.36	11.02		1.21	
		100-yr_FP	Proposed	15900.00	931.32	942.35	0.002470	0.050		5.83				0.36	11.03		1.21	
		25-yr	Proposed	5700.00	931.32	938.41	0.002655	0.050		4.05				0.34	7.09		0.71	
Reach-1	71893	100-yr_FP	Existing	15900.00	926.34	938.93	0.010040	0.050	7.79	10.57		10.32	281.19	0.71	12.59	1.55	4.19	
		100-yr_FP	Proposed	15900.00	926.34	939.30	0.008356	0.050	7.49	9.96		9.72	265.29	0.66	12.96	1.40	3.66	
		25-yr	Proposed	5700.00	926.34	934.93	0.012286	0.050		8.97		8.97	138.00	0.74	8.59		3.45	
Reach-1	70743	100-yr_FP	Existing	15900.00	915.63	930.27	0.006191	0.050		9.17		9.17	215.22	0.57	14.64		3.00	
		100-yr_FP	Proposed	19400.00	915.63	931.54	0.005781	0.050		9.65		9.65	219.48	0.56	15.91		3.18	
		25-yr	Proposed	5700.00	915.63	926.24	0.005555	0.050		6.27		6.27	186.11	0.50	10.61		1.65	
Reach-1	70193	100-yr_FP	Existing	15900.00	912.81	927.44	0.004698	0.050		8.50		8.50	213.79	0.51	14.63		2.50	
		100-yr_FP	Proposed	19400.00	912.81	928.37	0.006012	0.050		9.33		9.33	248.94	0.57	15.56		3.06	
		25-yr	Proposed	5700.00	912.81	921.78	0.010655	0.050		7.71		7.71	182.65	0.67	8.97		2.65	
Reach-1	69955	100-yr_FP	Existing	16840.00	911.32	927.00	0.002360	0.050	5.43	8.27	7.97	7.74	288.25	0.39	15.68	0.83	2.02	1.12
		100-yr_FP	Proposed	19400.00	911.32	927.99	0.002272	0.050	5.41	8.50	8.48	7.97	366.87	0.39	16.67	0.62	2.08	1.22
		25-yr	Proposed	5700.00	911.32	920.88	0.003917	0.050	5.87	7.27	4.74	6.60	176.17	0.46	9.56	0.80	1.89	0.58
Reach-1	69813	100-yr_FP	Existing	16840.00	910.17	926.01	0.005324	0.050		9.63		9.63	174.62	0.54	15.84		3.11	
		100-yr_FP	Proposed	19400.00	910.17	926.89	0.005434	0.050		10.19		10.19	177.07	0.55	16.72		3.40	
		25-yr	Proposed	5700.00	910.17	920.24	0.004946	0.050		6.90		6.90	131.53	0.48	10.07		1.85	
Reach-1	69793		Bridge															
Reach-1	69773	100-yr_FP	Existing	16840.00	906.99	922.42	0.018825	0.045		15.47		15.47	147.35	1.00	15.43		7.41	
		100-yr_FP	Proposed	19400.00	906.99	923.32	0.018635	0.045		15.82		15.82	159.61	1.01	16.33		7.65	
		25-yr	Proposed	5700.00	906.99	916.17	0.021515	0.045		13.67		13.67	72.38	1.00	9.18		6.37	
Reach-1	69733	100-yr_FP	Existing	16840.00	905.90	920.36	0.002609	0.020	5.83	20.03	8.61	13.57	149.85	0.99	14.46	0.72	1.97	1.29
		100-yr_FP	Proposed	19400.00	905.90	922.03	0.002146	0.020	6.52	19.73	7.93	12.94	184.95	0.92	16.13	0.81	1.84	1.08
		25-yr	Proposed	5700.00	905.90	914.73	0.002973	0.020	3.49	14.44	5.52	11.33	98.28	0.96	8.83	0.29	1.25	0.68
Reach-1	69198	100-yr_FP	Existing	19400.00	902.66	917.51	0.005882	0.050	8.66	11.99	8.46	10.56	264.62	0.60	14.85	1.59	4.43	1.54
		100-yr_FP	Proposed	19400.00	902.66	917.51	0.005882	0.050	8.66	11.99	8.46	10.56	264.62	0.60	14.85	1.59	4.43	1.54
		25-yr	Proposed	5700.00	902.66	912.17	0.005457	0.050	5.97	7.88	5.64	7.44	150.47	0.53	9.51	0.90	2.32	0.82
Reach-1	68448	100-yr_FP	Existing	19400.00	902.60	912.56	0.007362	0.050	10.09	11.81	12.30	11.20	263.97	0.66	9.96	2.12	4.58	2.85
		100-yr_FP	Proposed	19400.00	902.60	912.56	0.007362	0.050	10.09	11.81	12.30	11.20	263.97	0.66	9.96	2.12	4.58	2.85
		25-yr	Proposed	5700.00	902.60	909.69	0.002719	0.050	4.70	5.72	6.53	5.54	210.81	0.38	7.09	0.50	1.20	0.86
Reach-1	67548	100-yr_FP	Existing	19400.00	902.60	909.23	0.003006	0.050	7.05	4.39		5.61	716.59	0.37	6.63	0.98	0.83	
		100-yr_FP	Proposed	19400.00	902.60	909.23	0.003006	0.050	7.05	4.39		5.61	716.59	0.37	6.63	0.98	0.83	
		25-yr	Proposed	5700.00	902.60	909.49	0.000220	0.050	1.96	1.24		1.56	719.93	0.10	6.89	0.07	0.06	

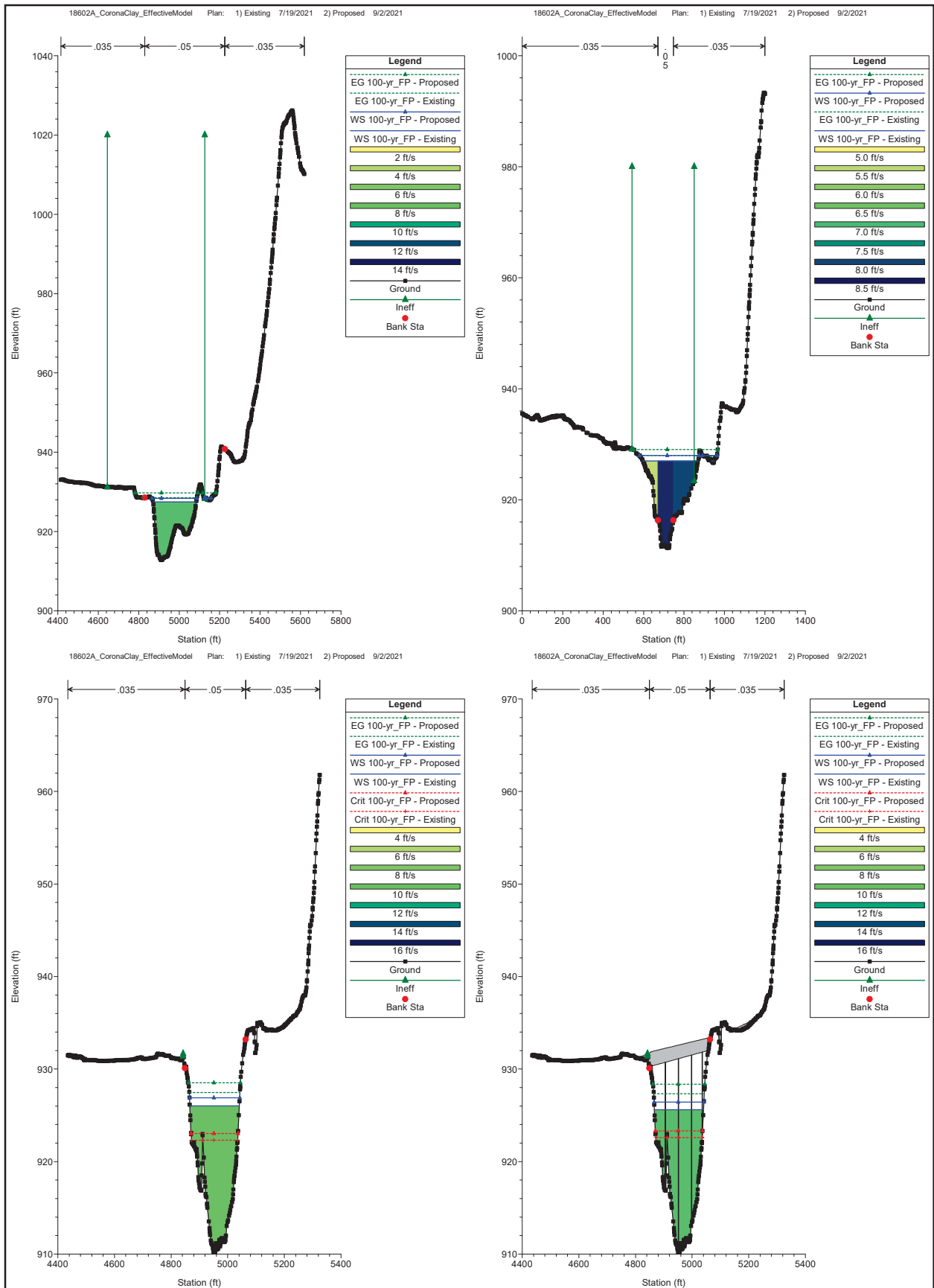
18602A_CoronaClay_EffectiveModel Plan: 1) Existing 7/19/2021 2) Proposed 9/2/2021

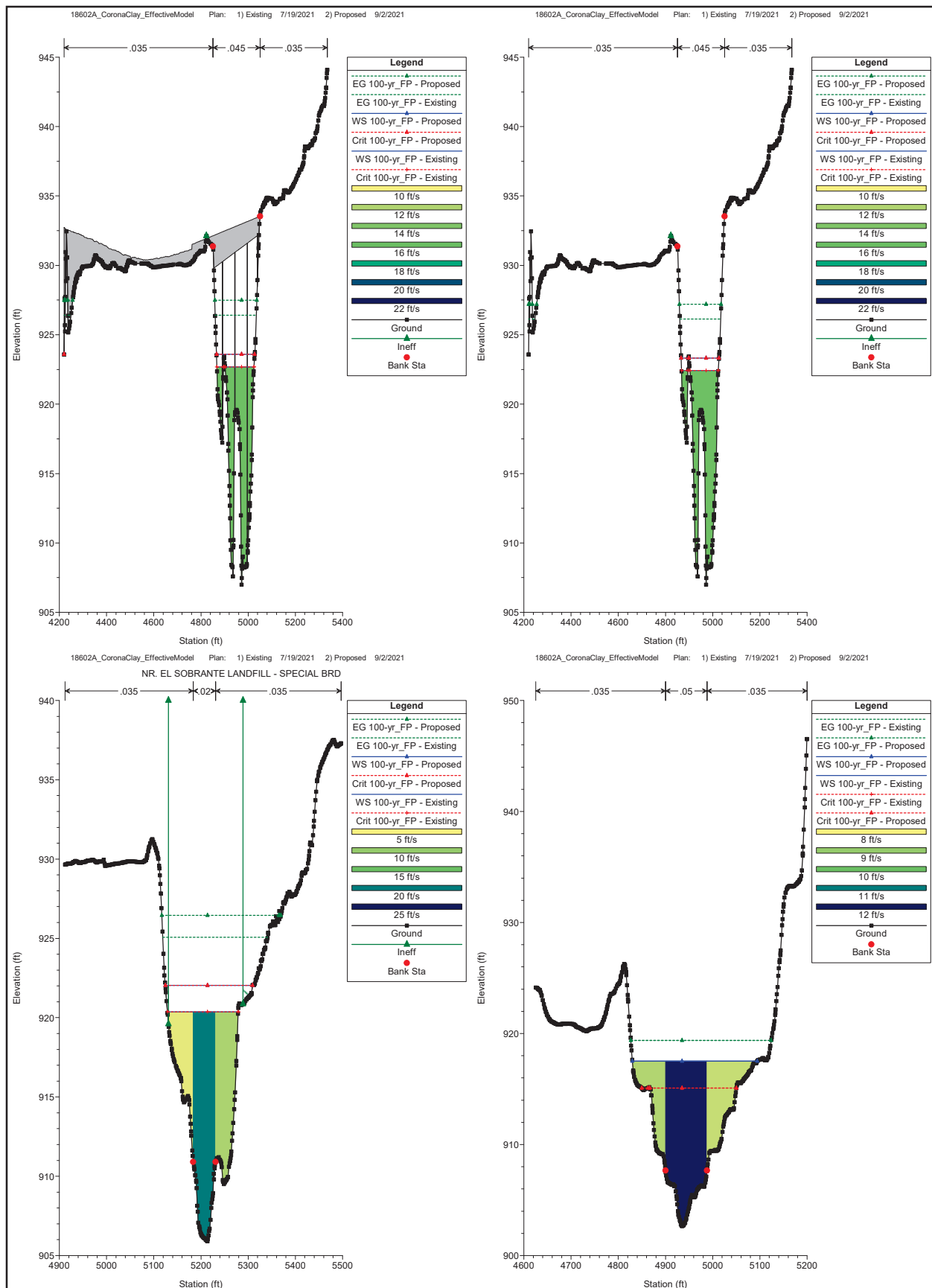
RIVER-1 Reach-1

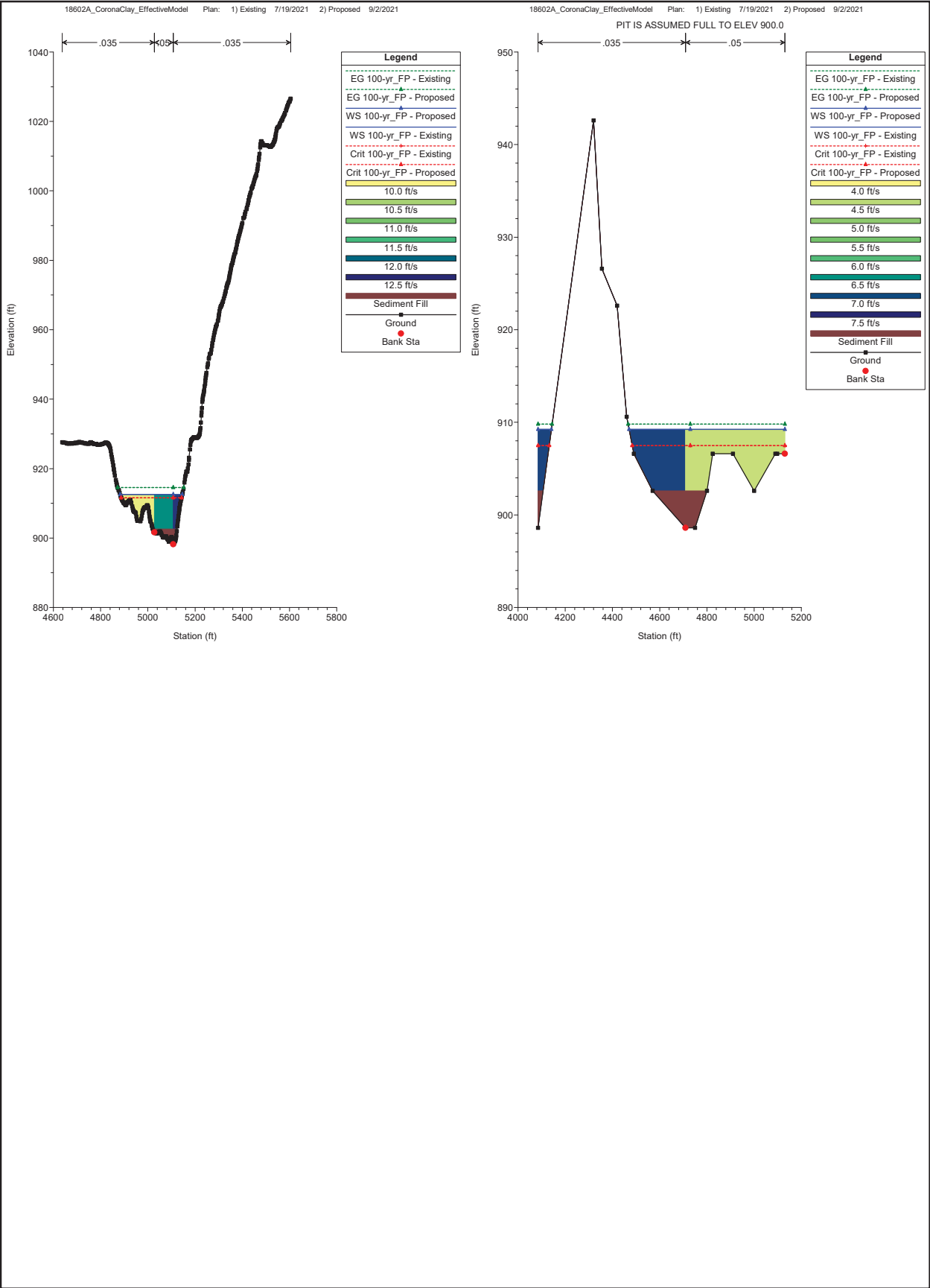
Legend	
EG 100-yr_FP - Existing	
EG 100-yr_FP - Proposed	
WS 100-yr_FP - Proposed	
WS 100-yr_FP - Existing	
Crit 100-yr_FP - Existing	
Crit 100-yr_FP - Proposed	
Ground	











Contact: Ruben S. Ramirez, Jr. 949-300-0212, r.ramirez@cadreenvironmental.com