I-5 MANAGED LANES PROJECT

(RED HILL AVE TO ORANGE / LOS ANGELES COUNTY LINE)

Counties of Orange and Los Angeles, California
Cities Irvine, Tustin, Santa Ana, Orange, Anaheim, Fullerton, Buena Park, La Mirada, and Santa Fe Springs

12-Ora-5 – PM 28.9/44.4, 26.9, 27.9, 28.4
07-LA-5 – PM 0.1, 0.3, 0.6, 1.7
12-Ora-55 – PM 7.4, 8.0, 8.7, 8.9, 9.2, 9.7 9.9, 10.2
12-Ora-57 – PM 11.0, 11.3, 11.9, 12.5, 12.7, 12.9, 13.5
12-Ora-91 – PM 0.4, 0.7, 1.1, 1.3, 1.4, 1.6, 1.8, 2.0, 2.2, 2.6, 2.8, 3.4

EA 12-0Q950

LOCATION HYDRAULIC STUDY AND SUMMARY FLOODPLAIN ENCROACHMENT REPORT

Prepared for

Caltrans

CALTRANS DISTRICT 12 ORANGE COUNTY

December 6, 2022

Location Hydraulic Study and Summary Floodplain Encroachment Report

I-5 Managed Lanes Project

(State Route 55 to Orange/Los Angeles Countyline)

Counties of Orange and Los Angeles, California
Cities of Irvine, Tustin, Santa Ana, Orange, Anaheim, Fullerton, Buena Park, La Mirada, and Santa Fe Springs

12-Ora-5 – PM 28.9/44.4, 26.9, 27.9, 28.4
07-LA-5 – PM 0.1, 0.3, 0.6, 1.7
12-Ora-55 – PM 7.4, 8.0, 8.7, 8.9, 9.2, 9.7 9.9, 10.2
12-Ora-57 – PM 11.0, 11.3, 11.9, 12.5, 12.7, 12.9, 13.5
12-Ora-91 – PM 0.4, 0.7, 1.1, 1.3, 1.4, 1.6, 1.8, 2.0, 2.2, 2.6, 2.8, 3.4

EA 12-0Q950

December 6, 2022

Prepared By: Sepideh Sarachi  Date 12/02/2022

Sr. Civil Engineer
(949) 735-5516
6 Hutton Centre Dr, Ste 800 | Santa Ana, CA 92707
TranSystems

Table of Contents

List of Figures

List of Tables

Acronyms and Abbreviations

Abbreviation	Definition
BMP	Best Management Practice
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CLOMR	Conditional Letter of Map Revision
CWA	Clean Water Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
Floodplain	A flat or nearly flat land adjacent to a stream or river that experiences occasional or periodic flooding.
HOV	High Occupancy Vehicle
Hydraulic	A topic of engineering subject dealing with the mechanical properties of liquids.
Hydrograph	A record through time of discharge (flow) in a stream.
I	Interstate
LOMC	Letter of Map Changes
LOMR	Letter of Map Revision
NFIP	National Flood Insurance Program
OCFCD	Orange County Flood Control District
RCB	Reinforced Concrete Box
Tributary	A stream or river which flows into another river (a parent river) or body of water, but which may not flow directly into the sea.
USACE	United States Army Corps of Engine

1. INTRODUCTION

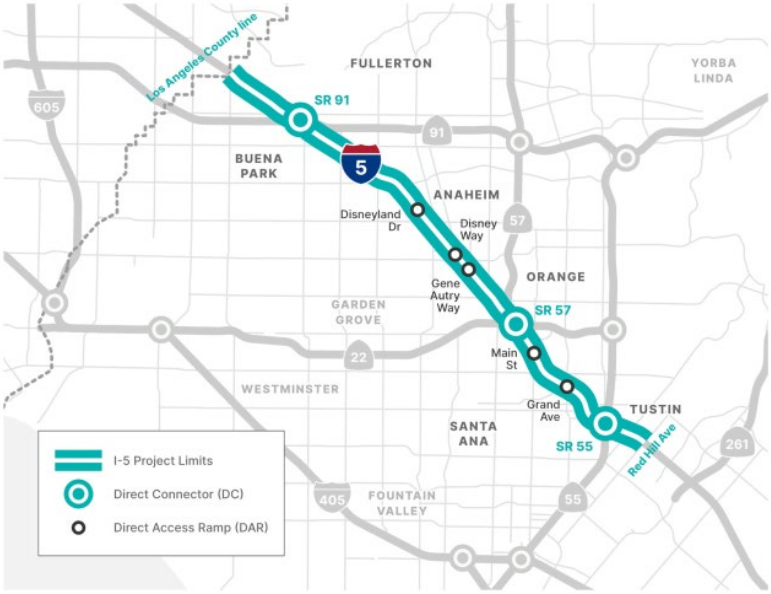
The California Department of Transportation (Caltrans) District 12, in cooperation with Caltrans District 7, and the Federal Highway Administration (FHWA), proposes to improve the overall regional managed lanes network operations, improve mobility and trip reliability, maximize person throughput by facilitating efficient movement of bus and rideshare users, and apply technology to help manage traffic demand, within the Interstate (I-) 5 corridor.

The Project improvement limits include I-5 from Red Hill Avenue to the Orange/Los Angeles Countyline, California (Figure 1-1). The Project improvements are within the cities of Irvine, Tustin, Santa Ana, Orange, Anaheim, Fullerton, Buena Park, La Mirada, and Santa Fe Springs.

The I-5 Project improvements include implementing managed lanes improvements in each direction between Red Hill Avenue and the Orange/Los Angeles Countyline. The improvements would modify the existing High Occupancy Vehicle (HOV) lanes within the project limits to address capacity and operational deficiencies. The proposed modifications would improve the overall movement of people and goods along this section of I-5. Project improvements to the SR 55, SR 57, and SR 91 corridors, as well as north of the Orange/Los Angeles Countyline, include implementing associated signage and tolling infrastructure, where required.

The Project intends to incorporate Context Sensitive Solutions, where applicable, that integrate and consider community, aesthetic, multimodal and environmental values with transportation safety, maintenance, and performance goals. The Project is expected to yield mobility benefits to commuters and freight traffic alike, through reduced travel times, increased vehicle and passenger throughput and reliability, and reduce delay through active traffic management to optimize freeway speeds throughout the corridor.

Figure 1-1 Project Limits



1.1 Project Alternatives

Based on the conceptual analysis and preliminary engineering studies, three Build Alternatives and a "No-Build" Alternative are being evaluated in the Draft Project Report and Environmental Document (PA&ED) phase.

- Alternative 1 – No-Build Alternative: Existing Conditions

  Under the No-Build Alternative, no additional roadway improvements would occur. This alternative includes other projects on the financially-constrained project list in the adopted Southern California Association of Governments (SCAG) 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) in the Project limits on I-5 and the Preferred Plan in the Orange County Transportation Authority (OCTA) 2018 Long Range Transportation Plan (LRTP) within the Project limits. Additional land areas would not be impacted, and existing and projected traffic congestion would not be alleviated beyond that associated with other projects in approved regional transportation plans.

- Alternative 2 – Build Alternative: Modify Existing HOV 2+ Lanes to HOV 3+ Lanes

  Alternative 2 would maintain the existing lane configurations for I-5 with a modification of the minimum HOV-lane occupancy requirement from two-plus (2+) to three-plus (3+) passengers within the current HOV system in each direction, between Red Hill Avenue and the Orange/Los Angeles Countyline. Under this alternative, no additional roadway improvements would occur.

- Alternative 3 – Build Alternative: Convert Existing HOV Lanes to ExpressLanes

  Alternative 3 would convert the existing HOV lane to an ExpressLane, in each direction, between Red Hill Avenue and SR 55; convert two existing HOV lanes to ExpressLanes, in each direction, between SR 55 and SR 57; and convert existing HOV lane to an ExpressLane, in each direction, between SR 57 and the Orange/Los Angeles Countyline.

- Alternative 4 – Build Alternative: Convert Existing HOV Lanes to ExpressLanes and Construct Additional ExpressLanes

  Alternative 4 would convert the existing HOV lane to an ExpressLane, in each direction, between Red Hill Avenue and SR 55; convert two existing HOV lanes to ExpressLanes, in each direction, between SR 55 and SR 57; convert the existing HOV lane to an ExpressLane, in each direction, between SR 57 and the Orange/Los Angeles Countyline; and construct additional ExpressLane, in each direction, between SR 57 and SR 91.

1.2 Report Overview and Purpose

TranSystems has performed a Location Hydraulic Study (LHS) and Summary Floodplain Encroachment Report for the proposed improvements associated with this project. The major regional drainage crossings within the project are Coyote Creek, Carbon Creek, Fullerton Creek, Santa Ana River and Santiago Creek in the Cities of La Mirada, Buena Park, Anaheim, Orange, and Santa Ana.

The Federal Highway Administration (FHWA) policies and procedures for the location and hydraulic design of highway encroachments on floodplains are found in 23 CFR 650 Subpart A. To comply with 23 CFR 650 Subpart A, projects are evaluated on the following:

- Avoiding longitudinal encroachments, where practicable
- Avoiding significant encroachments, where practicable
- Minimizing impacts of highway agency actions which adversely affect base floodplains
- Restoring and preserving the natural and beneficial floodplain values that are adversely impacted by highway agency actions
- Avoiding support of incompatible floodplain development
- Being consistent with the intent of the Standards and Criteria of the NFIP, where appropriate

Executive Order 11988 (Floodplain Management) directs federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. Agencies shall take action to reduce the risk of flood loss; minimize the impact of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains.

This report evaluates the potential impacts to the mapped Flood Hazard Areas within the project limits due to the proposed improvements.

1.3 Definitions

Base Flood: The base flood is defined as the "flood which has a 1% or greater chance of occurrence in any given year" (Executive Order 11988 Section 6 [b]). The base flood is also known as the 100-year flood.

Floodplain: The floodplain is defined as "the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, that area subject to a 1% or greater chance of flooding in any given year" (Executive Order 11988 Section 6 [c]). Floodplains store, convey, and slow floodwaters. When floodplains are constricted by structures or fill, flood elevations may rise.

Mapped Floodplain: Mapped floodplains are regulatory or managed floodplains. The Federal Emergency Management Agency (FEMA) has adopted the 1% annual chance flood as the base flood for flood insurance and management purposes. Therefore, the FEMA mapped floodplain corresponds to the areas inundated by the base flood. Mapped floodplains are also known as Flood Hazard Areas and can be found on Flood Insurance Rate Maps (FIRMs).

Regulatory Floodway: A regulatory floodway may be established as part of a mapped floodplain. The floodway includes the channel and portions of the floodplain that convey most of the floodwaters when the floodplain is un-encroached. If floodwaters were forced solely in the floodway, the base flood elevation would be increased by no more than one foot. Typically, encroachments on floodplains are only allowed if they cause no more than a one-foot increase in base flood elevations, and encroachments in floodways are typically allowed only if they cause no increase in base flood elevations.

Special Flood Hazard Areas: Special Flood Hazard Areas (SFHAs) are subject to inundation by the 1% annual chance flood (base flood). SFHAs are mapped on NFIP maps. Regulations are

enforced and the purchase of flood insurance is mandated in SFHAs. SFHAs include Zones A, AO, AH, A1-30, AE, A99, AR, AR/A1-30, AR/AE, AR/AO, AR/AH, AR/A, VO, V1-30, VE, and V.

2. EXISTING BRIDGES OVER MAJOR REGIONAL DRAINAGE CROSSINGS

There are five existing bridges over the regional drainage crossings within the project limits.

2.1 I-5 Bridge Over Coyote Creek (53-0279)

The existing I-5 bridge over Coyote Creek (53-0279) is a reinforced concrete bridge with Tee beam span design. The total length of the bridge is 90' and the deck width is 11'. It is located on I-5 at PM 0.34 in the city of La Mirada in Los Angeles County and conveys Coyote Creek (A01). The bridge was built in 1934 and reconstructed in 1959 and carries six lanes of traffic.

A review of the FEMA maps (FIRMs) for Los Angeles County indicates the I-5 Bridge over Coyote Creek is within FEMA FIRM Panel 06059C0019J. The bridge area is identified as Zone X, areas of the 0.2% annual chance floodplain. There are no physical improvements proposed at this location, therefore the project will not result in any floodplain encroachments. The FIS data for Coyote Creek Channel at the location of the I-5 bridge is summarized in Table 2-1 below:

Table 2-1 FEMA Flood Insurance Study Flow Rate Summary Table Coyote Creek Channel

Location	Tributary Area (sq. mi.)	Q10 (cfs)	Q50 (cfs)	Q100 (cfs)	Q500 (cfs)
Approximately 2,400 feet downstream of Beach Boulevard	11.7	3,000	6,300	8,100	17,000

2.2 I-5 Bridge Over Fullerton Creek (55-0087)

The existing I-5 bridge over Fullerton Creek (55-0087) is a concrete slab which consists of three spans. The bridge length is 76.0' and it is 95' wide. It is located on I-5 at PM 42.96 in the City of Buena Park in Orange County and carries Fullerton Creek at 2.7 miles upstream of its confluence with Coyote Creek. The bridge was built in 1957 and reconstructed in 2001. The bridge carries 12 main lanes and two off ramp lanes.

Figure 2-1 Bridge Over Fullerton Creek (55-0087) Looking Downstream

Fullerton Creek was modified in 1998 to create a stable subcritical flow throughout the channel. The modified channel at the location of the I-5 bridge (bridge # 55-0087) is a rectangular channel with a capacity of 6576 cubic feet per second (cfs),

bottom width of 37.5', and a longitudinal slope of 0.00641. Water Surface Elevation (WSE) at the location of this bridge is at 76.0' on the upstream side and 74.5' on the downstream side.

In the segment of Fullerton Creek Channel within the City of Buena Park, the Santa Ana Freeway-Southern Pacific Railroad (SPRR) crossing is a severe obstruction of flow causing a backwater situation that results in local shallow flooding.

The I-5 bridge over Fullerton Creek is within FEMA FIRM Panel 06059C0126J. The project limits within the tributary area to Fullerton Creek is identified as Zone X, except for a portion upstream of the bridge which is identified as Zone AH. The areas of 1% annual chance flood with flood depths of one to three feet with based flood elevation of 82' (NAVD 88) are shown on said FIRM map. The proposed improvements over the above waterway consist of restriping of the freeway to add MLs, without any bridge widenings, therefore the project will not result in any floodplain encroachments. The FIS data for Fullerton Creek Channel at the location of the I-5 bridge is summarized in Table 2-2 below:

Table 2-2 FEMA Flood Insurance Study Flow Rate Summary Table Fullerton Creek Channel

Location	Tributary Area (sq. mi.)	Q10 (cfs)	Q50 (cfs)	Q100 (cfs)	Q500 (cfs)
At Dale Avenue	16.8	1,300	3,300	5,300	11,800
At confluence of Houston Channel	14.8	1,250	3,250	5,750	10,150

2.3 I-5 Bridge Over Carbon Creek (55-0910)

The existing I-5 bridge over Carbon Creek (55-0910) is a reinforced concrete box culvert with two main spans at 16' each. The width of the bridge along the creek is approximately 200-feet. It is located under I-5 at PM 40.20 in the City of Anaheim in Orange County and conveys Carbon Creek (B01) at 7.4 miles upstream of its confluence with Coyote Creek (A01). The bridge was built in 2002 and carries 12 lanes of traffic.

Figure 2-2 Bridge Over Carbon Creek (55-0910) Looking Downstream

Upstream and downstream of the I-5 bridge, the creek is an earthen trapezoidal channel with a base width of 23-feet and a height of eight feet and is owned by Orange County Flood Control District (OCFCD). Initially the culvert was designed as a series of 15-48" reinforced concrete pipe culverts and in 1997 it was redesigned as a double 16' x 12'-6" reinforced concrete box culvert.

A review of the FEMA FIRM maps for the Orange County indicates that the I-5 bridge over Carbon Creek is within FEMA FIRM Panel 06059C0129J. The bridge area is identified as Zone A on the downstream side of the creek and Zone AH with an elevation of 88' on the upstream side. The 100-Year floodplain extends to the southwestern corner of the bridge covering the Crescent Retarding Basin (B01B02) owned by OCFCD. The proposed improvements over the above waterway consist of re-striping of the freeway to add MLs, without any bridge widenings, therefore the project will not result in any floodplain encroachments. The FIS data for Carbon Creek Channel at the location of the I-5 bridge is summarized in Table 2-3 below:

Table 2-3 FEMA Flood Insurance Study Flow Rate Summary Table Carbon Creek Channel

Location	Tributary Area (sq. mi.)	Q10 (cfs)	Q50 (cfs)	Q100 (cfs)	Q500 (cfs)
At Southern Pacific Railroad	15.1	1,600	2,400	4,200	15,000
At Knott Avenue	13.8	1,400	2,100	3,800	14,000

2.4 I-5 Bridge Over Santa Ana River (55-0811)

The existing I-5 bridge over the Santa Ana River (55-0811) is a reinforced concrete bridge with a Stringer/Multi-beam span with five main spans, a deck width of 270-feet and bridge length of 502'. It is located on I-5 at PM 34.47 in the City of Santa Ana in Orange County and conveys the Santa Ana River at 12 miles upstream of its outfall in the Pacific Ocean. The bridge was built in 1999 and carries 14 lanes of traffic.

Figure 2-3 Bridge Over Santa Ana River (55-0811) Looking Downstream

At the location of the bridge, the creek is an earthen trapezoidal channel with a base width of 260' and a height of 12.5' and is owned by OCFCD.

A review of the FEMA maps (FIRMs) for the Orange County indicates that the I-5 Bridge over the Santa Ana River is within FEMA FIRM Panel 06059C0142J. The bridge area is identified as Zone A. The area is protected from the 1-percent annual- chance or greater flood hazard by a levee system. The proposed improvements over the above waterway consist of restriping of the freeway to add MLs, without any bridge widenings. Therefore, the project will not result in any floodplain encroachments. The FIS data for Santa Ana River at the location of the I-5 bridge is summarized in Table 2-4 below:

Table 2-4 FEMA Flood Insurance Study Flow Rate Summary Table Santa Ana River

Location	Tributary Area (sq. mi.)	Q10 (cfs)	Q50 (cfs)	Q100 (cfs)	Q500 (cfs)
At Katella Avenue in Orange	2,346	-	-	50,000	-
At Imperial Highway in Coty of Anaheim	2,306	-	-	50,000	-

2.5 I-5 Bridge Over Santiago Creek (55-1046)

The existing I-5 bridge over Santiago Creek (55-1046) is a prestressed concrete bridge with a box beam span with four main spans at 82’ each, a deck width of 300’ (130’ for I-5 Northbound and 170’ for I-5 Southbound) and total length of 165’. It is located on I-5 at PM 33.39 in the City of Santa Ana in Orange County and conveys Santiago Creek at 1.5 miles upstream of its confluence with the Santa Ana River. The bridge was built in 1996 and carries 18 lanes of traffic.

Figure 2-4 Bridge Over Santiago Creek (55-1046R) Looking Downstream

At the location of the bridge, the creek is an earthen trapezoidal channel with a base width of 32' and a height of 12' and is owned by OCFCD.

A review of the FEMA maps (FIRMs) for Orange County indicates that the I-5 bridge over Santa Ana River is within FEMA FIRM Panel 06059C0163J. The bridge area is identified as Zone AE with a 100-year base flood of 144', based on the Flood Insurance Study for the Orange County, California (Volume 2 of 3, March 2019). The proposed improvements over the above waterway consist of restriping of the freeway to add MLs, without any bridge widenings. Therefore, the project will not result in any floodplain encroachments. The FIS data for Santiago Creek Channel at the location of the I-5 bridge is summarized in Table 2-5 below:

Table 2-5 FEMA Flood Insurance Study Flow Rate Summary Table Santiago Creek Channel

Location	Tributary Area (sq. mi.)	Q10 (cfs)	Q50 (cfs)	Q100 (cfs)	Q500 (cfs)
At Santa Ana River	102	1,500	4,000	12,000	27,000
At Atchison Topeka and Santa Fe Railway	96	1,500	4,000	12,000	27,000

3. AFFECTED ENVIRONMENT

The Project is located within multiple watersheds. From North to South the watersheds are: the Lower San Gabriel River Watershed (Fullerton Creek Subwatershed: HUC 180701060504 and Brea Creek-Coyote Creek Subwatershed: HUC 180701060503), the Lower San Gabriel River Watershed (Carbon Creek Subwatershed : HUC 180701060505), Bolsa Chica Channel-Frontal Huntington Harbour Watershed (HUC 1807020100000), Lower Santa Ana River Watershed (Walnut Canyon-Santa Ana River Subwatershed : HUC 180702031002), Santiago Creek Watershed (Lower Santiago River Subwatershed : HUC 180702030902) , Lower Santa Ana River Watershed (Greenville Bannin-Santa Ana River Subwatershed : HUC 180702031003), San Diego Creek (Lower San Diego Creek Subwatershed : HUC 180702040103) and San Diego Creek (Peters Canyon Wash Subwatershed : HUC 180702040101).

3.1 Land Use

The project location is highly urbanized. The land use along the I-5 corridor within the project limits consists mostly of single family residential, mixed residential, and commercial and industrial areas. The cities within the project area are Tustin, Santa Ana, Orange, Anaheim, Fullerton, Buena Park, and La Mirada.

3.2 Topography

The project is located within the San Diego Creek, Santa Ana River, Coyote Creek and Newport Bay watersheds and is bounded in the northeast by the Loma Ridge Foothills and the Santa Ana Mountains and in the south by the San Joaquin Hills. Most of the watersheds consist of the flat, alluvial Tustin Plain. Topography within the project area is relatively flat, gently sloping from the east to the west. Elevations range from 150 to 80 feet.

3.3 Hydrology

The area experiences a Mediterranean climate that is characterized by brief, intense, storms from October to March. The long-term average rainfall in the area is 14 inches per year. Commonly, most of this precipitation falls during a few storms within a short period of the year. The higher elevation portion of the watersheds receives greater precipitation. The combination of steep topography in the Santa Ana Mountains in the upstream portion of the watershed, intense storms, and temporal variability in rainfall can lead to events where stream discharge varies greatly in a short amount of time. The effects of climate change on hydrology are discussed in the Section Climate Change.

3.4 Beneficial Uses

Beneficial uses for the creeks are summarized in Table 3-1 below:

Table 3-1 Beneficial Uses for Direct Receiving Waters

Inland Surface Stream	MUN	GWR	IND	PROC	AGR	REC1	REC2	WARM	RARE	WILD
Coyote Creek (Above La Canada Verde Creek)	•*		•	•				•	•	•
Carbon Creek	•	•				•	•	•	•	•
Fullerton Creek	No designated beneficial uses per Santa ana Region Basin Plan update February 2016									
Santa Ana River, Reach 1	+					•	•**	I		I
Santa Ana River, Reach 2	+	•			•	•	•	•	•	•
Santiago Creek, Reach 1	•	•				•	•			•

• Existing or Potential Beneficial Use
I Intermittent Beneficial Use
+ Excepted from Municipal and Domestic Supply
* Designated under SB 88-63 and RB 89-03. May be considered for exemption at a later date.
** Access prohibited in all or part per agency with jurisdiction

Beneficial Use Definitions: MUN (Municipal and Domestic Supply); AGR (Agricultural Supply); GWR (Groundwater Recharge); IND (Industrial Service Supply); PROC (Industrial Process Supply); RARE (Rare, Threatened or Endangered Species); REC1 (Water Contact Recreation); REC2 (Non-Contact Water Recreation); WARM (Warm Freshwater Habitat); WILD (Wildlife Habitat).

REC-1 describes water contact recreation. REC-2 is for non-contact water recreation. WARM indicates warm freshwater habitat waters that support warm-water ecosystems. WILD designations are for wildlife habitat that includes the preservation and enhancement of vegetation and prey species used by waterfowl and other wildlife. RARE indicates the waterbody supports rare, threatened, or endangered species. COMM is for commercial or recreational collection of fish or other organisms. SPWN indicates waters supporting high quality aquatic habitats necessary for reproduction and early development of fish and wildlife. MAR designations describe waters supporting marine ecosystems. NAV is for waters used for shipping, travel, or other transportation by private, commercial, or military vessels. Groundwater Recharge (GWR) waters are used for natural or artificial recharge of groundwater for purposes that may include, but are not limited to, future extraction, maintaining water quality or halting saltwater intrusion into freshwater aquifers. Municipal and Domestic Supply (MUN) waters are used for community, military, municipal or individual water supply systems. These uses may include, but are not limited to, drinking water supply.

4. RISK AND IMPACTS

4.1 Potential Risk from Longitudinal Encroachment

The Caltrans Standard Environmental Reference defines a longitudinal encroachment as an encroachment that is parallel to the direction of flow, such as a highway that runs along the edge of a river. A transverse encroachment is an encroachment that is perpendicular or skewed to the direction of flow. Typically, bridge encroachments on floodplains are considered transverse encroachments. The existing project bridges cross the channels transversely and will not extend beyond their existing length. Therefore, there are no longitudinal encroachments.

4.2 Potential Risk to Life and Property

The risk to life and property is evaluated by the potential for backwater during the base flood event for residences, other buildings, and crops. The potential risk to life and property remains unchanged since the project improvements only incudes striping at the water crossings. The Caltrans Highway Design Manual (Section 804) evaluates the potential for traffic disruptions by backwater during the base flood event for emergency supply and evacuation routes, emergency vehicle access, whether a practicable detour is available, and school bus and mail routes. The Project will not increase WSEs above the existing condition, therefore, the potential for traffic disruptions will not increase due to the project.

4.3 Potential Risk to Natural and Beneficial Floodplain Values

The project has no permanent improvements within the floodplain boundary. Permanent impacts to beneficial uses are not anticipated. The project improvements do not pose potential risks to natural and beneficial floodplain values. Temporary construction impacts to beneficial uses, if any, will be addressed prior to the start of construction.

4.4 Potential Risk for Support of Incompatible Floodplain Development

The support of incompatible floodplain development includes encouraging, allowing, serving, or otherwise facilitating incompatible floodplain development, such as commercial development or urban growth. The project will not encourage incompatible floodplain development.

4.5 Assessment of Level of Risk

There is no change in the current risk to life and property because of the project and therefore risk to life and property is nominal. The proposed risks to natural and beneficial floodplain values are minimal, as the impairments are temporary due to construction activities. The project does not support further incompatible floodplain development. Therefore, the combined assessed risk level is low.

5. CLIMATE CHANGE

Climate change is characterized as a shift in the average weather within a region. Shifts may occur in average temperature, average precipitation, wind patterns, and changes in extremes in temperature and precipitation. Within Southern California, changes observed include sea level rise, decreased snowpack, and increased water temperatures. Droughts are predicted to become more severe while storm intensities are expected to increase.

Changes in climate have the potential to impact coastal areas further inland than current coastal condition impacts. This section assesses the vulnerability of the bridges to potential changes in sea level and storm events.

5.1 Precipitation

The Southwest region of the United States is expected to have less precipitation overall in the future, but with the potential for heavier individual events, and with more precipitation falling as rainfall. According to the Caltrans Transportation Asset Vulnerability Study, District 12, Caltrans No. 74A0737, the future percent change in 100-year storm precipitation depth based on the RCP 8.5 Emission Scenario is between 0% to 4.9% increase for the year 2085. Since this project does not impact the stream crossings and floodplains, a hydraulic model was not developed. Therefore, the impact due to the increase in precipitation was not evaluated. However, this minimal change is not anticipated to have a major impact on the Caltrans facilities within the Project area.

5.2 Sea Level Rise and Storm Surge

The project is not located within the coastal area therefore the impact due to the increase in sea level rise and storm surge were not evaluated in the Caltrans Climate Change Vulnerability assessments (August 2019).

6. EXECUTIVE SUMMARY

The California Department of Transportation (Caltrans), District 12, is proposing managed lanes (ML) improvements in both directions on Interstate (I) 5. The improvements would modify the existing high-occupancy vehicle (HOV) lanes within the project limits to address operational deficiencies. The project limits on I-5 extend from Red Hill Avenue (Post Mile [PM] 29.1) to 0.5 mile north of the Orange/Los Angeles (OC/LA) County line (12- OC-005 PM 44.4/07-LA-005 PM 0.5) in the cities of Tustin, Santa Ana, Orange, Anaheim, Fullerton, Buena Park, and La Mirada.

The major regional drainage crossings within the project are Coyote Creek, Carbon Creek, Fullerton Creek, Santa Ana River and Santiago Creek. The proposed improvements over the waterways consist of restriping of the freeway to add Managed Lanes (MLs), without any bridge widenings. Therefore, the project will not result in any floodplain encroachments.

The existing project bridges cross the channels transversely and will not be extended beyond their existing length. Therefore, there are no longitudinal encroachments associated with the project. The project will not increase WSEs above the existing condition, therefore, the potential risk to life and property and traffic disruptions will not increase due to the project. The project permanent improvement is not located within the floodplain boundary. Permanent impacts to beneficial uses are not anticipated. The project will not encourage incompatible floodplain development. The combined assessed risk level for the project is low.

7. REFERENCES

Federal Emergency Management Agency (FEMA). Flood Insurance Study, Federal Emergency Management Agency, Orange County, California And Incorporated Areas – Volumes 1 and 2, 2019

California Department of Transportation Division of Maintenance, Bridge Inspection Records Information Systems, Bridge Number 55-0811, December 2017

California Department of Transportation Division of Maintenance, Bridge Inspection Records Information Systems, Bridge Number 55-1046L, January 2017

California Department of Transportation Division of Maintenance, Bridge Inspection Records Information Systems, Bridge Number 55-1046R, November 2017

California Department of Transportation Division of Maintenance, Bridge Inspection Records Information Systems 55-087, March 2016

California Department of Transportation Division of Maintenance, Bridge Inspection Records Information Systems 55-0910, March 2016

Santa Ana Regional Water Quality Control Board, Water Quality Control Plan for the Santa Ana River Basin (8), 1995; Updated February 2016

Caltrans. Storm Water Quality Handbooks: Project Planning and Design Guide. July 2010.

County of Orange. Fullerton Creek Channel, Facility NO. A03 from Coyote Creek Channel (A01) to 100 Feet Upstream of Dorothy Lane, November 1998

County of Orange. Design Memorandum for The Carbon Creek Channel System (Facility No, B01) from Coyote Creek Channel (Facility No. A01) to the Miller Retarding Basin (Facility No. E02B01), January 1989

US Army Engineer District, Los Angeles, Corps of Engineers, Design Memorandum No.1, Phase II GDM on the Santa Ana River Mainstem, August 1988

US Army Engineer District, Los Angeles, Corps of Engineers, Design Memorandum No.1, Hydrology for Coyote Creek Channels, February 1959

Orange County Flood Control District (OCFCD). Preliminary Investigation and Report on the Coyote Creek Channel, Bond Project A-1, September 1959

APPENDIX A EFFECTIVE FIRM PANELS

Appendices provided upon request.

APPENDIX B LOCATION HYDRAULIC FORM AND SUMMARY FLOODPLAIN ENCROACHMENT REPORT

Appendices provided upon request.

APPENDIX C PROPOSED IMPROVEMENTS PLANS OVER MAJOR DRAINAGE CROSSINGS

Appendices provided upon request.