INTEGRATED FEASIBILITY REPORT

ENVIRONMENTAL IMPACT STATEMENT/

ENVIRONMENTAL IMPACT REPORT

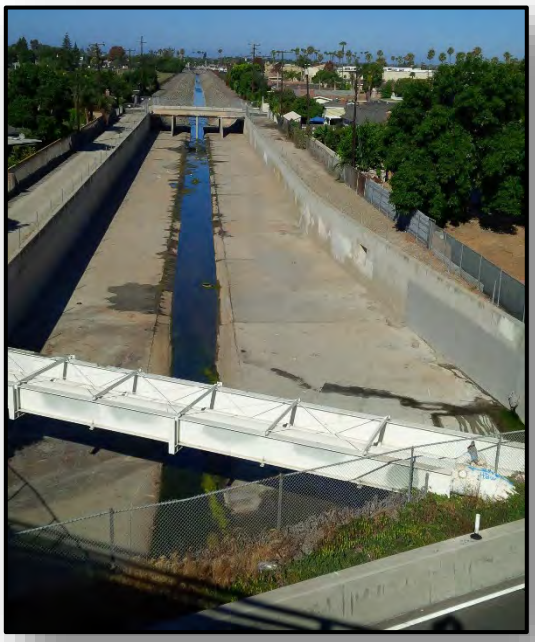
For

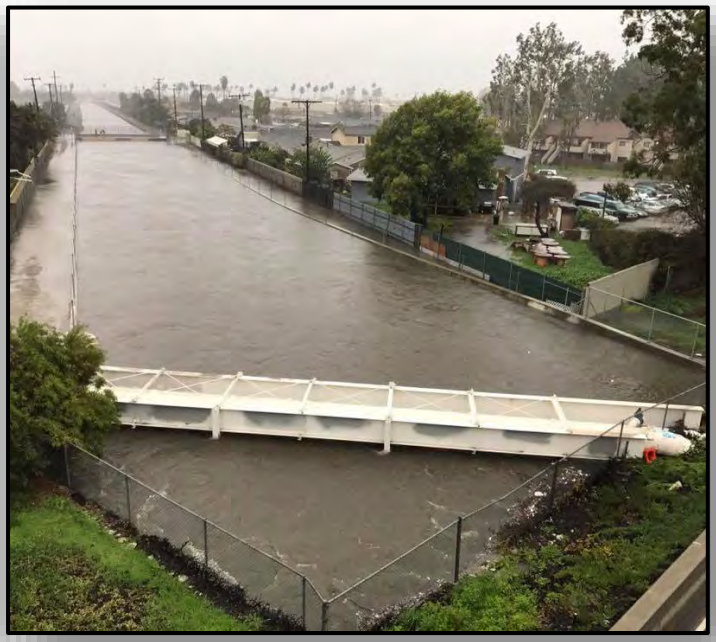
WESTMINSTER, EAST GARDEN GROVE, CA

FLOOD RISK MANAGEMENT STUDY

California State Clearinghouse No. 2017124001

County of Orange EIR No. 631 and IP No. 18-249





April 2020

US Army Corps of Engineers
Chicago District

USACE. 2020. Westminster, East Garden Grove Flood Risk Management Study. Integrated Feasibility Report Environmental Impact Statement Environmental Impact Report. Orange County, California. U.S. Army Corps of Engineers, Chicago District, 231 S. LaSalle Street, Suite 1500, Chicago, Illinois 60604. April 2020.

April 2020

COVER SHEET*

Westminster, East Garden Grove Flood Risk Management Study, Orange County, California

Final Integrated Feasibility Report and Environmental Impact Statement/Environmental Impact Report

The federal lead agency responsible for implementing the National Environmental Policy Act (NEPA) is the U.S. Army Corps of Engineers (USACE). The non-federal sponsor and local lead agency responsible for implementing the California Environmental Quality Act (CEQA) is Orange County. This report is an Integrated Feasibility Report (IFR), combining a feasibility report and an environmental impact statement/environmental impact report (EIS/EIR) complying with requirements of the federal Council on Environmental Quality and CEQA. An asterisk in the table of contents notes sections that are required for NEPA compliance.

Abstract

This IFR includes an analysis of opportunities to address flood risk to the residents of the communities in the Westminster watershed. The report includes an analysis of three alternatives, including the No Action Alternative, to determine which plan or plans would merit further consideration for federal and local participation. The documentation also includes an analysis of the impacts of each alternative on existing resources within the watershed. The alternatives were developed to a level of detail sufficient to identify a National Economic Development (NED) Plan, as well as a Locally Preferred Plan (LPP). Additional detailed design, cost estimating, and impacts assessment may be completed, as required for the NED Plan and the LPP. Each of the alternatives, including the NED and the LPP were formulated to be complete, effective, efficient and acceptable. Further, both the NED and the LPP have a benefit to cost ratio (BCR) greater than 1.0 at the current federal discount rate (2.75%).

The study and project area is located within the Westminster watershed in western Orange County, California, approximately 25 miles southeast of the City of Los Angeles. The watershed is approximately 87 square miles in area and is almost entirely urbanized. Cities in the watershed include Anaheim, Stanton, Cypress, Garden Grove, Westminster, Fountain Valley, Los Alamitos, Seal Beach, and Huntington Beach. Preliminary analysis shows that flooding overtops the existing drainage channel infrastructure in the study area between the 20% and 10% annual chance of exceedance storm events (5 and 10 year recurrence intervals, respectively), putting approximately 400,000 area residents and 44,000 structures at risk of inundation during a 0.2% ACE event. Study analyses were focused on modifications to the existing channels that include: C02 Bolsa Chica Channel; C04 Westminster Channel; C05 East Garden Grove-Wintersburg Channel; and the C06 Ocean View Channel.

The Minimum Channel Modifications Plan is the NED Plan. It reduces flood risk primarily by lining the existing drainage channels with concrete, thus increasing conveyance efficiency. The Maximum Channel Modifications Plan has been identified as the LPP. It reduces flood risk primarily by altering the geometry of existing drainage channels to increase conveyance efficiency and storage capacity throughout the study area. The expanded channels in the Maximum Modifications Plan would primarily be concrete lined and rectangular in cross section. Both of these plans include additional downstream measures to address the impacts of increased flood flow conveyance resulting from the channel modifications. The downstream

measures include increasing the span of Warner Avenue Bridge and removing the tide gates on C05. Compatible nonstructural measures were also included in the NED Plan to lessen the life safety risk associated with flooding in the project area. Each plan will require mitigation to address impacts to habitat.

The NED Plan has an estimated first cost of $483,856,000 and includes mitigation to address the direct impact to 0.15 acre of estuarine wetland, indirect impact to 1.70 acre of eelgrass, and temporary direct impact to special status species' foraging habitat. The LPP has an estimated first cost of $1,224,000,000 and includes mitigation for the direct impact to 0.15 acre of estuarine wetland, indirect impact to 1.70 acre of eelgrass, and temporary direct impact to special status species' foraging habitat.

The Final EIS is available for public review beginning April 24, 2020. The official closing date for the receipt of comments is May 26, 2020, 30 days from the date on which the notice of availability is made publically available by the U.S. Environmental Protection Agency. Comments may be mailed to the address listed below or hand delivered in person during business hours (Monday through Friday 8am to 5pm local time) to the address listed below. Comments may also be emailed to the email address listed below.

Mail Comments to:
U.S. Army Corps of Engineers
Attention: Mike Padilla
231 S. LaSalle St., Suite 1500
Chicago, IL 60604

Hand Deliver Comments to:
Orange County Public Works,
Attention: Justin Golliher
County Administration South Building
601 N. Ross St.
Santa Ana, CA 92701

Email Comments to:
westminster_comments@usace.army.mil

WESTMINSTER, EAST GARDEN GROVE FLOOD RISK MANAGEMENT STUDY EXECUTIVE SUMMARY

This Integrated Feasibility Report (IFR) and Environmental Impact Statement/Environmental Impact Report (EIS/EIR) presents the results of the Westminster, East Garden Grove, Orange County, California Flood Risk Management Study. The study is being conducted in accordance with the study resolution adopted by the House of Representatives Committee on Public Works on May 8, 1964 (Flood Control Act of 1938). This IFR includes an analysis of a reasonable range of alternatives to reduce risks to life safety, damages to residential and commercial structures, damages to public infrastructure, and time lost due to traffic delays caused by flooded transportation routes. The IFR also includes an assessment of the environmental impacts of the flood risk management alternatives, a review of the process for identifying the National Economic Development (NED) Plan and a Locally Preferred Plan (LPP), as applicable, and concludes with recommendations for project implementation. This study is being conducted by the U.S. Army Corps of Engineers (USACE) in partnership with its non-federal sponsor, Orange County Public Works (OCPW) acting on behalf of Orange County and the Orange County Flood Control District (OCFD). OCPW is the lead agency under the California Environmental Quality Act (CEQA).

The purpose of this study is to evaluate the flood risk within the Westminster watershed that is primarily attributable to undersized drainage channels that collect surface runoff and convey it downstream towards eventual discharge into the Pacific Ocean. Subsequent to the completion of the Santa Ana River projects, the Westminster watershed is the largest remaining Federal Emergency Management Agency Special Flood Hazard Area in Orange County. Preliminary analysis shows that flood flows overtop the drainage channels in the study area between the 20% and 10% annual chance of exceedance (ACE) storm events (5 and 10 year recurrence intervals, respectively), putting approximately 400,000 area residents and 44,000 structures at risk during a 0.2% ACE event ("500-year storm"). Overbank flooding also impacts traffic in the project area, causing delays and/or closures on local roads as well as major routes, including Interstate 405 (I-405). In total, the study area experiences approximately $72,000,000 (FY2020 price levels, 2035 base year, 2.75% federal discount rate) in average annual equivalent (AAE) direct damages as a result of overbank flooding.

The Corps Planning Modernization Initiative generated significant changes to the USACE feasibility study process. The planning process now includes the release of a draft document to solicit input from the public, interested stakeholders, and resource agencies earlier in the study schedule. Risk-informed planning methods are utilized to identify an alternative plan or plans that meet the federal and study objectives using the best available information and professional judgment. This IFR provides the feasibility level analysis of the performance, design, cost, and impacts to natural and manmade resources of three alternative plans. Upon the completion of the concurrent public, agency, and independent technical reviews, the final detailed analyses were completed for the recommended plan. These additional analyses have been added to the Draft IFR and are reflected in this final IFR.

STUDY AREA

The study area is located entirely within the Westminster watershed in western Orange County, California, approximately 25 miles southeast of the City of Los Angeles. The Westminster watershed was historically part of the Santa Ana River floodplain, which meandered as far north as Anaheim Bay. Channelization and large scale flood control projects constructed since the early 1900s have constrained the Santa Ana River to its main stem channel, resulting in the Westminster watershed being removed from the Santa Ana River's regulatory (100-year) floodplain.

The watershed is approximately 87 square miles and lies on a flat coastal plain. The study area is almost entirely urbanized. Cities in the watershed include Anaheim, Stanton, Cypress, Garden Grove, Westminster, Fountain Valley, Los Alamitos, Seal Beach, and Huntington Beach. The project area includes portions of four non-federal drainage channels within the watershed and the receiving waters of Outer Bolsa Bay in the Bolsa Chica Ecological Reserve (BCER). Drainage channels within the Westminster watershed collect local storm water runoff and vary in age, size, geometry, and lining material. The channels included in the study are:

- C02 – Bolsa Chica Channel (1.5 miles)
- C04 – Westminster Channel (7.8 miles)
- C05 – East Garden Grove/Wintersburg Channel (11.6 miles)
- C06 – Ocean View Channel (4.1 miles)

BACKGROUND AND NEED

Urbanization of the Westminster watershed since the 1950s has increased the potential for flood related damages, and life safety impacts associated with the overtopping of the C02/C04 and C05/C06 channel systems during short duration, high intensity rainfall events. Urbanization has also increased the total amount of impermeable area, resulting in higher volumes of stormwater being directed to the drainage channels due to limited infiltration opportunities. Historically, the watershed included large agricultural tracts with limited residential development. Current land use in the watershed is predominantly residential, but includes commercial, military, light industrial, schools, and parks. The main drainage channels within the watershed were originally built in the 1950s and the 1960s to convey residual flood waters after the channelization of the Santa Ana River. The channel systems were mostly designed to contain the 25-year event, although some segments were constructed to 65% of the 25-year capacity. The combination of increased runoff and undersized conveyance channels results in increased flood risk for the residents of the Westminster watershed.

Flooding also impacts traffic on area roadways. For example, portions of the Pacific Coast Highway, a major transportation route in the region, flood during storm events and/or during extreme tide conditions. Interstate-405 (I-405), that connects Orange County to both Los Angeles County to the north and San Diego County to the south, is also affected by storm events. I-405 within Orange County is one of the top three most heavily used freeways in California according to 2016 CalTrans Data. Flows from the C04, C05, and C06 channels inundate I-405 during frequent storm events, causing major delays to commercial, commuter, and emergency traffic in the watershed.

An additional area of flood risk is related to the possible spread of contaminants in BCER resulting from large storm events that overtop C05 upstream of the reserve and inundate the oil fields within it. If C05 flood waters inundate the oil fields, widespread distribution of oil-laden runoff could potentially be

transported to previously completed ecosystem restoration projects and eventually the Pacific Ocean as flood waters recede. Chemicals transported in flood waters from the oil fields could prove detrimental to sensitive natural areas.

The outlet of Outer Bolsa Bay into Huntington Harbour at Warner Avenue constricts flows and creates a backwater effect through Outer Bolsa Bay and up into the C05 channel. Similarly, the existing tide gates at the downstream end of C05 constrict discharge from the channel during high flow events. These existing downstream conditions in Outer Bolsa Bay limit flows being discharged from the C05 channel and increase flood risk to the oil facilities within BCER and to homes located upstream as well.

AFFECTED ENVIRONMENT

Table ES-1 provides a brief overview of the resources within the Westminster Watershed that are included as part of the affected environment of the Proposed Project.

ES-1: Overview of the Resources within the Westminster Watershed.

Resource	Overview
Earth Resources	The study area is located within the Peninsular Range Physiographic Province, a geomorphic province that extends 900 miles south from the Los Angeles basin to the tip of Baja California and is bound on the east by the Colorado Desert. Local soils moving from inland towards the shoreline include alluvium and marine terrace deposits. The Newport-Inglewood Fault runs through the study area. The most recent large event for this fault was the 1933 6.3 magnitude Long Beach Earthquake. A majority of the study area is in a Zone of Required Investigation for Liquefaction. There are no landslides that have been mapped within the study area.
Water Resources	The study area originally contained natural watercourses that have since been altered for flood control or water supply purposes. The study area lies within the historic overflow path of the Santa Ana River (SAR), and is susceptible to flooding because of its location on the alluvial plain of the SAR. Significant regional storm events or floods have occurred in the area over the last 175 years with the most recent occurring in 2017, for which a Major Disaster Declaration was approved for California.
Water Quality	Orange County has a National Pollutant Discharge Elimination System permit number CAS618030 issued and approved by the Santa Ana Regional Water Quality Control Board Order number R8-2009-0030, which includes the study area. Channel C05 and Huntington Harbour have been placed on the Santa Ana Region 303(d) List of Water Quality Limited Segments. Both the BCER and the Bolsa Marsh are being added to the 2016 303(d) list due to toxicity. Wetlands have been identified within the vicinity of the Proposed Project.

Air Quality	The study area lies within the South Coast Air Basin (SCAB). The SCAB area has high levels of air pollution, particularly from June through September. High rates of pollutant emissions combined with light wind and shallow vertical atmospheric mixing lead to reduced pollutant dispersion and exacerbate elevated air pollution levels. In regards to National Ambient Air Quality Standards, the study area is currently not attaining ozone and particulate matter $PM_{2.5}$ national standards, ozone and particulate matter state standards, and is maintaining carbon monoxide, nitrogen dioxide, and PM_{10} national standards.
Energy	Southern California Edison provides electrical services to the study area through State-regulated public utility contracts, while the Southern California Gas Company provides natural gas services. In regards to energy consumption, both electricity consumption and natural gas consumption have exhibited a decreasing trend between 2013 and 2017. Conversely, automotive fuel consumption has exhibited an increasing trend between 2013 and 2018.
Noise	The study area is located in an urban setting surrounded by residential and commercial uses. Ambient noise levels consist of traffic noise and noise associated with residential and commercial operations. Roadway traffic consisting of cars, buses, and commercial trucks generate the highest ground vibrations.
Biological Resources	The Westminster watershed has been channelized and a majority of the channels have been hardened with either riprap or concrete to increase flood conveyance. The vegetation resources are typical of constructed flood damage reduction channels in the urban environment. The vegetation in the channels is dominated by annual, weedy, and ruderal species. Eelgrass, which is designated as essential fish habitat, is found within the study area. Eelgrass is primarily found in the Anaheim Bay/Huntington Harbour area, with smaller amounts occurring in the lower portion of channel C02. Thirteen federally-listed threatened, endangered, or candidate species are listed on the U.S. Fish and Wildlife Service's official species list as potentially occurring within the study area. In addition, there are approximately 38 state-listed special status species that potentially occur within the study area. These special status species are primarily located within the adjacent BCER and Seal Beach National Wildlife Refuge.
Cultural Resources	There are no previously recorded National Register of Historic Places listed or eligible properties within or adjacent to the study area for channel reaches C02/C04 and C06. This is also true for the majority of C05, except the downstream reach (Reach 1) which is adjacent to the BCER. Within this area there are two historic period sites, one multicomponent site, and two prehistoric sites.

Tribal Cultural Resources	No sacred sites are recorded within the study area, however, Native American consultation conducted to date strongly indicates that the Proposed Project area should be considered sensitive for Native American resources.
Socioeconomic/Environmental Justice	Most cities within the Westminster watershed have significant white, Hispanic, and Asian populations in various percentages. Stanton, Anaheim, and Santa Ana have dominant Hispanic or Latino populations, whereas Westminster and Garden Grove have dominant Asian populations. Fountain Valley, Cypress, Huntington Beach, and Los Alamitos are the only cities with a median household income above the state average. Westminster, Stanton, Garden Grove, Anaheim, and Santa Ana have a greater than state average of those below the national poverty level.
Land Use	Current land use consists of a mix of residential, schools, businesses and a few parks located adjacent to the channels within the study area. Commercial uses such as retail and office buildings are scattered throughout almost the entire channel system. Industrial uses include warehouses and distribution centers. Open space along the channel system consists mainly of parks and a golf course. The only undeveloped area adjacent to the channel system are the Bolsa Chica Lowlands Restoration Project and the Bolsa Chica Ecological Reserve protected areas that are located to the south and north of C05 Reach 1. In addition, there is oil production at the southwest end of C05 Reach 1.
Hazardous, Toxic, and Radioactive Waste	A limited Hazardous, Toxic, and Radioactive Waste (HTRW) Phase I Environmental Site Assessment was conducted for the Proposed Project area. In regards to channels within the C02/C04 and C05/C06 system, a review of the EDR database suggests that there are LUST's adjacent to the proposed project area that have not been fully remediated. In addition, there are several service stations with active USTs and a facility with a potential surface impoundment directly adjacent to the Proposed Project area. In addition, C05 Reach 1 is adjacent to the Bolsa Chica Lowlands Restoration Project where remediation activities have occurred.
Recreation	There are several parks that are adjacent or within the vicinity of the Proposed Project. On the C02/C04 system there are five nearby parks, while the C05/C06 system has seven nearby parks including the BCER.
Aesthetics	The Proposed Project is located in western Orange County, California, approximately 25 miles southeast of the City of Los Angeles. Within the study area, the majority of scenic vistas and scenic resources are located within the City of Huntington Beach and along the coast. The Pacific Ocean is the area's most prominent scenic vista and scenic resource and is located west of the study area.

	Also west of the study area is the Bolsa Chica State Beach. Views of the channel system are limited to adjacent residential and commercial land uses, and areas where streets and highways cross over the reaches. Views are further limited by landscaping and fencing along the channel system.
Transportation	Several major freeways traverse the study area including the San Diego Freeway (e.g., I-405), the Santa Ana Freeway (I-5) and the Garden Grove Freeway (State Route 22). Local bus services are provided in most of the cities in Orange County. Several cities within the study area have designated truck routes for construction activities and long-term business operations.
Utilities	The channel systems within the study area bisect numerous utilities. These utility lines provide natural gas, sewer, water, oil, and fiber optic services.

COMPLIANCE WITH APPLICABLE LAWS, REGULATIONS, POLICIES AND PLANS

This document is a joint EIS/EIR, and fully complies with National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) requirements. The project complies with all federal and state laws, local laws, regulations, Executive Orders, and permit requirements.

DEVELOPMENT OF ALTERNATIVE PLANS

The study analyzes potential management measures to reduce flood risks within the watershed. Structural measures include channel lining, channel geometry modifications, and flood storage reservoirs. Nonstructural measures, including debris removal, regulations and response planning were also considered to address residual flood risks. Alternative plans, in addition to the No Action Alternative, were formulated using management measures that were determined to be both feasible and acceptable.

The range of study alternatives was refined based on preliminary analyses of effectiveness and cost. The alternatives that remained consisted of either increasing channel conveyance efficiency (Minimum Channel Modifications Plan) or increasing storage capacity (Maximum Channel Modifications Plan). Each of the four channels was further subdivided into reaches to facilitate engineering and economic analyses. A total of 23 reaches were identified. Minimum channel modifications include re-grading of the existing earthen or riprap lined channel to accommodate a concrete lining while maintaining the original channel cross section. Maximum channel modifications include installation of floodwalls/levees and the excavation of the existing earthen or riprap lined channel, resulting in an increase of the channel cross section.

COMPARISON OF FINAL ARRAY OF ALTERNATIVES

Comparison of the performance of the alternatives, the No Action Plan, Minimum Channel Modifications Plan, and the Maximum Channel Modifications Plan, resulted in the identification of the Recommended Plan. Evaluation of both the Minimum Channel Modifications Plan and the Maximum Channel Modifications Plan identified benefits (both direct and indirect) that exceed costs.

The Minimum Channel Modifications Plan produces higher net benefits than the Maximum Channel Modifications Plan, making it the National Economic Development (NED) Plan per USACE guidance. However, the NED Plan does not meet the non-federal sponsor's objective of containing the 1% ACE storm event (100 year recurrence interval) within the conveyance channels and reducing the size of the mapped floodplain.

The Maximum Channel Modifications Plan does meet the sponsor's objective of containing the 1% ACE (100 year recurrence interval) storm event within the channel system. Consequently, this plan has been identified as the Locally Preferred Plan (LPP). The LPP represents a larger plan, with a higher cost and lower net benefits than the NED Plan. LPPs must be approved by the Assistant Secretary of the Army for Civil Works (ASA(CW)), and have a benefit to cost ratio (BCR) greater than 1. Cost sharing for the project is based on the NED Plan. When an LPP is the Recommended Plan, the non-federal sponsor is responsible for 100% of the cost increase above the NED plan, as well as a 35% minimum cost share of the NED Plan.

Comparison of the Final Array of Alternatives. Shown at FY 2020 Price Level and 2.75% Federal Discount Rate

Name	Total First Cost ($1,000)	Equivalent Average Annual Values ($1,000s)		
		Benefits	Costs	Net Benefits
No Action	-	-	-	-
Minimum Channel Modifications	**$483,856**	**$101,743**	**$24,119**	**$77,624**
Maximum Channel Modifications	**$1,224,598**	**$116,255**	**$58,211**	**$58,044**

ENVIRONMENTAL CONSEQUENCES AND MITIGATION

The C05 channel outlets into the BCER which is comprised of two marine protected areas - the Bolsa Bay State Marine Conservation Area and the Bolsa Chica Basin State Marine Conservation Area. In addition, both federal and state special status species inhabit BCER. Both the NED Plan and LPP include features whose construction activities could have temporary adverse impacts primarily on special status bird species that nest and forage within the BCER and the green turtle. Special status bird species nesting and foraging behavior could be temporarily disrupted by construction activities associated with removal of the tide gates, modification of the Warner Avenue Bridge, and channel modification of C05 Reach 1. Mitigation measures, such as restricting construction activities in areas adjacent to the BCER during bird breeding season, would be implemented to minimize these temporary adverse impacts. In regards to the green turtle, this species has been observed within OBB and the lower reaches of C05 and C02. Construction activities could temporarily disrupt feeding behavior by the green turtle and movement; however, mitigation measures, such as having a biological observer present to spot green turtles and halt construction if necessary, would be implemented to minimize these temporary adverse impacts.

The plan formulation analysis included consideration to avoid or minimize impacts to natural resources within the study area. Where avoidance was not possible, mitigation was considered as part of the project formulation. Both the NED Plan and the LPP would have direct impacts to estuarine wetland, indirect impacts to eelgrass, and temporary impacts to special status wildlife as discussed above for the green turtle and bird species. Modification of the Warner Avenue Bridge, which is included in both the NED

Plan and LPP, involves the excavation of approximately 0.6 acre upland soil constriction located south of the bridge on the left descending bank of OBB. This constriction includes approximately 0.15 acres of estuarine wetland soils and vegetation that would be directly impacted by the excavation of this constriction point.

Both the NED Plan and LPP also include indirect impacts to eelgrass located downstream of Edinger Bridge in C02 Reach 23 and Huntington Harbour. Modification of the channels upstream in C02 Reach 23 and C04 Reaches 20 through 22 would result in increased water velocities above existing condition velocities within the channels during storm events. The increased velocities exceed typical eelgrass critical velocity thresholds, meaning the velocities created by the upstream channel modifications may be greater than eelgrass can withstand. Therefore, implementation of either the NED Plan or the LPP is expected to have an indirect impact to approximately 1.70 acre of eelgrass.

To offset temporary direct adverse impacts to special status species, direct adverse impacts to wetlands, and indirect adverse impacts to eelgrass, a conceptual mitigation strategy was prepared (refer to *Appendix M – Mitigation Strategy)*. The conceptual mitigation strategy proposes hydrological enhancement of the muted tidal pocket at the BCER, enhancement of the tern islands at BCER to withstand future sea level rise, and in-kind and out-of-kind mitigation for eelgrass to offset the aforementioned impacts. In addition, recommendations for eelgrass mitigation provided by NMFS have been incorporated into the Final IFR as discussed in Section 6.2.2.

Consultation with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act (1973) was completed February 10, 2020 (refer to *Appendix J – Coordination*). Consultation with the National Marine Fisheries Service under Section 7 of the Endangered Species Act was completed with the receipt of a Biological Opinion dated March 27, 2020 (refer to *Appendix J – Coordination*). Consultation with the State Historic Preservation Office under Section 106 of the National Historic Preservation Act was completed February 18, 2020 (refer to *Appendix J – Coordination*). A consistency determination (CD-0008-19) for project consistency with the Coastal Zone Management Act was filed with the California Coastal Commission December 27, 2019 (refer to *Appendix N – Coastal Consistency Determination*). The 75-day statutory time limit for commission action ran through March 11, 2020. The USACE formally extended the statutory time limit for commission action to April 21, 2020. The April 21, 2020 date was passed without any commission action, therefore, the consistency determination (CD-0008-19) is presumed to be concurred with.

STUDY RISKS

The Corps' Planning Modernization initiative resulted in the development of "Specific, Measurable, Attainable, Risk Informed, and Timely" (SMART) Planning Processes. The streamlined process utilizes risk informed decision making to make decisions earlier in the study process, using best available information and professional judgment. The primary remaining risk to the study and the recommended plan is that certain separable project features are just over the cusp of economic justification in the NED Plan. During detailed design, it is possible that these project features will prove not to be economically justified, resulting in a smaller overall project.

RECOMMENDATION

The NED Plan is the Minimum Channel Modifications Plan. This plan generates the highest average annual equivalent (AAE) net benefits, totaling $77,624,000. The Minimum Channel Modifications Plan is estimated to produce $101,743,00 in direct and indirect AAE benefits at an AAE cost of $24,119,000

(total project cost of $483,856,000), for a benefit to cost ratio (BCR) of 4.2 at the current Federal Discount Rate (FDR) of 2.75%.

While managing residual risk was a part of the plan formulation and preliminary design processes, it was not completely eliminated under the potential with-project conditions. Any reach of channel identified to receive maximum channel modifications (leveed or channel only) were designed and evaluated as being able to contain and convey the 1% ACE event, with 2-3 feet of assurance. This means any portion of the system being modified to the maximum condition would be anticipated to contain the 1% ACE event with at least 95% confidence. However, this also means that these portions of the system could still be exceeded by the 1% ACE event 5% of the time, and that the system could still be overwhelmed by events even larger than the 1% ACE event. Those working or living within the watershed will need to maintain awareness of significant rain events and be ready to react if needed.

The Maximum Channel Modifications Plan was approved as an LPP, and thus the Recommended Plan, by the Assistant Secretary of the Army for Civil Works (ASA(C)W)) in a memo dated October 16, 2019: *Westminster, East Garden Grove, California, Flood Risk Management Study – Exception Request for Locally Preferred Plan (LPP)*. The Principle Features of the Recommended Plan include:

a) Modification of approximately 25 miles of existing drainage channels to increase storage capacity and improve conveyance efficiency. This Locally Preferred Plan is designed to contain the one-percent annual exceedance probability (AEP) storm event. For the C02/C04 channel system, the plan includes conversion of approximately 11,600 linear feet of trapezoidal channel to rectangular concrete channel walls with soft bottom maintained in the center of the channel; creation or improvement of 15,000 linear feet of concrete rectangular channels; 5,000 linear feet of paving existing trapezoidal channels; and creation of a 7,500 linear foot diversion channel near the Westminster Mall along an abandoned U.S. Navy rail line and Edwards Street. Additionally, approximately 9,000 linear feet of sheet pile will be installed with subsequent excavation of the existing toe along the south bank of the marine-influenced C02 channel, preserving and expanding soft bottom habitat through this reach. For the C05/C06 channel system, the project includes conversion of approximately 25,000 linear feet of trapezoidal channel to rectangular concrete channel; 2,300 linear feet of paving existing trapezoidal channels; installing steel sheet pile channel walls in 14,500 linear feet of channel while preserving soft bottom marine influenced habitat at the downstream end of the system; and installing up to 40,000 linear feet of one-foot to two-foot floodwalls for reaches that do not contain the one-percent ACE event within the canal after conversion to a concrete rectangular channel. In addition to in-channel work, the Locally Preferred Plan includes replacement of 43 different roadway crossings, and replacement of pedestrian channel crossings.

b) Widening the restriction at Warner Avenue Bridge to improve conveyance in Outer Bolsa Bay as well as the hydraulic efficiency of the downstream reaches of the C05 Channel. It will also compensate for increased flow volumes that result from increased conveyance capacity in the channels. Widening of the channel in Outer Bolsa Bay would also require a pedestrian bridge at the Bolsa Chica Conservancy to be replaced.

c) Tide gate removal on the C05 Channel to improve flow conditions through the lower reaches of the channel. The existing tide gates leak and allow saltwater habitat to exist upstream, making replacement of the tide gate structure unnecessary. However, the current tide gates includes vehicle access across it. Therefore a replacement bridge structure will be installed at this location to allow for continued access for pedestrians, maintenance, and emergency response.

The Recommended Plan has AAE net benefits, totaling $58,044,000. This plan is estimated to produce $116,255,000 in direct and indirect AAE benefits at an AAE cost of $58,211,000 (total project cost of $1,224,598,000), for a BCR of 2.0 at the current FDR of 2.75%.

Table of Contents

1.0 Introduction* ... 3
1.1 General ... 3
1.2 Guiding Regulations ... 3
1.3 Stage of the Planning Process ... 3
1.4 Study Purpose and Need ... 4
1.5 Study Authority ... 5
1.6 Description of the Feasibility Study Process ... 5
1.7 Non-Federal Sponsor ... 6
1.8 Study Area and Location ... 7
1.9 Project Area ... 8
1.10 Prior Reports and Existing Water Projects ... 16
1.11 Problems and Opportunities ... 16
1.12 Planning Goal, Objectives, and Constraints ... 17
1.13 Report Organization ... 18
2.0 Affected Environment* ... 20
2.1 General Setting ... 20
2.2 Earth Resources ... 24
2.3 Water Resources and Water Quality ... 29
2.4 Air Quality ... 36
2.5 Climate Change ... 41
2.6 Energy ... 45
2.7 Noise ... 46
2.8 Biological Resources ... 47
2.9 Cultural Resources ... 76
2.10 Paleontological Resources ... 86
2.11 Socioeconomic/Environmental Justice ... 87
2.12 Land Use ... 91
2.13 Hazardous, Toxic, and Radioactive Waste ... 92
2.14 Recreation ... 94
2.15 Aesthetics ... 97
2.16 Public Health and Safety ... 98
2.17 Transportation ... 99
2.18 Utilities ... 103
2.19 Future without Project Conditions ... 103

3.0 Plan Formulation* 106
3.1 Risk–Informed Planning 106
3.2 Management Measures 111
3.3 Initial Screening of Measures 115
3.4 Plan Formulation Strategies 120
3.5 Initial Alternative Analysis 121
3.6 Final Array of Alternatives 127
4.0 Comparison of the Final Array of Alternatives* 131
4.1 Channel Reaches and Impact Areas 131
4.2 Traffic Impact Analysis 132
4.3 Cost Estimates for Minimum & Maximum Channel Modification Plans 133
4.4 Annualized Costs and Benefits for Minimum & Maximum Channel Modification Plans 133
4.5 Selection of a Recommended Plan 134
5.0 Environmental Consequences* 136
5.1 Alternatives Evaluated 136
5.2 Effects Not Found to be Significant 137
5.3 Earth Resources 139
5.4 Water Resources 179
5.5 Air Quality 216
5.6 Energy 253
5.7 Noise 260
5.8 Biological Resources 294
5.9 Cultural Resources 362
5.10 Tribal Cultural Resources 385
5.11 Socioeconomic/Environmental Justice 398
5.12 Hazards and Hazardous Materials 414
5.13 Land Use and Planning/Recreation 471
5.14 Aesthetics 490
5.15 Transportation 518
5.16 Utilities and Service Systems 576
5.17 Summary of Environmental Consequences 601
5.18 Mandatory Findings of Significance 608
5.19 Cumulative Impacts 610
5.20 Cumulative Impacts Analysis 619
5.21 Unavoidable Significant Environmental Effects 623

5.22 Growth Inducing Impacts 623
5.23 Irreversible and Irretrievable Commitment of Resources 624
5.24 Local Short-term Uses of the Environment and Long-Term Productivity 624
6.0 Public Involvement, Review and Coordination* 626
6.1 Public Involvement under NEPA and CEQA 626
6.2 Coordination with Other Federal, State, Regional, and Local Agencies 627
6.3 Consultation with Native American Tribes 640
6.4 Issues of Known or Expected Controversy 642
7.0 Compliance with Applicable Laws, Policies, and Plans* 645
7.1 Federal Requirements 645
7.2 State Requirements 653
7.3 Local Plans and Policies 657
7.4 Summary of Compliance with Applicable Laws, Policies, and Plans 659
8.0 Recommended Plan* 660
8.1 Components of the NED Plan and LPP 660
8.2 Mitigation 672
8.3 Operation, Maintenance, Repair, Replacement, and Rehabilitation 686
8.4 Monitoring and Adaptive Management 687
8.5 Real Estate Considerations 687
8.6 Costs and Benefits 687
8.7 Risk Analysis 688
8.8 Environmental Operating Principles (EOPs) 693
8.9 USACE Campaign Plan 693
8.10 Plan Implementation 695
8.11 Project Implementation 698
9.0 Recommendations for Implementation* 702
10.0 Bibliography* 706
11.0 List of Report Preparers* 713
11.1 USACE 713
11.2 Chambers Group, Inc. Consulting 714
11.3 Orange County Public Works 714
12.0 Index* 715

Figures:

Figure 1: SMART Planning key decision and product milestones. 6

Figure 2: Westminster watershed and the study channels overlaid on the FEMA 1% ACE floodplain (Source: FEMA National Flood Hazard Layer (NFHL)). 7

Figure 3: Study area. 8

Figure 4: Drainage channels within the study area. 9

Figure 5: Study channels divided into 23 discrete reaches for siting in-channel modifications. 11

Figure 6: Receiving waters for C02/C04 and C05/C06. 13

Figure 7: Bolsa Chica Ecological Reserve (BCER) 15

Figure 8: Bolsa Chica wetlands restoration 15

Figure 9: Riprap lined trapezoidal and earthen trapezoidal channels found within the Westminster watershed. 22

Figure 10: Example trapezoidal riprap and earthen channel cross-sections found within the Westminster watershed. 22

Figure 11: Existing channel geometry 23

Figure 12: Existing channel bottom conditions. 23

Figure 13: Newport-Inglewood Fault Zone Trace relative to the project area. 27

Figure 14: Wells within the Westminster Watershed. 28

Figure 15: Location of 303(d) listed water quality limited segments 31

Figure 16: Orange County Water District map showing location of the groundwater basin 33

Figure 17: Coastal area chloride concentrations and Aquifer Mergence Zones 34

Figure 18: C05 reach 1 with various channel structures. 35

Figure 19: National Wetland Inventory data for wetland types within the study area 36

Figure 20: California GHG inventory forecast 41

Figure 21: RSLC for Gage 9410660, Los Angeles, CA; NOAA's published rate: 0.83 mm/yr 43

Figure 22: Location of eelgrass in the Anaheim Bay/Huntington Harbour area, ... 52

Figure 23: Habitats present within the Bolsa Chica Lowlands Restoration Project, including eelgrass 53

Figure 24: Habitat types in the SBNWR 57

Figure 25: Boundary of the Orange County Transportation Authority NCCP/HCP 71

Figure 26: Boundary of the Orange County Central-Coastal NCCP/HCP 72

Figure 27: Bolsa Chica Lowlands Restoration Project map 76

Figure 28: Recreational areas within the vicinity of the drainage channels 97

Figure 29: Map of Designated Truck Routes within the Vicinity of the Drainage Channels. 99

Figure 30: USACE six-step planning process 106

Figure 31: USACE Risk-informed planning process. 107

Figure 32: Anticipated flooding in the study area for multiple ACE events under the future without project condition. 109

Figure 33: Typical existing trapezoidal channels 122

Figure 34: Examples of channel reaches with rectangular cross-sectional geometry 124

Figure 35: The diversion tunnel alternative would run under C05 from I-405 to Outer Bolsa Bay. 125

Figure 36: Diversion tunnel conceptual profile with 2-3 Inlets and an outlet offshore of Bolsa Bay. 125

Figure 37: Minimum Channel Modifications Plan. 128

Figure 38: Maximum Channel Modifications Plan 129

Figure 39: Proposed alignment of diversion channel at Westminster Mall 130

Figure 40: Economic impact areas are generally broken up to correspond with reach extents. 132

Figure 41: Location of Special Status Bird Species Nesting Habitat Within the Bolsa Chica Ecological Reserve 307

Figure 42: Location of Special Status Bird Foraging Areas within the Bolsa Chica Ecological Reserve. 308

Figure 43: Location of Belding's Savannah Sparrow Territories Surveyed in 2011 by Merkel & Associates. 309

Figure 44: Orange County Fire Hazard Severity Zones in State Responsibility Areas (SRA) (Source: California Department of Forestry & Fire Protection 2007) 470

Figure 45: Location of Scenic Overlooks within the Bolsa Chica Ecological Reserve 493

Figure 46: Location of Scenic Overlooks within the Bolsa Chica Ecological Reserve 495

Figure 47: Historical coastal wetlands, Los Angeles and Orange counties. 616

Figure 48: The Minimum Channel Modifications Plan is the NED Plan. 664

Figure 49: The Maximum Channel Modifications Plan is the Locally Preferred Plan. 670

Figure 50: Preliminary best-case implementation strategy based on the Maximum Channel Modifications Plan. 700

Tables:

Table 1: Characteristics of the 14 soil types found within the study area. 25

Table 2: C05/Huntington Harbour 303(d) listed pollutants 32

Table 3: Local ambient air quality 38

Table 4: Attainment status for federal and state regulated criteria pollutants in the proposed project area 39

Table 5: Global warming potentials and atmospheric lifetimes of select greenhouse gases 40

Table 6: South coast air basin 2018 greenhouse gas summary 40

Table 7: Relative Sea Level Change for Gage 9410660, Los Angeles, CA through 2100 43

Table 8: Non-Residential Electricity Consumption in Orange County 2013-2017 45

Table 9: Non-Residential Natural Gas Consumption in Orange County 2013-2017 45

Table 10: Automotive Fuel Consumption in Orange County 2013-2018 46

Table 11: Permissible noise exposures. 46

Table 12: Noise levels for common sounds. 47

Table 13: Channel reaches with potential Essential Fish Habitat. 60

Table 14: Federal listed species potentially within the project area. 60

Table 15: Natural communities and land cover types found within the Orange County Transportation Authority NCCP/HCP. 73

Table 16: Species covered under the Orange County Transportation Authority NCCP/HCP. 73

Table 17: Natural communities and land cover types found within the Orange County Central-Coastal Natural Communities Conservation Plan/Habitat Conservation Plan. 73

Table 18: Species covered under the Orange County Central-Coastal Natural Communities Conservation Plan/Habitat Conservation Plan. 74

Table 19: Cultural Resources within 0.5 Mile of the APE 77

Table 20: Populations within the project area. 89

Table 21: Land use in the Anaheim Bay/Huntington Harbour Watershed. 92

Table 22: Designated Truck Routes within the Vicinity of the Drainage Channels. 99

Table 23: Existing major utilities 103

Table 24: Screening of flood damage risk reduction measures. 119

Table 25: Minimum channel modifications. 123

Table 26: Maximum channel modifications. 124

Table 27: ROM cost estimates for the structural alternatives in the focused array. 126

Table 28: Channel reaches and their corresponding impact areas in the economic analysis. 131

Table 29: Project First Costs by Plan, FY 2020 Price Levels ($000) 133

Table 30: EAD for the without project condition 134

Table 31: Annualized costs, benefits, and net benefits of the Final Array of Alternatives, FY 2020 Price Level. 134

Table 32: Comparison of the Final Array of Alternatives, FY 2020 Price Level ($000's)..... 135

Table 33: Measures Under Each Alternative 137

Table 34 – Peak Storm Flow Channel Capacity 198

Table 35 – Peak Storm Flow Channel Capacity 200

Table 36 – Peak Storm Flow Channel Capacity 201

Table 37 – Peak Storm Flow Channel Capacity 202

Table 38: General Conformity De Minimis Levels 223

Table 39: SCAQMD Regional Criteria Pollutant Emission Thresholds of Significance..... 223

Table 40: SCAQMD Localized Significant Thresholds (LSTs) for 5 acre site and 25 m receptor distance in applicable project source receptor areas. 224

Table 41: Westminster FRM Project Areas (acres). 226

Table 42: Westminster LPP Construction Schedule. 226

Table 43: Construction Phases for Warner Avenue Bridge Expansion. 227

Table 44: Construction Phases for Tide Gate Removal and Replacement. 227

Table 45: Construction Phases for Reach 1. 228

Table 46: Construction Phases for Reach 23. 229

Table 47: Construction Phases for Reach 21 (LPP)..... 229

Table 48: Equipment Numbers for each Project. 230

Table 49: Westminster NED Plan Construction Schedule. 232

Table 50: Estimated Emissions with Unmitigated Construction for Individual NED Plan Projects. 232

Table 51: Estimated Emissions with Unmitigated Construction for the NED Plan. 233

Table 52: Estimated Emissions with Mitigated Construction for Individual NED Plan Projects. 233

Table 53: Estimated Emissions with Mitigated Construction for the NED Plan. 234

Table 54: CalEEMod Estimated Emissions with Unmitigated Construction for LPP Projects. 235

Table 55: CalEEMod Estimated Emissions with Unmitigated Construction for the LPP. 236

Table 56: CalEEMod Estimated Emissions with Mitigated Construction for LPP Projects. 236

Table 57: CalEEMod Estimated Emissions with Mitigated Construction for the LPP. 237

Table 58: Maximum daily CalEEMod emissions (winter) and SCAQMD regional thresholds for NED Plan construction with mitigation. 239

Table 59: Maximum daily CalEEMod estimates (winter) and SCAQMD regional thresholds for LPP construction with mitigation. 240

Table 60: Maximum daily emissions and SCAQMD localized significance thresholds for mitigated construction at Warner Avenue Bridge (1.15 acres). 243

Table 61: Maximum daily emissions and SCAQMD localized significance thresholds for mitigated construction on Reach 1 (40.78 acres). 244

Table 62: Maximum daily emissions and SCAQMD localized significance thresholds for mitigated construction on Tide Gate (0.23 acres). 244

Table 63: Maximum daily emissions and SCAQMD localized significance thresholds for mitigated NED Plan construction on Reach 23 (46.8 acres). 244

Table 64: Maximum daily emissions and SCAQMD localized significance thresholds for mitigated NED Plan construction of upstream Reach 21 (11.77 acres). 244

Table 65: Maximum daily emissions and SCAQMD localized significance thresholds for LPP construction on Reach 23 (46.8 acres). 246

Table 66: Maximum daily emissions and SCAQMD localized significance thresholds for Reach 21 (11.77 acres). 246

Table 67: Estimated GHG emissions during NED Plan construction.* 250

Table 68: Estimated GHG emissions during LPP construction.* 251

Table 69: Estimated Automotive Fuel Consumption during Construction of NED Plan 255

Table 70: Estimated Automotive Fuel Consumption during Construction of LPP..... 257

Table 71: Summary of noise ordinances related to construction within the study area. 261

Table 72: Typical Noise Levels from Construction Activities for Public Works Projects 265

Table 73: Vibration Criteria for Structural Damage 282

Table 74: Vibration Criteria for Human Annoyance 282

Table 75: Vibration Source Levels for Construction Equipment..... 283

Table 76: Roads adjacent to the C02/C04 Flood Control Channels that Could Experience Temporary Impacts during Construction. 526

Table 77: Location of Bicycle Lanes within the Vicinity of the Proposed Project. 527

Table 78: Location of Sidewalks within the Vicinity of the Proposed Project. 528

Table 79: Location of Sidewalks within the Vicinity of the Proposed Project. 528

Table 80: Roads adjacent to the C02/C04 Flood Control Channels that may Experience Temporary Impacts during Construction. 533

Table 81: Bicycle Lanes within the Vicinity of the Proposed Project that would be Temporarily Impacted during Construction. 536

Table 82: Bicycle Lanes along Crossings that would be Temporarily Impacted during Construction of the Proposed Project. 537

Table 83: Sidewalks within the Vicinity of the Proposed Project that would be Temporarily Impacted during Construction. 538

Table 84: Sidewalks along Crossings that would be Temporarily Impacted during Construction of the Proposed Project. 539

Table 85: Public Transit Routes that may Experience Impacts during Construction of the Proposed Project. 540

Table 86: Bicycle Lanes along Crossings that would be Temporarily Impacted during Construction of the Proposed Project. 544

Table 87: Sidewalks that would be Temporarily Impacted during Construction of the Proposed Project. 545

Table 88: Public Transit Routes that may Experience Impacts during Construction of the Proposed Project. 548

Table 89: Sidewalks within the Vicinity of the Proposed Project that would be Temporarily Impacted during Construction. 550

Table 90: Area Landfill Information..... 589

Table 91: Summary of Impact Levels for the NED Plan. 602

Table 92: Summary of Impact Levels for the LPP Plan. 605

Table 93: Geographic area that would be affected by the Westminster, East Garden Grove Flood Risk Management Study. 611

Table 94: Development projects within the vicinity of the study area..... 618

Table 95: Significant and unavoidable environmental impacts of the NED Plan and LPP. 623

Table 96: Summary of compliance with applicable laws, policies, and plans..... 659

Table 97: The LPP is the Recommended Plan..... 660

Table 98: The Minimum Channel Modifications Plan (NED Plan)..... 662

Table 99: The Minimum Channel Modifications Plan (NED Plan)..... 663

Table 100: Reach-by-reach description of modifications to C02/C04 in the Maximum Channel Modifications Plan (LPP) 668

Table 101: Reach-by-reach description of modifications to C05/C06 in the Maximum Channel Modifications Plan (LPP) 669

Table 102: Mitigation Measures. 674

Table 103: Impacts Requiring Mitigation for the NED Plan and LPP..... 686

Table 104: Alternative Plan Average Annual Costs in FY 2020 Price Levels ($000)..... 687

Table 105: Without project performance (%). 690

Table 106: With-project minimum channel modifications performance (%). 691

Table 107: With-project maximum channel modifications performance (%). 692

Table 108: Federal and non-federal cost sharing for the NED Plan and the LPP..... 696

Table 109: Study schedule. 697

Page intentionally left blank
for double-sided printing

Appendices:

A. Hydrology and Hydraulics (H&H)
B. Civil Engineering
C. Cost
D. Real Estate
E. Economics
F. Hazardous, Toxic, and Radioactive Waste (HTRW)
G. Geotechnical Engineering
H. Plan Formulation
I. General Conformity Analysis
J. Coordination
K. U.S. Fish and Wildlife Service Coordination Act Report
L. Environmental Considerations
M. Conceptual Mitigation Strategy
N. Coastal Consistency Determination
O. Structural Engineering

Page intentionally left blank
for double-sided printing

List of Acronyms:

Acronym	Definition		Acronym	Definition
ACE	Annual Chance of Exceedance		MSA	Magnuson-Stevens Fishery Conservation and Management Act
ADM	Agency Decision Milestone		NAAQS	National Ambient Air Quality Standards
ASA(CW)	Assistant Secretary of the Army (Civil Works)		NCCP	Natural Communities Conservation Plan
BCER	Bolsa Chica Ecological Reserve		NED	National Economic Development
BCR	Benefit to Cost Ratio		NEPA	National Environmental Policy Act
BMP	Best Management Practice		NFS	Non-federal Sponsor
CAA	Clean Air Act		NHI	Northwest Habitat Institute
Cal-OSHA	California Division of Occupational Safety and Health Administration		NOAA	National Oceanic and Atmospheric Administration
CCC	California Coastal Conservancy		NOI	Notice of Intent
CDC	California Department of Conservation		NOP	Notice of Preparation
CDFW	California Department of Fish and Wildlife		NPDES	National Pollutant Discharge Elimination System
CEQ	Council on Environmental Quality		NRHP	National Register of Historic Places
CEQA	California Environmental Quality Act		NWR	National Wildlife Refuge
CESA	California Endangered Species Act		NWSSB	Naval Weapons Station Seal Beach
CFR	Code of Federal Regulations		OCTA	Orange County Transportation Authority
CNDDB	California Natural Diversity Database		OCPW	Orange County Public Works
CTR	California Toxics Rule		OCWD	Orange County Water District
DAMP	Drainage Area Management Plan		OMB	Office of Management and Budget
DoD	Department of Defense		O&M	Operations and Maintenance
DTA	DynusT Dynamics Simulation and Assignment		OMRR&R	Operation, Maintenance, Repair, Replacement, and Rehabilitation
EAD	Expected Annual Damages		OSHA	Occupational Safety and Health Administration
ECOS-IPaC	Environmental Conservation Online System Information for Planning and Consultation		PCH	Pacific Coast Highway
EDR	Environmental Data Resources		PDT	Project Delivery Team

Acronym	Definition		Acronym	Definition
EFH	Essential Fish Habitat		PED	Preconstruction Engineering and Design
EFHA	Essential Fish Habitat Areas Protected from Fishing		PHMS	Pacific Highly Migratory Species
EGGW	East Garden Grove Wintersburg		PMP	Project Management Plan
EIR	Environmental Impact Report		REC	Recognized Environmental Conditions
EIS	Environmental Impact Statement		RWQCB	Regional Water Quality Control Board
EOP	Environmental Operating Principles		SAR	Santa Ana River
ESA	Federal Endangered Species Act		SBNWR	Seal Beach National Wildlife Refuge
FCSA	Feasibility Cost Sharing Agreement		SCAB	South Coast Air Basin
FDR	Federal Discount Rate		SCAG	Southern California Association of Governments
FEMA	Federal Emergency Management Agency		SCAQMD	South Coast Air Quality Management District
FUDS	Formerly Used Defense Sites		SFHA	Special Flood Hazard Area
GHG	Greenhouse Gases		SHPO	State Historic Preservation Office
GI	General Investigation		SIP	State Implementation Plan
GWP	Global Warming Potential		SPL	Los Angeles District
HAPC	Habitat Areas of Particular Concern		SR	State Route
HCP	Habitat Conservation Plan		SWP	State Water Project
HQUSACE	Headquarters U.S. Army Corps of Engineers		SWPPP	Storm Water Pollution Prevention Plan
HTRW	Hazardous, Toxic, and Radioactive Waste		TSP	Tentatively Selected Plan
I-	Interstate-		USACE	U.S. Army Corps of Engineers
IBA	Important Bird Area		USDA FS	U.S. Department of Agriculture Forest Service
IDC	Interest During Construction		USEPA	U.S. Environmental Protection Agency
IEPR	Independent External Peer Review		USFWS	U.S. Fish and Wildlife Service
IFR	Integrated Feasibility Report		UST	Underground Storage Tanks
LACM	Los Angeles County Museum of Natural History		UXO	Unexploded Ordnance
LERRDs	Lands, easements, rights-of-way, relocation, and disposal areas		VT	Vertical Team
LPP	Locally Preferred Plan		WY	Water Year
LUST	Leaking Underground Storage Tanks			

WESTMINSTER, EAST GARDEN GROVE, CA

FLOOD RISK MANAGEMENT STUDY

1.0 Introduction*

1.1 General

This document serves as a feasibility report, Environmental Impact Statement (EIS), and Environmental Impact Report (EIR) – known as an Integrated Feasibility Report (IFR) – for the Westminster, East Garden Grove, California Flood Risk Management Study. This IFR analyzes the environmental impacts associated with implementing multiple flood risk management alternatives and reviews the process for identifying a Recommended Plan for implementation. The Recommended Plan is synonymous with the term "Proposed Project" which is the terminology typically used under the California Environmental Quality Act (CEQA) to identify the project to be implemented.

The U.S. Army Corps of Engineers (USACE) is the lead agency under the National Environmental Policy Act (NEPA). The non-federal sponsor (NFS), Orange County Public Works (OCPW) acting on behalf of Orange County and the Orange County Flood Control District (OCFD), is the lead agency under the CEQA.

1.2 Guiding Regulations

This IFR was prepared to comply with NEPA (42 United States Code [U.S.C.] Section 4321, et seq.) in conformance with the Council on Environmental Quality (CEQ) Regulations for Implementing NEPA (40 Code of Federal Regulations [C.F.R.] Part 1500, et seq.) and the USACE Engineer Regulation (ER) 200-2-2, Implementing NEPA (33 C.F.R. Part 230), as well as USACE policies including, the Economic and Environmental Principles for Water and Related Resources (May 1983), and ER 1105-2-100, Planning Guidance Notebook (22 April 2000), as amended. This IFR was also prepared to comply with the CEQA (California Public Resources Code [P.R.C.] Section 21000, et seq.) and the Guidelines for Implementation of the CEQA of 1970 (CEQA Guidelines) (14 California Code of Regulations [C.C.R.] Section 15000, et seq.).

1.3 Stage of the Planning Process

This is a General Investigation (GI) feasibility study addressing flood risk management. The study was initiated in September 2003 and was re-scoped in 2012-2013 to comply with the USACE SMART planning paradigm (see section 1.6). Following this transition, plan formulation workshops were held on 5 December 2012 and 11 April 2013. The Alternatives Milestone was held in February of 2014, where the Project Delivery Team (PDT) presented a rationale for evaluating study alternatives that included making risk-informed decisions and outlining next steps to complete the study.

In April 2017, USACE conducted a Study Assessment to determine the remaining scope, schedule, and cost to complete the feasibility study. In July 2017, a Draft Final Project Management Plan (PMP) was completed, based on the findings in the Study Assessment, to map out a path for arriving at the TSP Milestone. The TSP Milestone briefing was held on 25 July 2018, where the PDT received approval to release the IFR for concurrent public and policy review, Agency Technical Review (ATR), and Independent External Peer Review (IEPR).

The Agency Decision Milestone (ADM) was convened on 04 February 2019. At the ADM and a supplemental IPR (29 March 2019), a panel of senior leaders from the U.S. Army Corps of Engineers Headquarters (HQUSACE) endorsed the selected plan, pending additional analyses that were identified at these meetings and carried out prior to the submittal of this final report.

1.4 Study Purpose and Need

The purpose of this study is to evaluate the flood risk within the Westminster watershed that is primarily attributable to undersized drainage channels that collect surface runoff and convey it downstream towards eventual discharge into the Pacific Ocean. Subsequent to the completion of the Santa Ana River (SAR) projects, the Westminster watershed is the largest remaining Federal Emergency Management Agency (FEMA) Special Flood Hazard Area in Orange County. Preliminary analysis shows that flood flows begin to overtop the drainage channels in the study area between the 20% and 10% annual chance of exceedance (ACE) storm events (5 and 10 year recurrence intervals, respectively), with approximately 400,000 area residents and 44,000 structures at risk during a 0.2% ACE event. Overbank flooding also impacts traffic in the project area, causing closures on local roads as well as major routes, including Interstate 405 (I-405) and Pacific Coast Highway (PCH). In total, the study area experiences approximately $72,000,000 (Fiscal Year 2020 price levels, 2035 base year, 2.75% federal discount rate) in equivalent annual direct damages as a result of overbank flooding.

Urbanization of the Westminster watershed since the 1950s has increased the potential for flood related damages, and life safety impacts associated with the overtopping of the existing drainage channel systems during short duration, high intensity rainfall events. Urbanization has also increased the total amount of impermeable area, resulting in higher volumes of stormwater being directed to the channels due to limited infiltration opportunities. Historically, the watershed included large agricultural tracts with limited residential development. Current land use in the watershed is predominantly residential, but includes commercial, military, light industrial, schools and parks. The main drainage channels within the watershed were originally built in the 1950s and the 1960s to convey residual flood waters after the channelization of the SAR. The channel systems were mostly designed to contain the 25-year event, although some segments were constructed to 65% of the 25-year capacity. The combination of increased runoff and undersized conveyance channels results in increased flood risk for the residents of the Westminster watershed.

The study area has a population at risk of approximately 400,000 during the 0.2% ACE event. Flat terrain in the Westminster watershed and a high population density increase the impact of flooding on traffic and evacuation. The additional burden that flooding puts on already crowded roads can result in a loss of functionality for Garden Grove Hospital as delays caused by flooding negatively impact ambulance routes and other emergency services. Flooding can also negatively impact schools in the project area by obstructing pedestrian and bus routes, damaging facilities, and reducing access to emergency services. I-405 and other major transportation routes in the project area can become impassable due to flooding, further increasing delays during high traffic periods and reducing access for people and services.

The evaluation of flood risk includes identifying measures to reduce the consequences of flooding, such as risks to life safety, damages to residential and commercial structures and public infrastructure, and time lost due to traffic delays caused by flooded transportation routes. The evaluation also considered measures to reduce flood impacts downstream of the channels in the vicinity of Outer Bolsa Bay.

The study report is a decision document in the form of an integrated feasibility report and NEPA EIS in accordance with the USACE Planning Guidance Notebook, ER 1105-2-100 (22 April 2000).

1.5 Study Authority

The Westminster feasibility study was conducted in accordance with the study resolution adopted by the House of Representatives Committee on Public Works on May 8, 1964 (Flood Control Act of 1938), which reads:

> *"Resolved by the Committee on Public Works of the House of Representatives, United States, that the Board of Engineers for Rivers and Harbors is hereby requested to review the reports on (a) San Gabriel River and Tributaries, published as House Document No. 838, 76th Congress, 3d Session; (b) Santa Ana River and Tributaries, published as House Document No. 135, 81st Congress, 1st Session; and (c) the project authorized by the Flood Control Act of 1936 for the protection of the metropolitan area in Orange County, with a view to determining the advisability of modification of the authorized projects in the interest of flood control and related purposes."*

1.6 Description of the Feasibility Study Process

In February and March 2012, two planning memoranda were issued (Walsh 2012a and Walsh 2012b, respectively) that collectively revised USACE's approach to planning studies, emphasized risk-based decision-making and early Vertical Team (VT), or leadership chain, engagement during the Feasibility Study process. The memoranda were key guidance tied to an initiative known as Planning Modernization. Planning Modernization was a central component of the Corps' Civil Works Transformation efforts. A key tenet of Planning Modernization is bringing increased efficiency and efficacy to the processes USACE uses to make decisions and produce planning decision documents. The new processes is called Specific, Measurable, Attainable, Risk Informed, and Timely Planning (SMART Planning), and is derived from the Principles and Guidelines and the USACE Planning Guidance Notebook (P&G), ER 1105-2-100. Under SMART Planning, a Feasibility Study works progressively through the six-step planning process, but also includes three key decision points or milestones (Figure 1) that mark points along the path to an effective and efficient study.

Studies conducted within the new SMART Planning paradigm are expected to be completed within 3 years, at a cost not to exceed $3 million, and be fully coordinated among the three levels of USACE's VT; this is referred to as the 3x3x3 rule. This feasibility study predates USACE's SMART Planning guidelines as outlined in the Planning SMART Guide (Planning Bulletin 2012-02), but it was re-scoped in fiscal years (FY) 2012-2013 to follow the 3x3x3 rule.

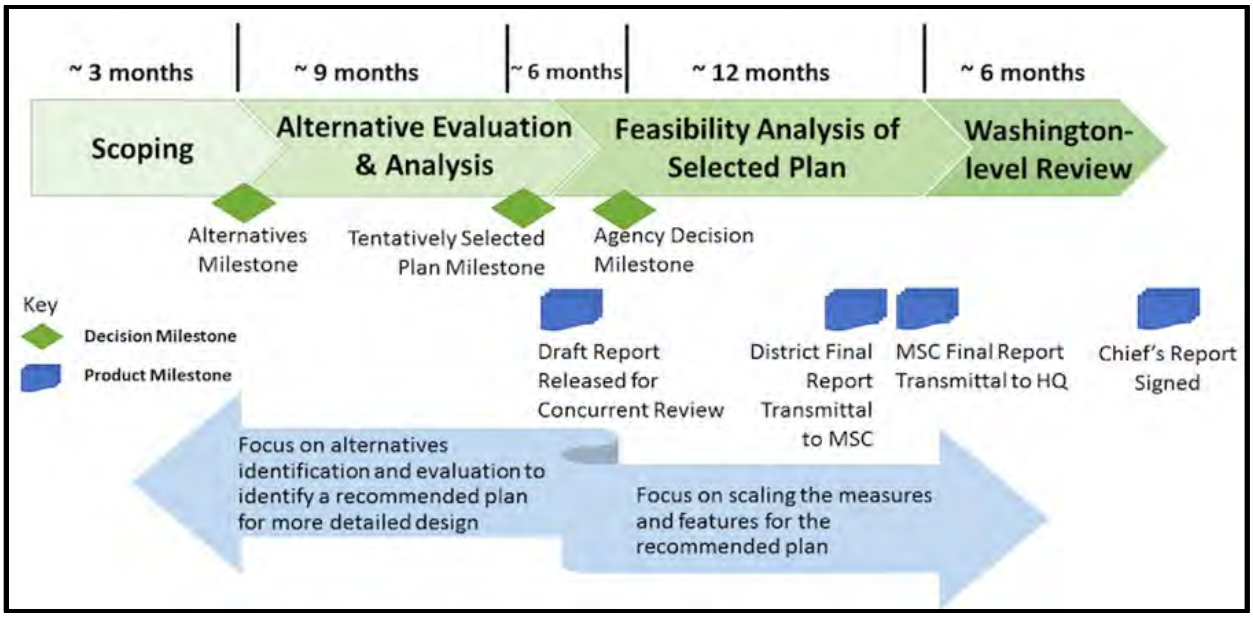


Figure 1: SMART Planning key decision and product milestones.

1.7 Non-Federal Sponsor

The NFS is Orange County and OCFCD and is being managed by OCPW. The Corps of Engineers and OCPW executed a Feasibility Cost Sharing Agreement (FCSA) in September 2003. While the sponsor is deeply committed to the success of this study and has contributed greatly within the USACE planning process, there are certain criteria separate from those outlined in the planning goals and objectives listed in Section 1.12 that it aims to meet. Specifically, one of OCPW's goals for this study is to provide flood damage risk reduction within the drainage channels of the Westminster watershed up to and including the 1% ACE storm event.

Throughout the planning process, USACE and OCPW worked together to ensure that consideration was given to analyzing the work necessary to fulfill this additional criteria. Once the recommended federal project was identified, the team determined what potential additional measures or siting differences would be required to meet the NFS's goal of containing the 1% ACE storm event. The Westminster watershed and the study channels are shown in relation to the FEMA 1% ACE floodplain in Figure 2.

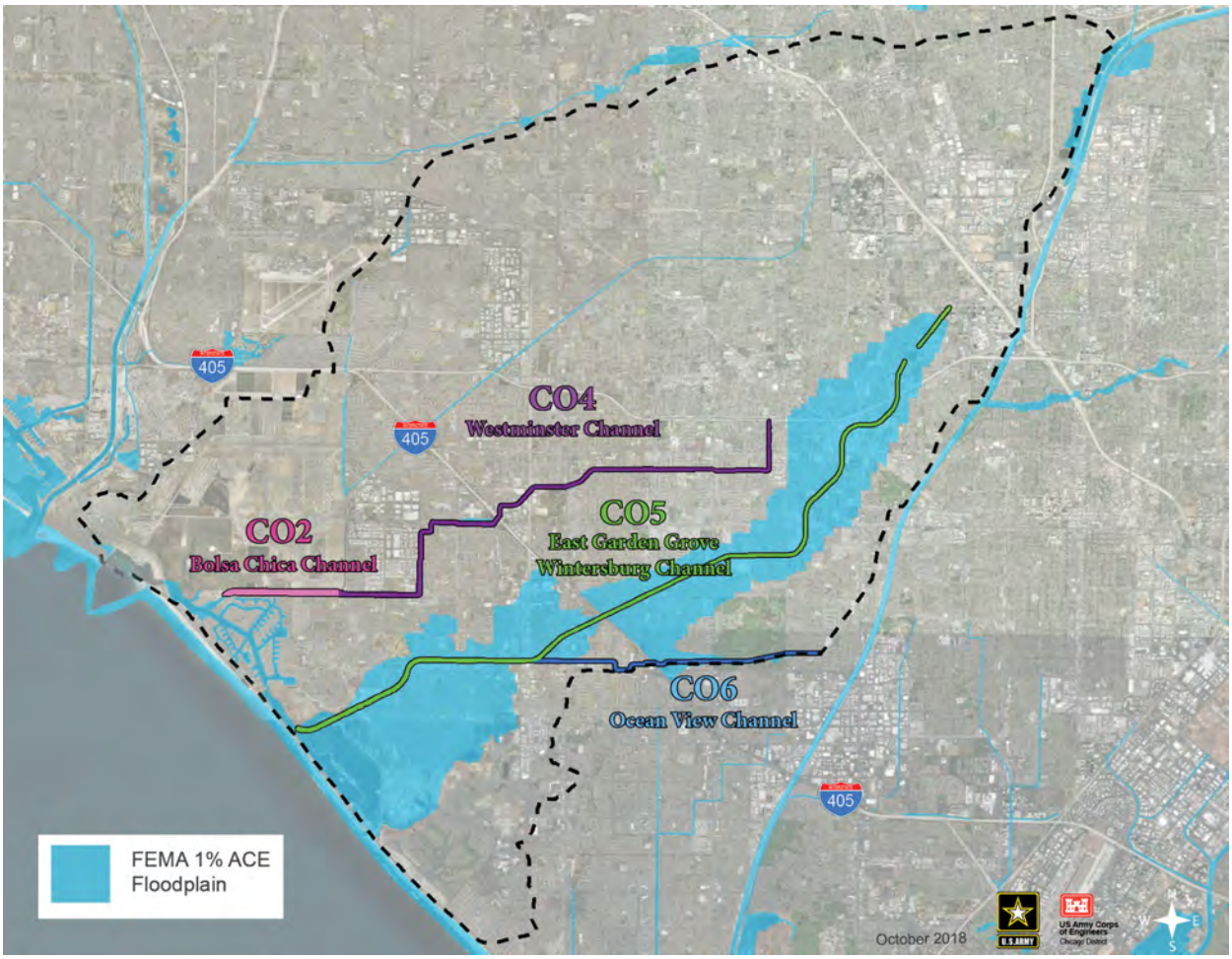


Figure 2: Westminster watershed and the study channels overlaid on the FEMA 1% ACE floodplain (Source: FEMA National Flood Hazard Layer (NFHL)).

1.8 Study Area and Location

The study area is the highly urbanized Westminster watershed in western Orange County, California. The watershed is approximately 87 square miles in area and lies on a flat coastal plain. The watershed was formerly part of the floodplain of the SAR, which historically meandered throughout the existing watershed as far north as Anaheim Bay. Channelization and large scale flood control modifications have constrained the SAR to the main stem channel on the eastern border of the Westminster watershed.

Cities in the watershed include Anaheim, Stanton, Cypress, Garden Grove, Westminster, Fountain Valley, Los Alamitos, Seal Beach, and Huntington Beach (Figure 3).

Naval Weapons Station Seal Beach (NWSSB), Bolsa Chica Ecological Reserve (BCER), and Seal Beach National Wildlife Refuge (SBNWR) are significant landmarks on the downstream end of the project area (see Sections 1.9.3 and 1.9.4).

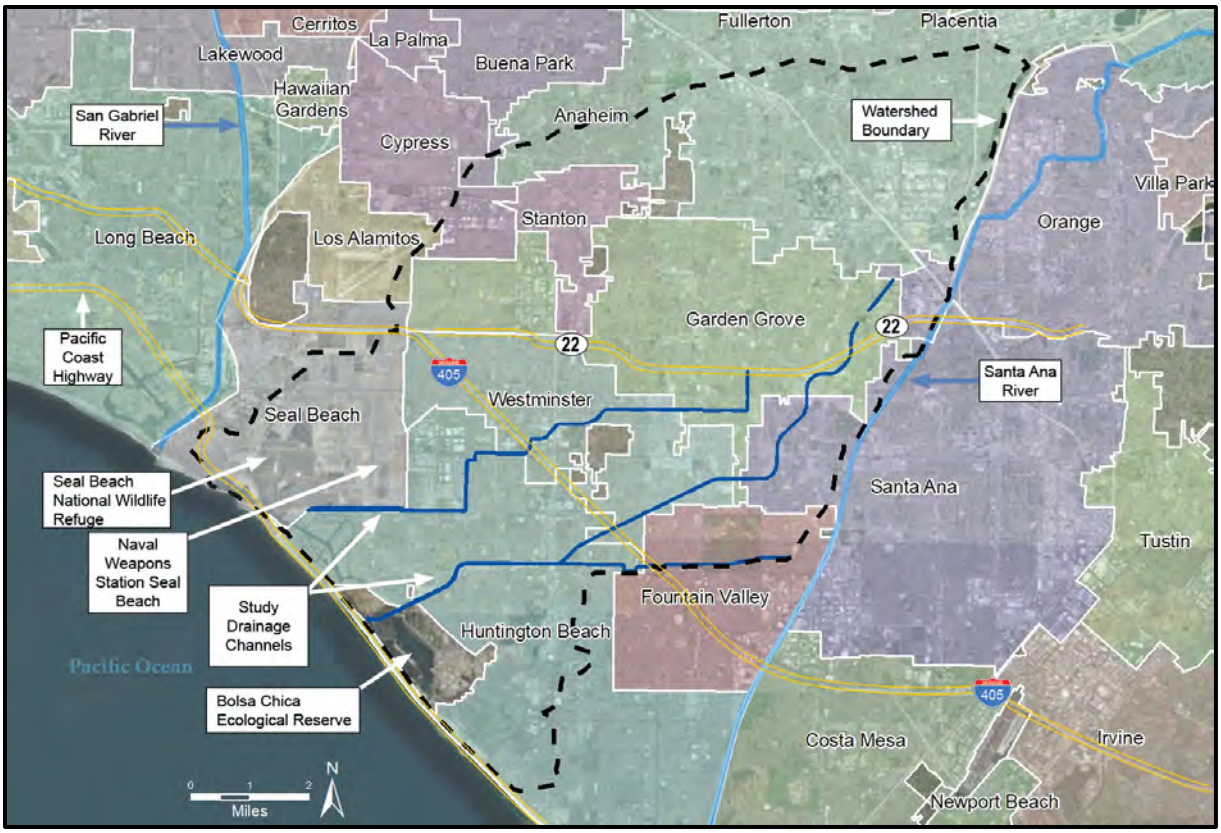


Figure 3: Study area.

1.9 Project Area

The project area includes portions of four non-federal drainage channels within the Westminster watershed (Figure 4) and the receiving waters of one of the channel systems in the BCER.

1.9.1 Watershed Drainage Channels

The channels within the Westminster watershed collect local storm water runoff and vary in size, geometry, and lining material. The original study scope included all of the drainage channels within the watershed. In consultation with OCPW and a review of existing conditions in the watershed, it was determined that the study would instead focus only on portions of the C02, C04, C05, and C06 channels (Figure 4).

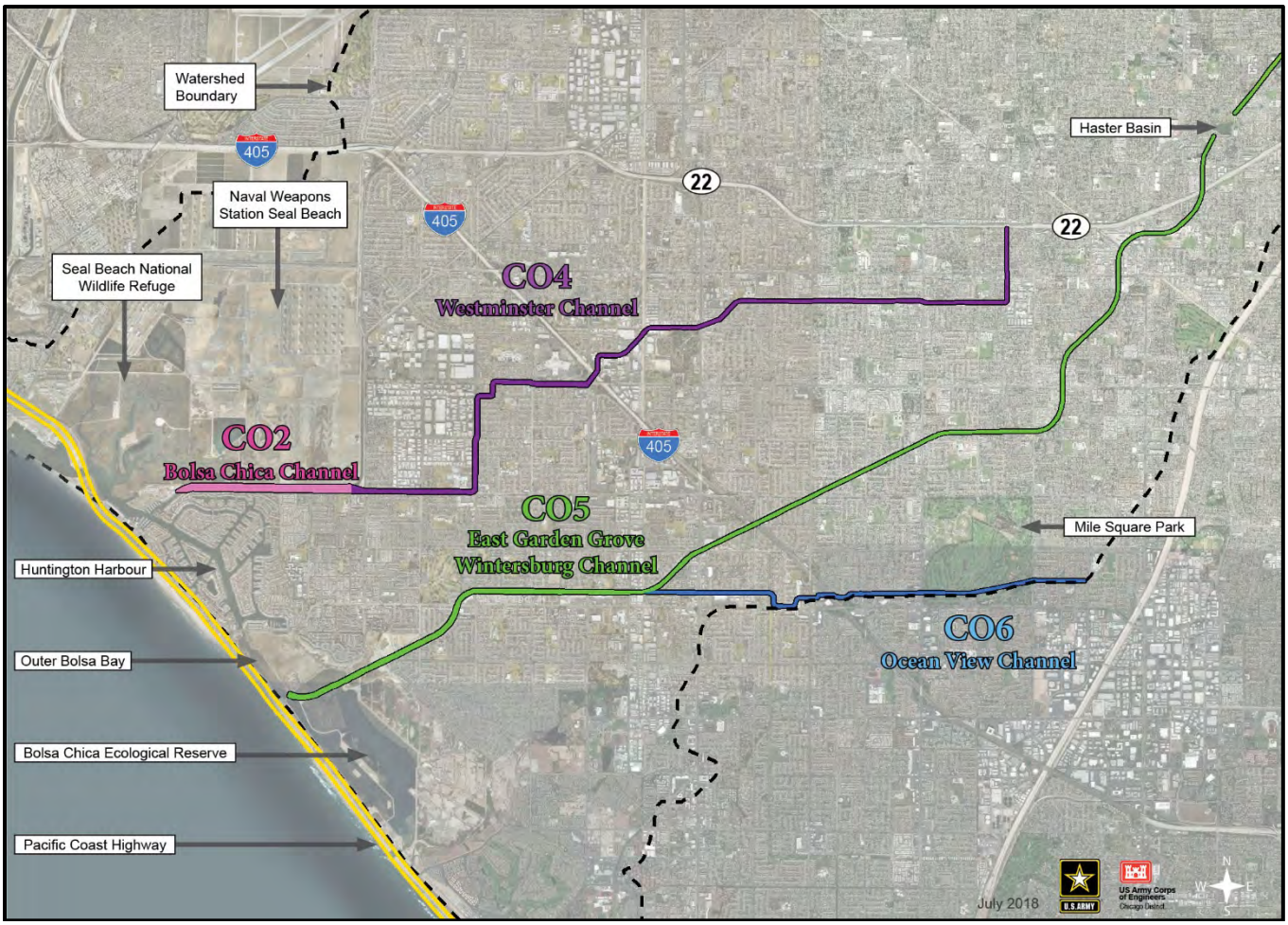


Figure 4: Drainage channels within the study area.

C02 – Bolsa Chica Channel

For the C02 channel, this study focuses only on the portion that extends from the confluence with the C04 channel, near the southeastern corner of the NWSSB, to where the channel discharges into Huntington Harbour. This channel segment is approximately 1.5 miles long and provides flood risk management for Huntington Beach, Huntington Harbour, and the NWSSB.

C04 – Westminster Channel

The C04 channel is approximately 7.8 miles in length and provides flood risk management for the cities of Garden Grove, Westminster, and Huntington Beach. The channel begins south of Highway 22 and flows westward past Westminster Memorial Park Cemetery, I-405, and the Westminster Mall, joining with the C02 channel near the southeastern corner of the NWSSB.

C05 – East Garden Grove/Wintersburg Channel

The C05 channel is approximately 11.6 miles in length and provides flood risk management for the cities of Santa Ana, Garden Grove, Westminster, and Huntington Beach. The channel begins west of the intersection of I-5, Highway 57, and Highway 22 in the city of Santa Ana and flows southwest through Haster Basin, under I-405, and through the BCER, ultimately discharging into Outer Bolsa Bay and

eventually the Pacific Ocean. Haster Basin is a detention basin that controls flows entering the C05 channel downstream with a pump system.

C06 – Ocean View Channel

The C06 channel is approximately 4.1 miles in length and provides flood risk management for the cities of Fountain Valley and Huntington Beach. The channel begins 0.5 miles east of Mile Square Regional Park in the City of Fountain Valley and flows westward through Mile Square Regional Park and under I-405, ultimately discharging into the C05 channel at the confluence near Gothard Street in Huntington Beach. Mile Square Regional Park is a 640 acre park that is home to multiple golf courses, a 55 acre recreation center, and two lakes. This park is located in the city of Fountain Valley but is a key recreation resource for the communities throughout the watershed.

1.9.2 Channel Reaches

The channels included in the study area are divided into 23 discrete reaches based primarily on the physical conditions within the channels throughout the project area. Typical channel configurations are described below and vary throughout the channel systems. Study channel reaches are shown in Figure 5.

- Concrete rectangular channels: vertical channel walls with concrete lined sides and bottom.
- Riprap-lined trapezoidal channels: channels with sloped walls that are lined with riprap; soft or unlined bottom.
- Concrete-lined trapezoidal channels: channels with sloped walls and bottom that are lined with concrete.
- Enclosed culverts: rectangular or box conduits and large diameter pipes that are not exposed at the surface.
- Levees: earthen berms are located along channels in the flattest downstream extents of the watershed.
- Steel Sheet Pile: rectangular channels comprised of vertical sheet pile walls with soft channel bottom in between.

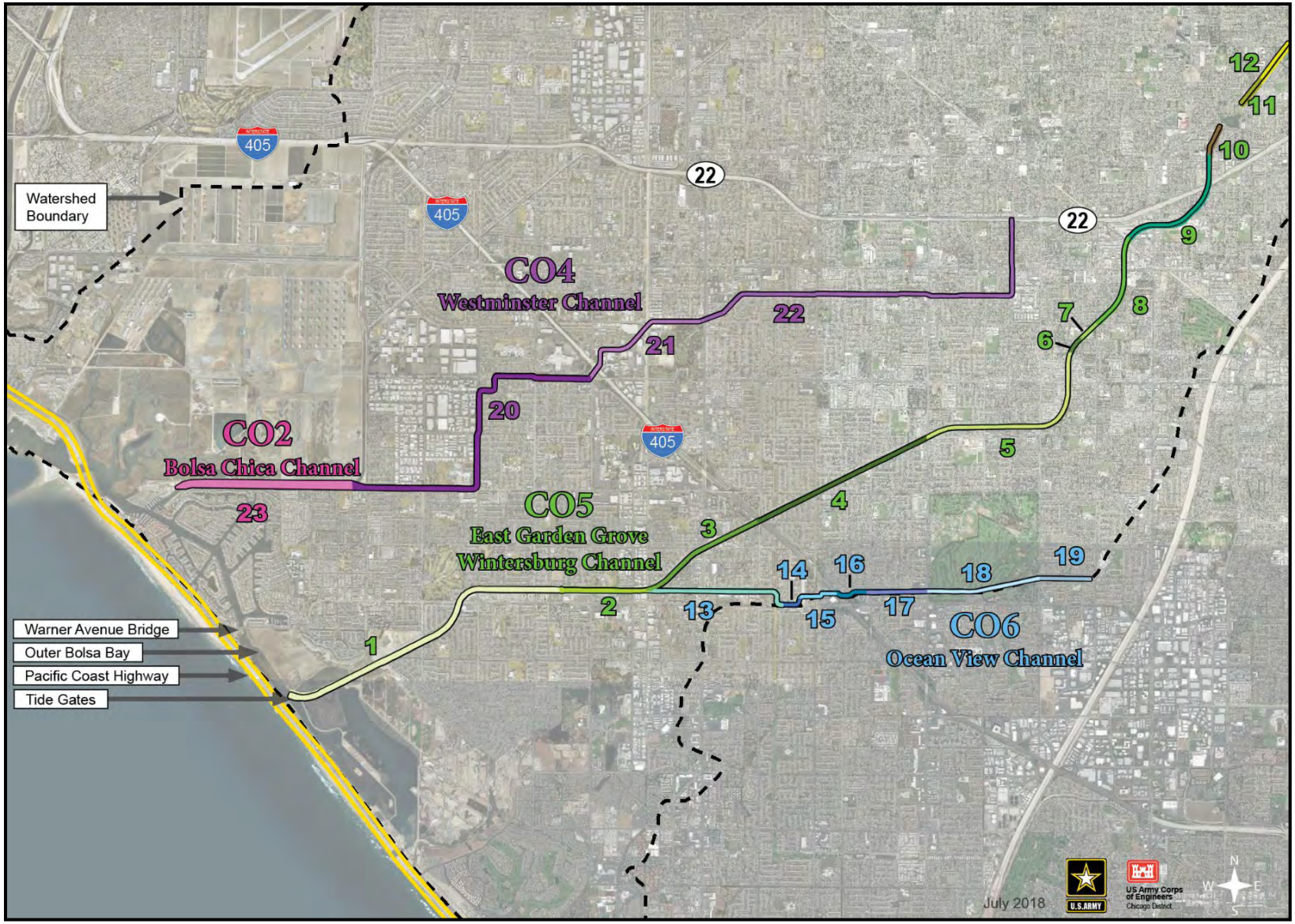


Figure 5: Study channels divided into 23 discrete reaches for siting in-channel modifications.

Page intentionally left blank
For double-sided printing

1.9.3 Receiving Waters Downstream of the C02/C04 and C05/C06 Channel Systems

Figure 6 depicts the receiving waters of both channel systems. The downstream receiving waters are comprised of the following four regions:

Huntington Harbour

Huntington Harbour is a residential community that includes five man-made islands and waterways used for boating. This community is located downstream of Outer Bolsa Bay and receives flood waters from both C02/C04 and C05/C06.

Seal Beach National Wildlife Refuge

SBNWR was developed through a collaboration of the U.S. Fish and Wildlife Service (USFWS) and the Department of the Navy (Navy). The refuge is part of NWSSB located to the northwest of the C02/C04 channel confluence.

Anaheim Bay

Anaheim Bay serves as the outlet to the Pacific Ocean for SBNWR, the study channels, Huntington Harbour, and Bolsa Bay. The Navy is currently investigating ways to modify navigation in Anaheim Bay to redirect civilian ships in Huntington Harbour away from the facilities at NWSSB.

Bolsa Chica Ecological Reserve

This nature reserve is designed to protect a significant coastal wetland and provide habitat for endemic plant and animal species, including federally listed endangered species (see Figure 7).

Figure 6: Receiving waters for C02/C04 and C05/C06.

1.9.4 Bolsa Chica Ecological Reserve

The BCER is owned by California State Lands Commission and hosts a variety of local wildlife and habitat types. Historically, the reserve has been used for oil extraction, as evidenced by numerous active and inactive oil wells. A number of the oil wells were removed during a restoration project that was completed in 2006. This restoration project reconnected portions of the reserve with the Pacific Ocean and included the construction of nesting areas for migratory birds using material that was excavated during construction. The lower segment of C05 bisects the reserve and discharges into Outer Bolsa Bay (see Figure 7). The BCER is comprised of the following areas:

Full Tidal Basin

The Full Tidal Basin is located along the eastern edge of the C05 channel and is considered an environmentally sensitive area. The Full Tidal basin is separated from C05, the Muted Tidal Basin, and Inner Bolsa Bay by levees. Water exchange between the Muted Tidal Basin and the Full Tidal Basin is permitted by a series of culverts and is controlled by flap gates that respond to changes in tide. Water exchange between the Seasonal Pond Area and the basin is controlled by flap gates that respond to changes in tide. The basin is connected to the Pacific Ocean by an ocean outlet that passes under PCH at the southern tip of the Full Tidal Basin.

Muted Tidal Basin

The Muted Tidal Basin is located northeast of the Full Tidal Basin. The Muted Tidal Basin is divided into three cells that only allow water to move between them through overflow weirs during larger storm events. Each cell is separated from the Full Tidal Basin and the C05 channel by a levee. Culverts permit water exchange between the Muted Tidal Basin and the Full Tidal Basin, and flap gates allow regular but muted tidal influence.

Inner Bolsa Bay

Inner Bolsa Bay is located between PCH and the Full Tidal Basin. The bay is isolated from the Full Tidal Basin by a levee and is separated from Outer Bolsa Bay by tide gates. The tide gates permit water from Outer Bolsa Bay to enter Inner Bolsa Bay and maintain a tidal influence within Inner Bolsa Bay. There is no water exchanged between the Full Tidal Basin and Bolsa Bay.

Muted Tidal Pocket

The Muted Tidal Pocket is separated from the Full Tidal Basin by the C05 channel. A culvert connects the Muted Tidal Pocket to Outer Bolsa Bay, maintaining a muted tidal influence.

Seasonal Ponds

The Seasonal Ponds are located along the eastern edge of the Full Tidal Basin and are separated from the Full Tidal Basin by a levee system. A single culvert controls discharge from the Seasonal Ponds into the Full Tidal Basin.

Outer Bolsa Bay

Outer Bolsa Bay is located at the mouth of C05. Water exchange between C05 and the bay is controlled by tide gates and a culvert connects Outer Bolsa Bay to the Muted Tidal Pocket just north of the C05 outfall. Water is discharged from Outer Bolsa Bay under the Warner Ave Bridge into Huntington Harbour.

Figure 7: Bolsa Chica Ecological Reserve (BCER)

In 1997, the State of California purchased the land in the Bolsa Chica area using mitigation funds from the Port of Los Angeles deepening project. In 2004, restoration of the Full Tidal Basin began to mitigate for the loss of soft bottom habitat caused by the deepening the Port of Los Angeles. The restoration efforts focused on restoring the Full Tidal Basin by removing former oil wells on the site, connecting the basin to the Pacific Ocean, and dredging the basin to ensure proper tidal flows. Restoration efforts also included constructing a culvert to connect the Muted Tidal Pocket to Outer Bolsa Bay (Figure 8).

Figure 8: Bolsa Chica wetlands restoration

1.10 Prior Reports and Existing Water Projects

The following is a list of existing reports and studies related to the Westminster, East Garden Grove, California Flood Risk Management Study:

- Flood control project under the Federal Flood Control Act of 1936 that resulted in the construction of Prado Dam, completed 1941.
- Re-study of the previous federal flood control work that led to the construction of the Prado Dam Project, 1964-1975. This report recommended an "All River Plan" (that subsequently became the SAR Mainstem Project)
- SAR Mainstem Project, 1976-present
- Phase 1 – General Design Memorandum (GDM), 1980
- Phase 2 – more detailed GDM, 1986
- New Construction Start authorized in 1988
- Santa Ana Mainstem Economic Reevaluation Report, 2018
- EIR/EIS for the Bolsa Chica Lowlands Restoration Project Vol. 1-4. Prepared by Chambers Group Inc.
- Westminster watershed Reconnaissance Study, 2001.

1.11 Problems and Opportunities

The evaluation of public concerns reflects a range of needs and desires perceived by the public. This section describes the needs in the context of the problems and opportunities.

1.11.1 Problems

- The main drainage channels within the watershed were originally built in the 1950s and the 1960s to convey residual flood waters after flood damage risk reduction measures were implemented for the SAR (including channelization). Continued urbanization, and the associated increase in impermeable area, in the watershed throughout the years has increased the amount of structures, infrastructure, people at risk from flooding.
- PCH floods regularly during flood events and/or during extreme tide conditions. PCH is a major transportation route in a highly urban environment. Closures due to flooding exacerbate already heavy traffic in the study area.
- An additional area of flood risk is related to the possible spread of contaminants in BCER resulting from large storm events that overtop C05 upstream of the reserve and inundate the oil fields within it. If C05 flood waters inundate the oil fields, widespread distribution of oil-laden runoff could potentially be transported to previously completed ecosystem restoration projects and eventually the Pacific Ocean as flood waters recede. Chemicals transported in flood waters from the oil fields could prove detrimental to sensitive natural areas.
- I-405 connects Orange County to both Los Angeles County to the north and San Diego County to the south. I-405 also feeds into I-10 and Highway 60, which are major highways into San Bernardino and Riverside counties to the east. Heavy traffic throughout the study area is common during commuting hours and on weekends. I-405 and I-5 within Orange County are two of the top three most heavily used freeways in California according to 2016 Caltrans Data. Flows

from the C04, C05, and C06 channels inundate I-405 during frequent storm events, causing major delays to commercial, commuter, and emergency traffic in the watershed.

- The existing downstream conditions in Outer Bolsa Bay limit flows being discharged from the C05 channel. The outlet of Outer Bolsa Bay into Huntington Harbour at Warner Avenue constricts flows and creates a backwater effect through Outer Bolsa Bay and up into the C05 channel. Similarly, the existing tide gates at the downstream end of the C05 channel further exacerbate backwater conditions up into the channel during high flow events. These constrictions increase the flood risk to oil facilities within BCER and homes located to the north.

1.11.2 Opportunities

- Reduce flood damages and reduce risks to public safety associated with flooding within the Westminster watershed.
- Reduce flooding impacts to traffic and emergency vehicle access on PCH in the vicinity of Outer Bolsa Bay caused by flooding from the C05/C06 channel system.
- Reduce potential for overtopping of C05 upstream of the Bolsa Chica Reserve and the potential spread of contaminants during large storm events associated with the oil wells within the BCER; Improve tidal flushing and circulation for surrounding marsh habitat within Outer Bolsa Bay.
- Reduce the occurrence of inundation along I-405 during larger storm events in order to minimize delays caused by overtopping of the drainage channels in the project area.
- Improve the downstream efficiency of the C05/C06 channels by addressing the constrictions at the Warner Avenue Bridge and the existing tide gates.

1.12 Planning Goal, Objectives, and Constraints

1.12.1 Study goal

The goal of the study is to identify sustainable flood risk management solutions within the Westminster watershed to reduce flooding caused by overtopping of the C05/C06 and C02/C04 channel systems over a 50 year period of analysis.

1.12.2 National Objective

The national or federal objective of water and related land resources planning is to contribute to National Economic Development (NED) consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable Executive Orders, and other federal planning requirements. Contributions to NED include increases in the net value of the national output of goods and services, expressed in monetary units. These contributions are the direct net benefits that accrue in the study area and the rest of the Nation. Per USACE guidance, the study must identify the plan that appears to maximize NED benefits.

1.12.3 Planning Objectives

The following are the objectives for the Westminster, East Garden Grove Flood Risk Management Study. The below objectives are the project objectives under NEPA and CEQA.

- Reduce the risk of flood damages to structures and infrastructure: Reduce the depth, duration, and likelihood of flooding at residential and commercial structures, as well as infrastructure, such as roadways, caused by flooding of the C05/C06 and C02/C04 channel systems in the Westminster watershed during storm events over the 50 year period of analysis.

- Reduce life-safety risk associated with overbank flooding: Reduce the depth, duration, and likelihood of flooding at key public facilities and access routes required for emergency services caused by flooding of the C05/C06 and C02/C04 channel systems in the Westminster watershed during storm events and improve flood preparedness over the 50 year period of analysis.
- Reduce the risk of downstream flood damages: Reduce the depth, duration, and likelihood of existing flooding in the vicinity of Outer Bolsa Bay and reduce the impact of increased flow into the bay associated with recommended channel modifications upstream over the 50 year period of analysis.
- Promote compatible recreation: Incorporate and protect access to recreation opportunities such as walking and wildlife viewing in the study area, particularly in the vicinity of BCER over the 50 year period of analysis.

1.12.4 Planning Constraints and Considerations

Unlike planning objectives that represent desired positive changes, planning constraints represent restrictions that should not be violated. Further, plan formulation must provide safe conditions in the interest of public safety and be socially acceptable. The planning constraints for this study are as follows:

- Limit extensive changes to local land use designations and zoning by limiting channel modifications to within the existing channel right of way, when feasible.
- Minimize impacts to culturally sensitive areas.
- Limited change in elevation across the watershed reduces opportunities for lowering the invert of the existing channel systems.
- Alternatives should avoid induced adverse hydraulic impacts relative to existing conditions and comply with floodplain management requirements.
- Do not impact the contaminated soil containment sites adjacent to Reaches 1 & 2 of the C05 channel and Bolsa Chica Ecological Reserve.

1.13 Report Organization

The content for this IFR was established based on USACE guidelines, professional judgment, CEQA Guidelines, and USACE standard NEPA practices. Chapters noted below by an asterisk (*) are compliant with and required by CEQ Regulations for Implementing NEPA. Detailed technical and background information are provided in the appendices.

Executive Summary:* Summarizes the IFR. It stresses the major conclusions, areas of controversy (including issues raised by agencies and the public), and the issues to be resolved (including the choice among alternatives).

List of Acronyms:* A list of acronyms is included with the Table of Contents

Chapter 1 - Introduction:* Describes lead agencies, guiding regulations, study authority, statement of purpose and need, proposed project area and scope, study participants and coordination. Identifies problems and opportunities, project objectives and planning constraints, prior reports, and report organization.

Chapter 2 - Affected Environment:* Describes the existing, potentially affected environment in the Westminster watershed proposed project area.

Chapter 3 - Plan Formulation:* Identifies a range of potential management measures that address specific problems identified in Chapter 1; develops screening evaluation; the basis (strategies) and considerations driving the development of alternative plans; associated screening; and establishment of focused alternative plans that adequately address the objectives established. Chapter 3 also describes the evaluation process leading to the final array of alternatives, summary comparison of impacts of the alternatives, and the identification of a Recommended Plan that meets the study objectives.

Chapter 4 - Comparison of the Final Array of Alternatives:* Quantitatively compares the costs and benefits of the Final Array of Alternatives.

Chapter 5 - Environmental Consequences:* Discloses the potential environmental impacts of implementing each of the alternatives in the final array. This chapter also identifies applicable mitigation measures to avoid or minimize impacts. Mitigation needs are addressed in this chapter, as applicable.

Chapter 6 - Public Involvement, Review and Coordination:* Summarizes the coordination with agencies and the public that has taken place during the study.

Chapter 7 - Compliance with Applicable Laws, Policies, and Plans:* Description of applicable laws, policies, and plans, as well as a list describing the study's compliance status for each.

Chapter 8 - Recommended Plan:* Describes the recommended alternative plan. This includes costs, project-specific considerations, design and construction considerations, and a project implementation strategy.

Chapter 9 - Recommendations for Implementation:* Identifies the Recommended Plan and next steps towards implementation.

Chapter 10 - Bibliography:* Lists the references cited throughout the report.

Chapter 11 - List of Preparers:* Provides a listing or preparers of this report.

Chapter 12 - Index*

Appendices: Separate documents that provide additional technical detail for analyses referenced throughout the main report.

2.0 Affected Environment*

This chapter describes the existing natural and human environment in which the proposed Westminster East Garden Grove Flood Risk Management Project (Proposed Project) would be implemented within and adjacent to the Westminster watershed. The study area is essentially the Westminster watershed, and includes areas either adjacent to the watershed or in its vicinity that could be impacted by the Proposed Project. This chapter provides the existing conditions (baseline) in the Westminster watershed and the basis for plan formulation in Chapter 3.0. The topics in this chapter mirror the topics in Chapter 5.0, Environmental Consequences, where the forecast of the "future without-project" conditions (No Action Alternative) and "future with-project" conditions are described.

2.1 General Setting

The Proposed Project lies in the area referred to as the Westminster watershed, a sub-watershed of the Anaheim Bay-Huntington Harbour watershed (identified by the U.S. Environmental Protection Agency [USEPA] as # 18070201) located between the lower reaches of the San Gabriel River watershed and the SAR watershed in Orange County, California. The study area is approximately 25 miles southeast of downtown Los Angeles, California.

The Westminster watershed lies on a flat coastal plain, approximately 90 square miles in area and is almost entirely urbanized with residential, commercial, industrial, and institutional development. The SAR historically meandered widely over this coastal plain. Channelization occurred throughout the mid-20th century with containment in concrete channels and earthen berm channels (Figure 9 and Figure 10) from Anaheim Bay to the north, southward to Newport Bay. Urbanization within the Westminster watershed generally followed historic alignments of the former SAR drainage system.

The Proposed Project includes constructed flood control channels or storm drains of the Bolsa Chica Channel (Facility No. C02), Westminster Channel (Facility No. C04), East Garden Grove-Wintersburg Channel (Facility No. C05), and Oceanview Channel (Facility No. C06) (Figure 11 and Figure 12). These channels vary in age, size, geometry, lining material, and have been modified from their original construction from repairs and improvements. Runoff is collected from the urbanized areas in the cities of Anaheim, Stanton, Cypress, Orange, Santa Ana, Garden Grove, Westminster, Fountain Valley, Los Alamitos, Seal Beach, Huntington Beach, and including portions of unincorporated Orange County.

The Bolsa Chica Channel (C02) is divided into seven reaches beginning with Reach 23 and ending at Reach 29, but only Reach 23 is included in the study area. Reach 23 is approximately 1.5 miles long. The drainage area for the Bolsa Chica Channel consists of approximately 8.8 square miles and includes portions of the cities of Anaheim, Cypress, Garden Grove, Los Alamitos, Stanton, and unincorporated Orange County territory. The area surrounding the channel is fully developed for residential, commercial, industrial, educational, and recreational uses. The channel runs adjacent to the NWSSB. It also runs through and adjacent to the Los Alamitos Armed Forces Training Base. Apart from the two military installations, this portion of the watershed is almost entirely urbanized.

The Westminster Channel (C04) is approximately eight miles long. The channel collects storm runoff from an approximately 10.9 square mile drainage area and is located in the cities of Santa Ana, Huntington Beach, Westminster, and Garden Grove. The channel begins at its confluence with C02 in Huntington Beach and extends northeast into Westminster and Garden Grove. The channel is divided into three reaches beginning with Reach 20 and ending at Reach 22.

The East Garden Grove-Wintersburg Channel (C05) is approximately 11.5 miles in length from Reach 1 through Reach 12. The C05 channel begins upstream of Haster Basin (i.e., Haster Basin Recreational Park) located in the City of Garden Grove and flows southwest through the cities of Santa Ana, Garden Grove, Westminster, and Huntington Beach before discharging into BCER, OBB then into Huntington Harbour and ultimately into the Pacific Ocean. The channel collects storm runoff from an approximately 22.2 square mile drainage area (not including drainage area associated with the Oceanview Channel [C06]). The principle tributary is the OV channel (C06) that runs through the lower portion of the Westminster watershed and drains into Bolsa Bay. Bolsa Bay is home to the BCER and Bolsa Chica State Beach.

The Oceanview Channel (C06) is approximately 4.1 miles long from Reach 13 through Reach 19 (from Newhope Street to the confluence with the East Garden Grove Wintersburg [EGGW] channel) and is a tributary to the EGGW channel. The C06 channel begins east of Mile Square Park in the City of Fountain Valley and flows west through the park into the City of Huntington Beach, where it discharges into C05 at a point northeast of the intersection of Gothard Street and Warner Avenue. The channel provides flood risk management to approximately 5.1 square miles of residential or industrial areas in the cities of Fountain Valley and Huntington Beach, California.

Bolsa Chica Bay Marsh Area (at the downstream end of C05) is a biologically sensitive area that is environmentally protected. The area includes a multitude of existing and migrating species within a brackish waterbody.

The Non-functioning Tide Gate and Tidal Influence on the C05 Channel is currently a series of tide gates in Reach 1 of the C05 channel that serves to regulate and manage the coastal tidal influence, however, existing conditions indicate that the gates are not functioning as designed. Therefore, the lower reaches of the C05 channel convey urban runoff from upstream, yet are tidally influenced from the Pacific Ocean inlet at Bolsa Chica Bay. The tide gate is operated by OCPW.

Anaheim Bay-Seal Beach National Wildlife Refuge is part of the extensive San Diego NWR Complex and is located within the NWSSB. It encompasses 965 acres of remnant saltwater marsh in the Anaheim Bay estuary and serves as a significant stopover and wintering area along the Pacific Flyway for shorebirds. The refuge provides essential habitat for two federally listed endangered species — the light-footed Ridgway's rail (*Rallus obsoletus levipes*) and the California least tern (*Sternula antillarum browni*) — as well as the federally threatened western snowy plover (*Charadrius nivosus nivosus*), the state endangered Belding's savannah sparrow (*Passerculus sandwhichensis beldingi*) and a variety of migratory shorebirds, waterfowl, and seabirds. The green turtle (*Chelonia mydas*) has also been observed in one of the Refuge's four tidal basins (7th Street Pond), as well as the channel that extends from Anaheim Bay into the tidal basin. The green turtle is a federally-listed threatened species. USFWS operates the Nature Center on the Refuge in cooperation with the Navy.

Huntington Harbour is the discharge point for C02 and includes a public marina and facilities that are highly used by the public. Huntington Harbour also receives flows from the terminus of C05.

Figure 9: Riprap lined trapezoidal and earthen trapezoidal channels found within the Westminster watershed.

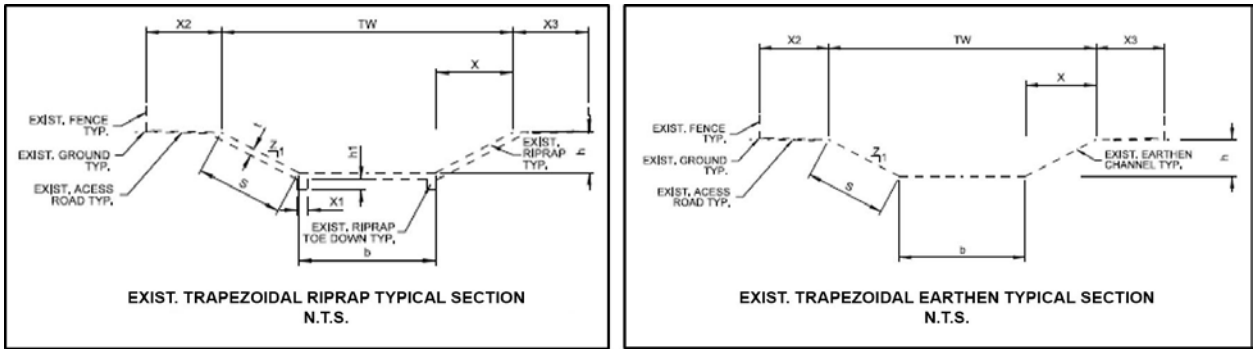


Figure 10: Example trapezoidal riprap and earthen channel cross-sections found within the Westminster watershed.

Figure 11: Existing channel geometry

Figure 12: Existing channel bottom conditions.

2.2 Earth Resources

2.2.1 Geology and Topography

The Westminster watershed is located within the Peninsular Range Physiographic Province, a geomorphic province that extends 900 miles south from the Los Angeles basin to the tip of Baja California and is bound on the east by the Colorado Desert. The Peninsular Ranges Province is characterized by elongated northwest-trending mountain ridges separated by sediment-floored valleys. The topography is similar to the Coast Ranges, but the geology is more similar to the Sierra Nevada, with granitic rock intruding the older metamorphic rocks.

One of the most significant landforms is the coastal plain of Orange County from the City of Irvine to the Orange/Los Angeles County border. The coastal plain is divided into two (2) sub-plains, the Downey Plain and the Tustin Plain. The Downey Plain comprises the alluvial fans of the Los Angeles, San Gabriel, and Santa Ana Rivers (Poland et al. 1956). The Downey Plain has a uniform grade with an average grade of 20 feet per mile and was formed by deposits from ancestral streams. The Tustin Plain is a sedimentary basin and is bounded on the north and east by the Santa Ana Mountains, on the south by the San Joaquin Hills, and on the northwest by the Los Angeles Basin. The Tustin Plain is nearly flat and gently slopes to the southwest. The alluvial fan soils that comprise the Tustin Plain are derived from deposits from the Santa Ana Mountains.

2.2.2 Soils

The local soils moving from inland towards the shoreline include alluvium and marine terrace deposits. The study area is made up of 14 soil types (Table 1) which generally have a slow to medium runoff potential. The banks of the C02 channel primarily consist of beaches, Bolsa silt loam (drained), and tidal flats. The banks of the C04 channel consist primarily of Bolsa silt loam, Bolsa silt loam (drained), Bolsa silty clay loam (drained), Hueneme fine sandy loam, Hueneme fine sandy loam (drained), Metz loamy sand, and Metz loamy sand (moderately fine substratum).

The banks of the C05 channel consist primarily of Bolsa silt loam, Bolsa silt loam (drained), Bolsa silty clay loam, Bolsa silty clay loam (drained), Hueneme fine sandy loam (drained), Metz loamy sand, Myford sand loam (9 to 30 percent slopes, eroded), Omni clay (drained), Thapto-histic fluvaquents, and tidal flats. The banks of the C06 channel consist primarily of Bolsa silt loam (drained), Hueneme fine sandy loam (drained), Metz loamy sand, Metz loamy sand (moderately fine substratum), and Omni silt loam (drained). The lower reaches of the C05 channel consist of peat deposits of variable thickness. Soils within the channels consist of compacted gravel, sand, and clay. Soils making up at least 10% of the study area include: beaches, Bolsa silty clay loam, Hueneme fine sandy loam (drained), and Metz loamy sand.

Beaches and Hueneme fine sandy loam (drained) are the only primary soils in the study are (i.e., make up at least 10% of the study area) that are considered hydric soils. Hydric soils are those soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper portion of the soil to support the growth and reproduction of hydrophytic vegetation.

The Hueneme fine sandy loam (drained) soil type is also a hydrologic soil. The hydrologic soils group can be used to estimate the amount of infiltration that can be expected from a certain soil. Under the hydrologic soils group classification system, soils are grouped A to D with “A” having the lowest runoff potential (highest infiltration rates) and “D” having the highest runoff potential (lowest infiltration rates). Hueneme fine sandy loam (drained) is a Class A hydrologic soil.

Table 1: Characteristics of the 14 soil types found within the study area.

Soil Type	Soil Characteristics	Hydric Soil Rating	Depth to Water Table	Drainage	Runoff Potential
Beaches	Sandy, gravelly, or cobbly coastal shores.	-	0-72 inches	-	High
Bolsa Silt Loam	Mixed alluvium that generally occurs on large alluvial fans.	No	36-72 inches	Somewhat poorly drained	Low
Bolsa Silt Loam, Drained	Mixed alluvium derived from igneous, metamorphic and sedimentary rock. Typically occur on alluvial fans.	No	>80 inches	Somewhat poorly drained	Low
Bolsa Silty Clay Loam	Mixed alluvium generally occurring on alluvial fans.	No	36-72 inches	Somewhat poorly drained	Low
Bolsa Silty Clay Loam, Drained	Mixed alluvium derived from igneous, metamorphic and sedimentary rock. Typically found on alluvial fans.	No	>80 inches	Somewhat poorly drained	Low
Hueneme Fine Sandy Loam	Stratified alluvium derived from sedimentary rock found on alluvial fans.	No	42-60 inches	Poorly drained	Low
Hueneme Fine Sandy Loam, Drained	Stratified alluvium derived from sedimentary rock found on alluvial fans.	Yes	>80 inches	Poorly drained	Low
Metz Loamy Sand	Alluvium derived from mixed found typically on alluvial fans.	No	>80 inches	Somewhat excessively drained	Low

Soil Type	Soil Characteristics	Hydric Soil Rating	Depth to Water Table	Drainage	Runoff Potential
Metz Loamy Sand, Moderately Fine Substratum	Mixed alluvium derived from igneous, metamorphic and sedimentary rock found on alluvial fans and flood plains.	No	>80 inches	Negligible	Negligible
Myford Sand Loam, 9 to 30 percent slopes, eroded	Alluvium derived from sandstone typically found on floodplain terraces.	No	>80 inches	Moderately well drained	High
Omni Clay, Drained	Mixed alluvium found on depressions.	Yes	>80 inches	Poorly drained	Low
Omni Silt Loam, Drained	Mixed alluvium found on depressions.	Yes	>80 inches	Poorly drained	Low
Thapto-histic Fluvaquents	Organic material and/or mixed alluvium found on beach plains.	Yes	24-42 inches	-	-
Tidal Flats	Stratified clay to sand deposits found adjacent to bays and lagoons and is regularly inundated by tidal flow.	Yes	0 inches	-	-

2.2.3 Faults and Seismic Activity

Several significant active faults run through the metropolitan southern California area. The major faults in the area include: (1) the Newport-Inglewood Fault that runs northwest to southeast near the coast through the area of the proposed project, (2) the San Andreas Fault, which is located 60 miles to the north; (3) the Whittier-Elsinore Fault, which is located 50 miles to the northwest; and (4) the San Jacinto Fault, which is located 50 miles to the northeast. The Newport-Inglewood fault zone (Figure 13) consists of a series of short and discontinuous fault traces with relatively shallow folded rock structures extending approximately 36 miles from the Santa Monica Mountains to offshore Newport Beach. A segment of the fault zone also extends from Newport Beach to about six miles southeast of San Onofre. The most recent large event for the Newport-Inglewood fault was the 1933 6.3 magnitude (M) Long Beach Earthquake. The projected maximum earthquake moment magnitude that could occur within the specified fault zone is 6.9 (SCEDC 2004; OCSD 2005).

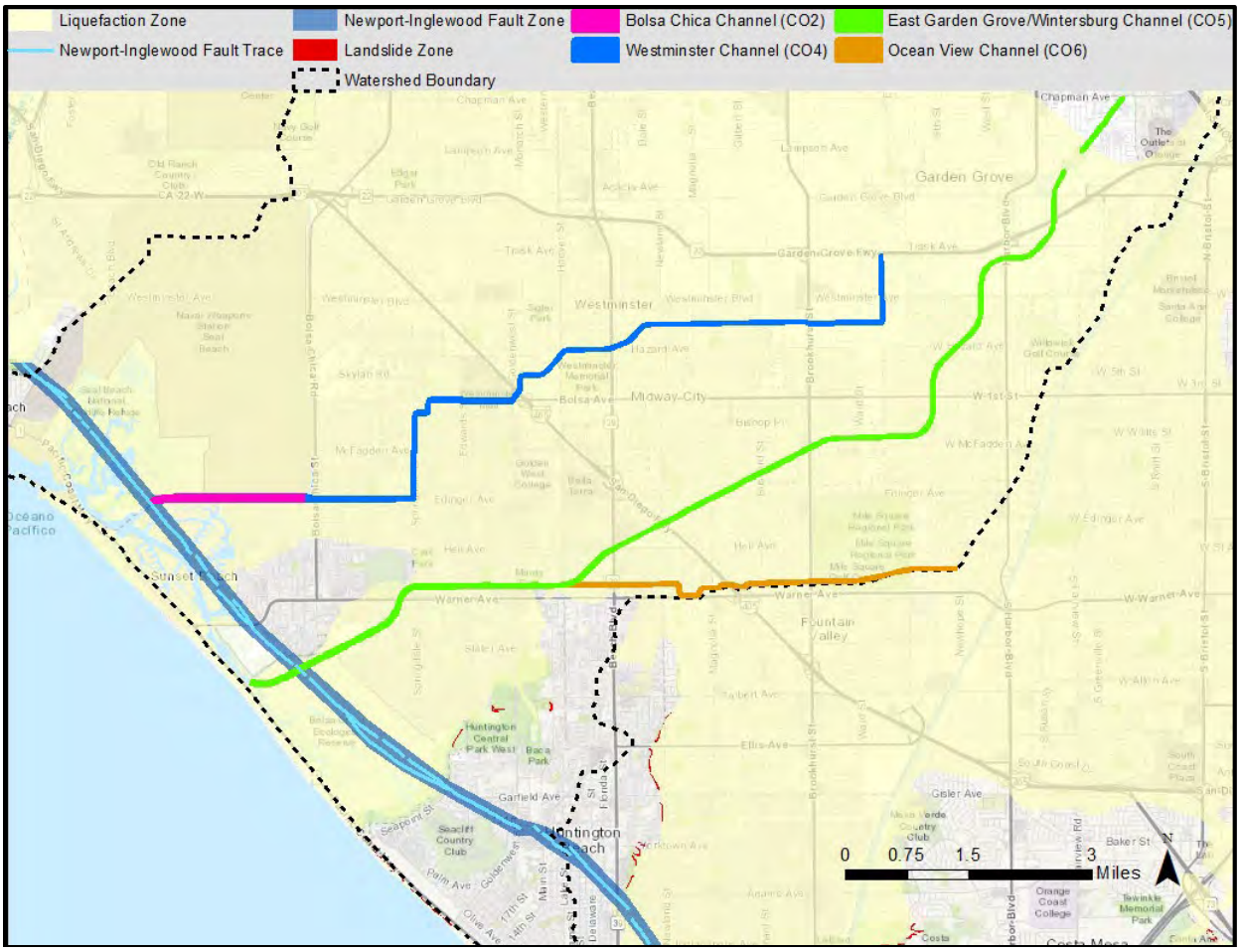


Figure 13: Newport-Inglewood Fault Zone Trace relative to the project area.

2.2.4 Liquefaction and Landslides

Liquefaction is caused when the ground shakes wet granular soil and changes it to an unstable liquid state. This subsurface process can lead to near-surface or surface ground failure that can result in property damage and structural failure. Areas prone to liquefaction have thick alluvial soils that are poorly consolidated. The majority of the study area, except the upstream end of the East Garden Grove/Wintersburg Channel (C05) is in a Zone of Required Investigation for Liquefaction (Figure 13), as shown on the State of California Seismic Hazard Zones, Seal Beach, Newport Beach, and Anaheim Quadrangle maps.

No landslides have been mapped within the study area. Mapped landslide features that are closest to the study area are located approximately 1.6 miles southeast of the East Garden Grove/Wintersburg Channel (C05), near Huntington Central Park West (Figure 13).

2.2.5 Mineral Resources

District 1 Well geographic information system (GIS) Data was obtained from the California Department of Conservation Division of Oil, Gas, and Geothermal Resources website. Within the Westminster watershed there are approximately 275 active wells, 32 new wells, 177 idle wells, 22 buried wells, and 2,562 plugged wells (Figure 14). Of the 275 active wells, 227 are oil and gas production well types. The remaining 48 wells are injection type wells of which 47 are water flood and 1 is water disposal.

Within the immediate vicinity of the study area, oil production is currently occurring in an undeveloped area adjacent to the west end of Reach 1 (BCER). The oil production is operated by CalResources LLP and includes numerous active oil wells and wells for water injection.

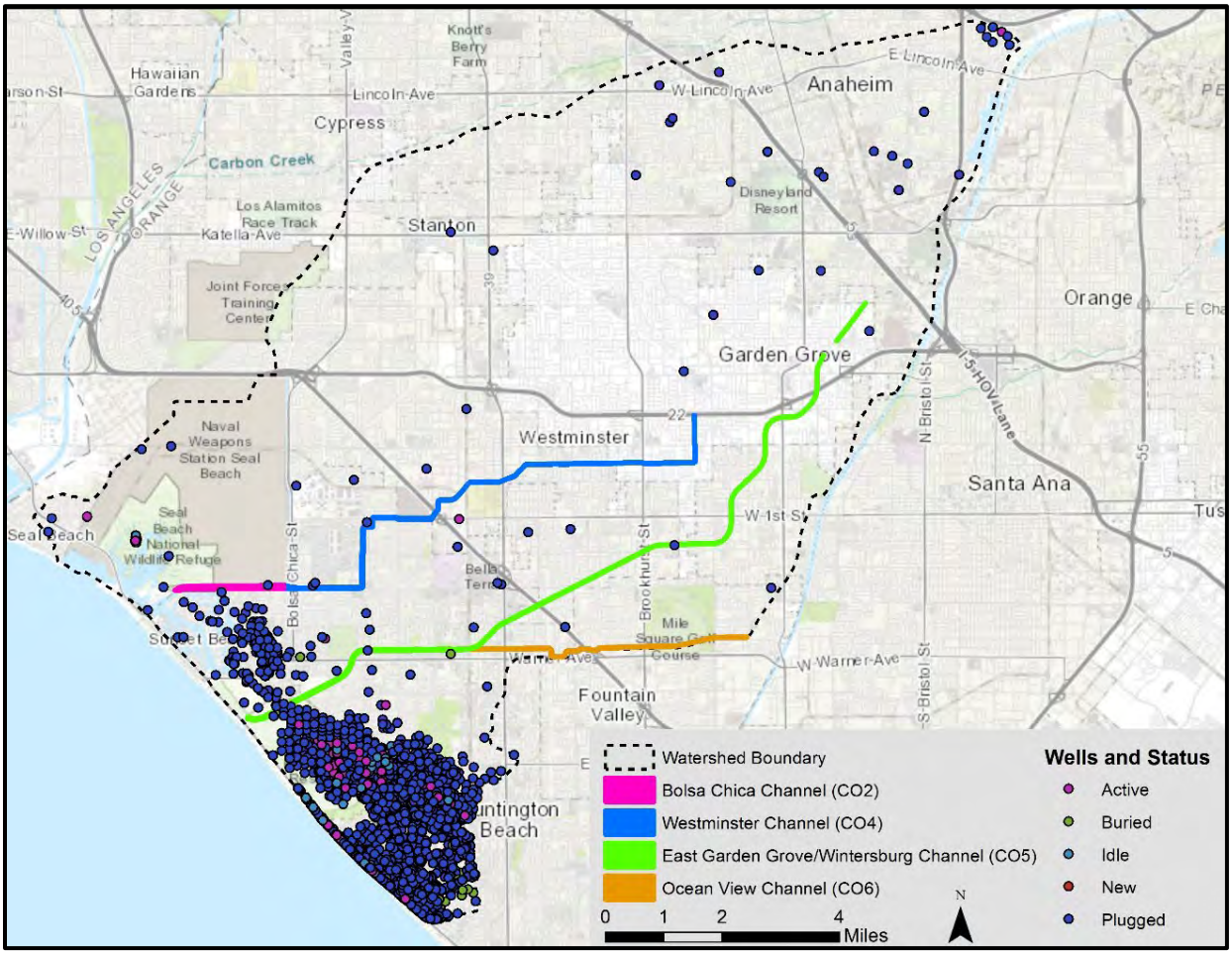


Figure 14: Wells within the Westminster Watershed.

In regards to aggregate resources, sand and gravel are the principal mineral resources in Orange County. According to the California Department of Conservation, Division of Mines and Geology (Miller and Corbaley 1981), the majority of the study area is classified as MRZ-1 and MRZ-3. The MRZ-1 land classification indicates areas that are underlain by sedimentary deposits composed predominately of fine-grained material unsuitable for use as aggregate. The MRZ-3 land classification indicates areas containing mineral deposits (aggregate), the significance of which cannot be evaluated from available data (Miller and Corbaley 1981).

2.3 Water Resources and Water Quality

The Westminster watershed originally contained natural watercourses that have been altered for flood control or water supply purposes. Water bodies in the Westminster watershed include:

- Anaheim Bay-SBNWR
- Huntington Harbour
- Bolsa Bay
- Bolsa Chica Ecological Reserve
- Bolsa Chica State Beach

2.3.1 Hydrology and Hydraulics

The Westminster study area, consisting of the C02, C04, C05, and C06 channels, lies within the historic overflow path of the SAR, which flowed through the downtown Anaheim area prior to the 1918 diversion of the SAR into its present alignment. Since the diversion of the SAR, the C02, C04, C05, and C06 channels have served as local drainage facilities. These facilities have been improved at various locations on multiple occasions to account for development within the watershed.

2.3.2 Flooding

Orange County is susceptible to flooding because of its location on the alluvial plain of the SAR. These floods are relatively short, with most of the flow occurring over a three (3) to four (4) hour period. Urban development in Orange County and within the Westminster watershed study area has increased impervious surfaces, creating increased peak flood flows and increased risk of flooding. Flooding continues to occur in the watershed due to existing substandard conditions of the C05 and C02 channels.

Significant regional storm events or floods have occurred over the last 175 years: 1825, 1862, 1884, 1891, 1916, 1927, 1938 (largest storm of record), 1941, 1969, 1974, 1978, 1980, 1983, 1993, 1995, and 2010. The historical storm seasons have consisted of nearly continuous periods of moderate to high intensity rainfall ranging from a few days to several weeks and have extended inland as far as the San Bernardino Mountains. Long duration storm events, covering large geographical areas are a threat to large drainage basins such as the SAR, but do not generally overburden local drainage facilities such as C02, C04, C05, and C06.

The major threat to local facilities, such as C02, C04, C05, and C06, are short duration high intensity storm events. Two storms of this type occurred in Orange County in 1974 and 1983. The storms of December 4, 1974, and March 1, 1983 were short duration, high intensity, nonorographic storms producing intense rainfall in excess of 1% Annual Exceedance Probability (AEP) depths for several durations. Both flood events resulted in overflow from the C05 channel at Golden West Street (upstream of Woodruff Street) and immediately upstream of I-405. The 1974 storm also caused flooding on the C05 channel near Bushard Street and the C06 channel immediately upstream of the I-405 Freeway.

Additional historic flooding events along the C02, C04, C05, and C06 have also occurred and have been documented by Orange County in recent years.

- Flooding at Goldenwest in 1974, 1983, 1993, and 1995 on C05
- Flooding at Euclid Street in 1986, 1992, and 2010 on C05
- Flooding at Haster Basin in 1986 and 1995

- Flooding between Newland Street and Magnolia Street in 1992 on C05
- Flooding between Lapson Avenue and Chapman Avenue in 1992
- Flooding at 1st Street in 1992 and 1995 on C05
- Flooding at Graham Street in 1993 on C05
- Flooding at Warner Avenue, Springdale Street, Edwards Street, and downstream of Newland Street in 1995 on C05
- Flooding between Magnolia Street and Bushard Street (date not specified) on C06
- Flooding between Bushard Street and Brookhurst Street (date not specified) on C06
- Flooding between Euclid Street and Newhope Street in 2010 and other dates not specified on C06
- Flooding downstream of Valley View Street in 2010 and other dates not specified on C02
- Flooding at Beach Boulevard in 2010 and other dates not specified on C04
- Flooding near Graham Street south of I-405 in 2017 on C05 and PCH

On March 16, 2017, a Major Disaster Declaration was approved for California, which included Orange County and the Westminster watershed (FEMA 2018). The declaration meant that federal disaster assistance was made available to the State of California to supplement State, tribal, and local recovery efforts in the areas affected by severe winter storms, flooding, and mudslides from January 18 to January 23, 2017.

2.3.3 Water Quality

A draft report on water quality and sediment in the project area was prepared in 2015. This document is included in *Appendix L – Environmental Considerations*. The report summarizes existing data on water quality and sediment with the East Garden Grove – Wintersburg Channel, and compares water quality in 2015 to water quality conditions in the 1990s. Since the time of that report, conditions in the channel do not appear to have changed significantly. Under Section 303(d) of the CWA, states, territories, and authorized tribes are required to develop, and update every two years, lists of waters — rivers, lakes, coastal waters, and estuaries — that are impaired (or threatened) by one or more pollutants. The general findings and existing impairments for the Westminster watershed listed on the CWA 303(d) list have not changed over time, even though the list had been updated and additional data has been collected. A summary of the water quality conditions is given here.

In early 2002, the Santa Ana Regional Water Quality Control Board (RWQCB) issued National Pollutant Discharge Elimination System (NPDES) permits that regulate storm water discharge from municipal storm drain systems. Orange County has a NPDES permit number CAS618030 issued and approved by the Santa Ana RWQCB Order number R8-2009-0030, which includes the Westminster watershed study area. NPDES number CAS618030 is incorporated as part of the countywide Drainage Area Management Plan (DAMP) for compliance with the NPDES. Regular water quality monitoring and construction requirements are part of the DAMP that include criteria for the County and City water quality ordinances as well as construction building and grading ordinances for new and redevelopment projects (Orange County 2003).

The RWQCB lists the receiving waters of C05 as Sunset Bay-Huntington Harbour, Inner and OBB, and BCER. No beneficial uses have been set for C05 itself. Designated beneficial uses common to all three

receiving water bodies include contact and non-contact water recreation (REC-1, REC-2), wildlife habitat (WILD), rare, threatened, or endangered species (RARE), spawning, reproduction and development (SPWN), and marine habitat (MAR). Sunset Bay-Huntington Harbour beneficial uses also include commercial and sports fishing (COMM) and navigation (NAV). Beneficial uses of Bolsa Bay and BCER include preservation of Biological Habitats of Special Significance (BIOL). Additional designated beneficial uses are shellfish.

Table 2 and Figure 15 show the pollutants for which C05 and Huntington Harbour have been placed on the Santa Ana Region 303(d) List of Water Quality Limited Segments. Huntington Harbour is on the 303(d) list for chlordane, copper, lead, nickel, polychlorinated biphenyl (PCBs), indicator bacteria, and sediment toxicity all from unknown and multiple sources. The indicator bacteria pollutant is focused at the 11th Street, Anderson Street Marina, Clubhouse Marina and Sunset Aquatic Park locations. These locations exceed the enterococcus bacteria standard, however, recent data seem to show improvement over earlier data. Several parameters including ammonia and bacterial issues are listed with the source of the issue identified as urban runoff/storm sewers.

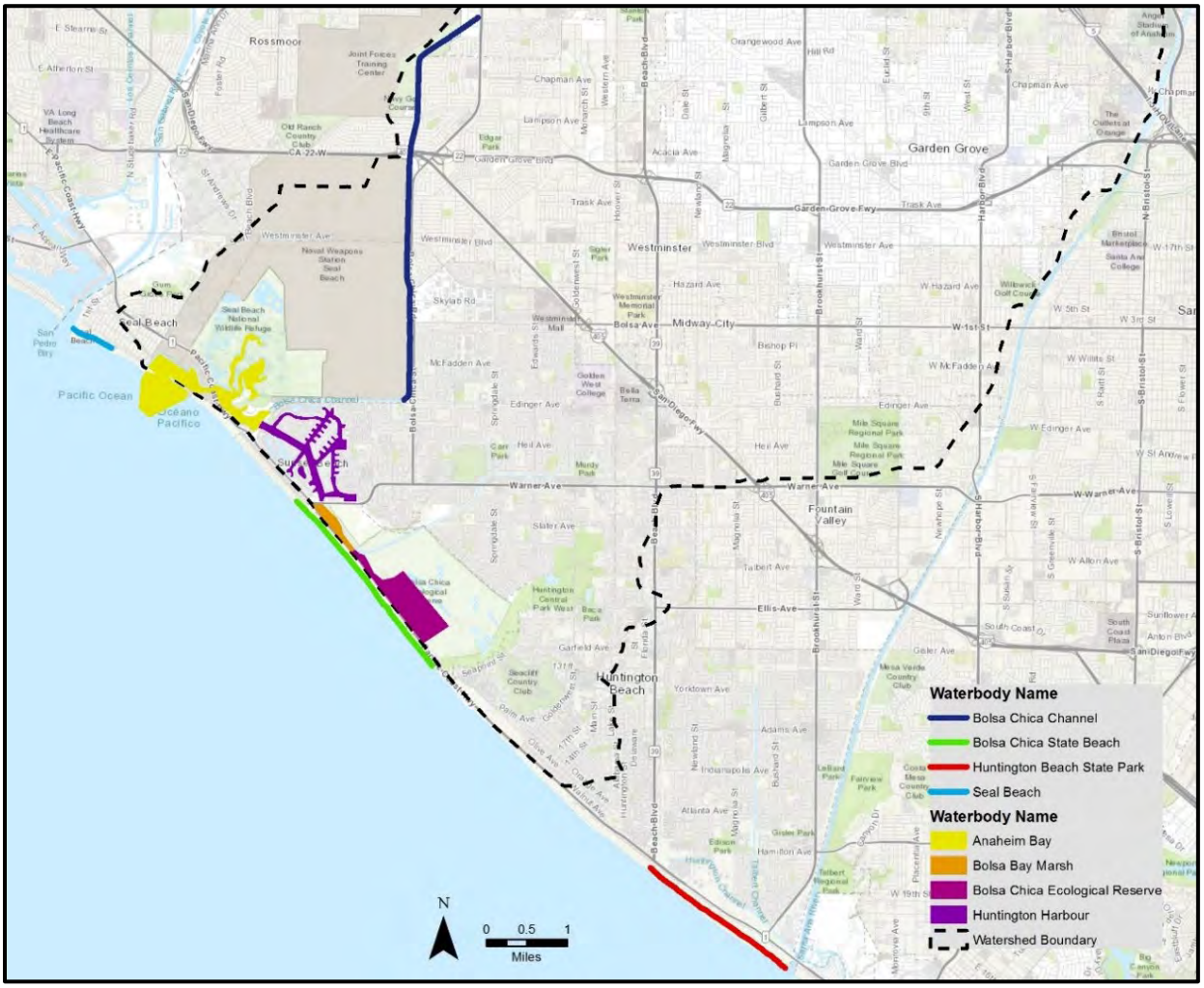


Figure 15: Location of 303(d) listed water quality limited segments

Table 2: C05/Huntington Harbour 303(d) listed pollutants

Area (acres[a] or miles[a])	Impairment	Total Maximum Daily Load (TMDL) Required Date	Source
Anaheim Bay (402 acres)	Nickel	2019	Unknown
	PCBs	2019	Unknown
	Sediment Toxicity	2019	Unknown
Bolsa Chica Ecological Reserve (239 acres)	Sediment Toxicity	2027	Unknown
	Water Toxicity	2027	Unknown
Bolsa Chica Marsh (44 acres)	Sediment Toxicity	2027	Unknown
	Water Toxicity	2027	Unknown
C02 (Bolsa Chica Channel) (5.15 miles)	Ammonia (Unionized)	2021	Urban runoff, Storm sewers, non-point sources
	Indicator Bacteria	2021	Unknown
	pH	2021	Unknown
Bolsa Chica State Beach (2.64 miles)	Copper	2019	Unknown
	Nickel	2019	Unknown
C05 (EGGW) (2.87 miles)	Ammonia (Unionized)	2021	Unknown
Huntington Beach State Park (5.8 miles)	PCBs	2019	Unknown
Huntington Harbour (221 acres)	Chlordane	2019	Unknown
	Copper	2019	Unknown
	Lead	2019	Unknown
	PCBs	2019	Unknown
	Indicator Bacteria	2019	Urban runoff/storm sewers
	Sediment Toxicity	2019	Unknown
Seal Beach (0.53 acres)	Indicator Bacteria	2019	Urban runoff/storm sewers
	PCBs	2019	Unknown

[a] refers to the acres or miles assessed
Source: CEPA 2017

The increase in runoff due to the projected rise in urbanization of the area around C05 will further strain the already impaired water bodies, exacerbating those issues already caused by urban runoff/storm sewer input to the system. The TMDLs which are limits set for the total loading of a particular pollutant/stressor have been projected to be developed by 2019, 2021, and 2027 for the Westminster watershed.

Both the BCER and the Bolsa Marsh are being added to the 2016 303(d) list due to toxicity (RWQCB 2018). Samples collected at the sites during the last 10 years have exhibited both sediment and water toxicity. The RWQCB staff has concluded that the water body-pollutant combination should be placed on the section 303(d) list because applicable water quality standards are exceeded and a pollutant contributes to or causes the problem.

Recent data (i.e., 2005-2014) on California Toxics Rule (CTR) exceedances in C05 show that the water quality is generally good in both dry and wet weather. Based on the review of recent water quality data

for C05, although there are occasional exceedances of CTR criteria, toxicity, and bacteria, the frequency and concentrations of these exceedances are less than that identified from two decades ago.

2.3.4 Ground Water

Orange County depends on imported water from northern California through the State Water Project (SWP) and the Colorado River for approximately half of its total water supply. The other half comes from the large groundwater basin underlying the northern half of Orange County, recycled wastewater produced by several local water agencies, and several small groundwater basins.

The large groundwater basin that underlies the northern half of the County includes portions of the northern Westminster watershed study area (Figure 16) and provides about 75 percent of the upper half of Orange County's area needs (OCWD, 2004a). Groundwater quality in Orange County and the Westminster watershed is degraded by infiltration of chemicals and salts from agriculture, saltwater intrusion, and the poor quality of imported water and surface runoff used for recharge of the groundwater basins.

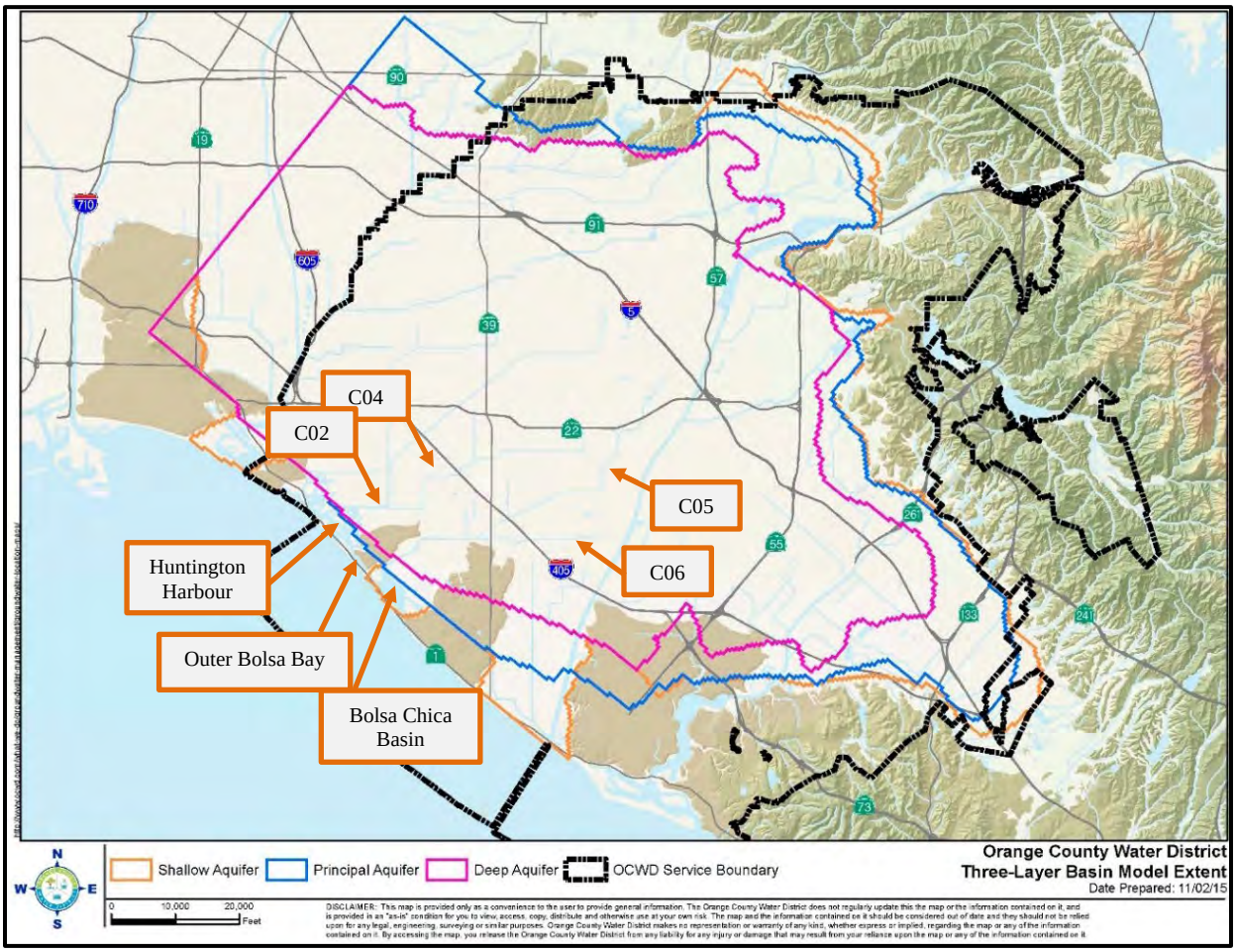


Figure 16: Orange County Water District map showing location of the groundwater basin within the study area

Seawater intrusion into coastal aquifers is a continuing management challenge. The Orange County Water District (OCWD) measures chloride concentrations in groundwater to monitor seawater intrusion. Chloride concentrations are monitored twice a year at coastal-area monitoring wells, and chloride contour

maps are prepared every two years to delineate the extent of seawater intrusion and determine areas where it is migrating inland or being pushed seaward. Figure 17 is a map prepared by the OCWD using 2016 data to show coastal area chloride concentrations and aquifer mergence zones in relation to the study area. On Reach 1 of the C05 channel there are non-functioning tide gates that allow coastal tidal influence (Figure 18). The tide gates, separating lower C05 from OBB, consist of twelve 84-inch diameter, 28-feet long, corrugated metal pipes with heavy duty flap gates. The tide gates are not operating as originally designed, as tidal influence extends approximately 2.5 miles upstream from the tide gates in C05. Available records indicate that the gates are hydraulically inefficient. Therefore, the lower reaches of the C05 channel convey urban runoff from upstream, yet are tidally influenced from the Pacific Ocean inlet at Bolsa Bay.

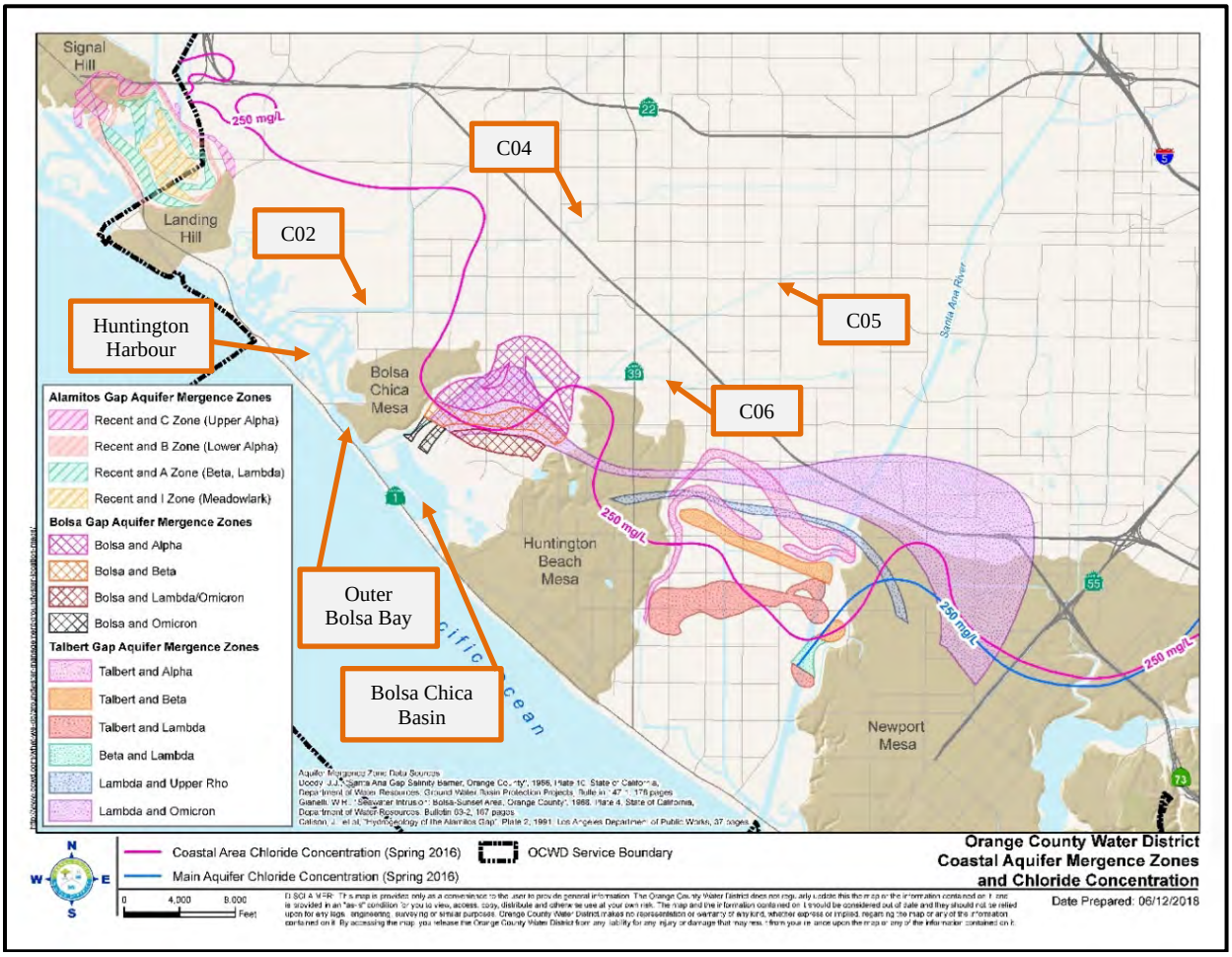


Figure 17: Coastal area chloride concentrations and Aquifer Mergence Zones within the study area

Figure 18: C05 reach 1 with various channel structures. Waters are tidally influenced due to the hydraulic connection with Outer Bolsa Bay.

2.3.5 Wetlands

"Wetlands" means areas that are inundated or saturated by surface or groundwater at a frequency and duration to support a prevalence of obligate and facultative vegetation, redoxymorphic soil features, and hydrology associated with saturated soil conditions. Wetlands generally include swamps, marshes, and bogs. It is estimated that approximately 80-90% of California's historical wetlands had been lost by 1989, and 90-95% of southern California's riparian ecosystem has been destroyed or severely degraded (Tiner 1984, Dahl and Johnson 1991, USDOI 1994).

The National Wetlands Inventory was queried regarding wetlands present within the study area (Figure 19). Within the C05 channel there is approximately 1.5 acres of freshwater emergent wetland present between Gothard Street (upstream end) and Edward Street (downstream end). These wetlands have been characterized as seasonally flooded wetlands dominated by herbaceous vegetation. The C02 channel includes approximately 0.89 acres of estuarine and marine wetland. The substrate in these habitats is flooded and exposed by tides. These wetlands are regularly flooded, intertidal salt marsh characterized by erect, rooted, herbaceous hydrophytes.

In order to confirm the presence of wetlands within the study area as designated within the National Wetlands Inventory, a jurisdictional determination was performed in April 2019 by the USACE Los Angeles District Regulatory Division. No wetlands were identified within the C02/C04 or C05/C06 drainage channels, only waters of the U.S. Wetlands were identified near the Warner Avenue Bridge which spans the waters where OBB meets Huntington Harbour. Within the vicinity of the bridge, 0.01 acre of estuarine bordering mudflat, 0.01 acre of estuarine bordering wetland, and 0.03 acre of estuarine

bordering wetland, and 0.11 acre of estuarine neighboring wetland were identified. Refer to *Appendix L – Environmental Considerations* for the complete jurisdictional determination.

Within the BCER there is approximately 199 acres of freshwater emergent wetland and 32 acres of estuarine and marine wetland. OBB has approximately 0.67 acres of freshwater emergent wetland and 15 acres of estuarine and marine wetland.

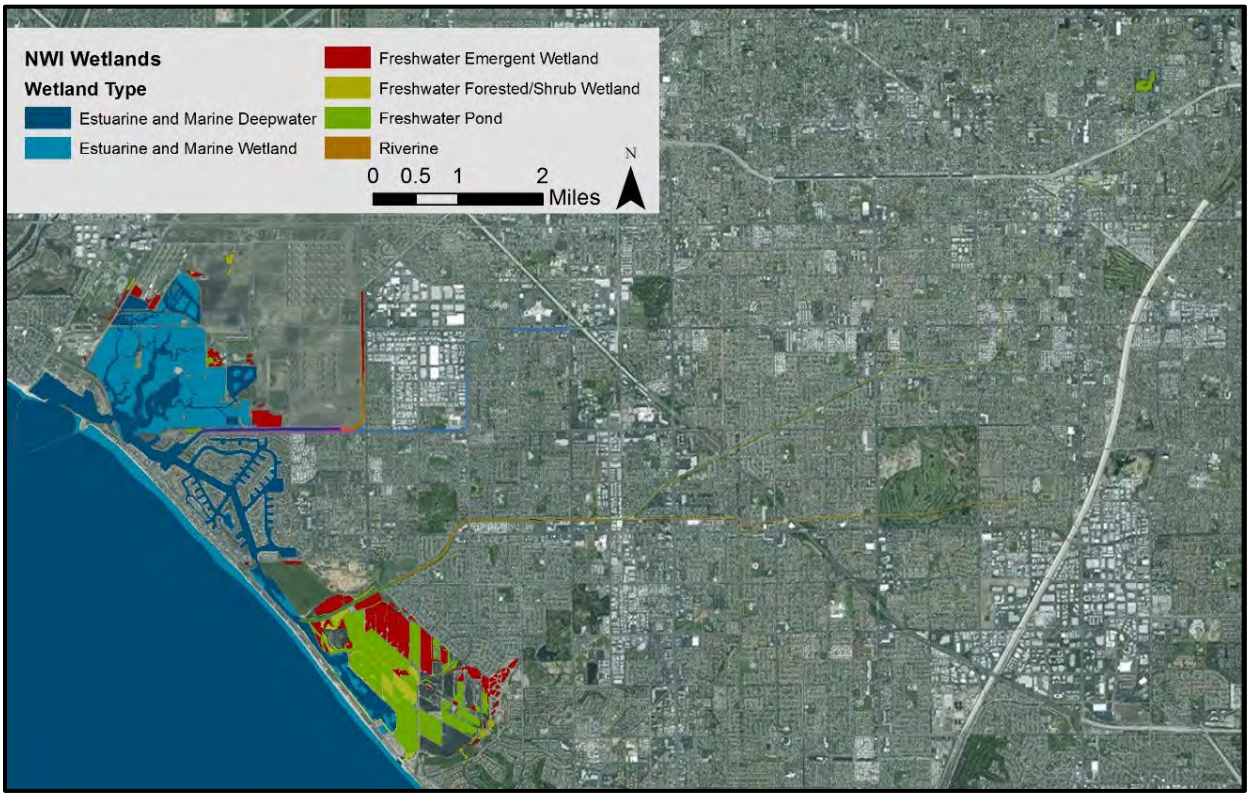


Figure 19: National Wetland Inventory data for wetland types within the study area

2.4 Air Quality

2.4.1 Regional Climate

The regional climate in Orange County is classified as Mediterranean, characterized by cool, dry summers and mild, wet winters. During the fall and winter months, build-up of high pressure in the Great Basin region can produce a “Santa Ana” condition, characterized by warm, dry northeast winds, that if sufficiently strong, may ventilate the air basin and prevent the build-up of high pollutant concentrations.

Average high and low temperatures in July at the Anaheim monitoring station are 82 degrees Fahrenheit (°F) (27.8 degrees Celsius (°C) and 62°F (16.7°C). January average high and low temperatures at this monitoring station are 65°F (18.3°C) and 45°F (7.2°C), respectively. Temperatures at the Costa Mesa monitoring station are generally less extreme due to the moderating effects of the Pacific Ocean.

Most rainfall occurs during the late fall, winter, and early spring months (November through March). Southern California is one of the regions being continuously impacted by El Niño events, which bring warmer than normal winters with severe rain storms.

2.4.2 Regional Air Quality

The area of influence for the Proposed Project lies within the South Coast Air Basin (SCAB). The SCAB area has high levels of air pollution, particularly from June through September. High rates of pollutant emissions combined with light wind and shallow vertical atmospheric mixing lead to reduced pollutant dispersion and exacerbate elevated air pollution levels. Pollutant concentrations in the SCAB vary by location, season and time of day.

The South Coast Air Quality Management District (SCAQMD) maintains two air quality monitoring stations that cover the proposed project area in the cities of Anaheim (i.e., central Orange County) and Costa Mesa (i.e., north coastal Orange County). These stations provide air quality data that are assumed to be typical of the study area (Table 3).

Table 3: Local ambient air quality (Source: SAQMD 2016)

		Air Quality Monitoring Station	
		Central Orange County (Anaheim)	**North Coastal (Costa Mesa)**
Carbon Monoxide[a]	Max Conc. in ppm 1-hour	2.6	2.1
	Max Conc. in ppm 8-hour	2.1	1.7
Ozone[b]	Max Conc. in ppm 8-hour	0.074	0.069
	No. Days Exceeded Federal 8-hour Standards (>0.084)	0	0
	No. Days Exceeded State 8 hour Standards (>0.070)	4	0
Nitrogen Dioxide[c]	Max. Conc. in ppb 1-hour	64.3	59.8
	Average Annual AAM. Conc. ppb	14.8	10.1
Sulfur Dioxide[d]	Max Conc. in ppb 1-hour	-	3.3
Suspended Particulates PM10[e]	Max Conc. in µg/m^3 24-hour	74	-
	No. (%) Samples Exceeding Federal 24-hour Standards (>150 µg/m^3)	0	0
	No. (%) Samples Exceeding State 24-hour Standards (>50 µg/m^3)	3(1%)	-
	Annual Average Conc.[f] (AAM) µg/m^3	24.4	-
Fine Particulates PM2.5[g]	Max. Conc. in µg/m^3 24-hour	44.45	-
	No. (%) Samples Exceeding Federal 24-hour Standards (>35 µg/m^3)	1(0.3%)	-
	Annual Average Conc.[h] (AAM) µg/m^3	9.47	-
Lead[i]	Max. Monthly Average Conc. µg/m^3	-	-
	Max. 3-Months Rolling Averages µg/m^3	-	-
PM10 Sulfate[j]	Max. Conc. in 24-hour µg/m^3	-	-

- Pollutant not monitored; ppm – Parts Per Million parts of air, by volume; ppb – Parts Per Billion parts of air, by volume; AAM – Annual Arithmetic Mean; µg/m3 – Micrograms per cubic meter of air

a) The federal and state 8-hour CO standards (9 ppm and 9.0 ppm) were not exceeded. The federal and state 1-hour CO standards (35 ppm and 20 ppm) were not exceeded, either.

b) The current (2015) O3 federal standard was revised effective December 28, 2015.

c) The NO2 federal 1-hour standard is 100 ppb and the annual standard is annual arithmetic mean NO2 > 0.0534 ppm (53.4 ppb). The state 1-hour and annual standards are 0.18 ppm and 0.030 ppm.

d) The federal SO2 1-hour standard is 75 ppb (0.075 ppm). The state standards are 1-hour average SO2 > 0.25 ppm (250 ppb) and 24-hour average SO2 > 0.04 ppm (40 ppb).

e) PM10 statistics listed are based on combined Federal Reference Method (FRM) and Federal Equivalent Method (FEM) data.

f) State annual average (AAM) PM10 standard is > 20 µg/m3. Federal annual PM10 standard (AAM > 50 µg/m3) was revoked in 2006.

g) PM2.5 statistics listed above are for the FRM data only. FEM PM2.5 continuous monitoring instruments were operated at some of the above locations for real-time alerts and forecasting only.

h) Both Federal and State standards are annual average (AAM) > 12.0 µg/m3.

i) Federal lead standard is 3-months rolling average > 0.15 µg/m3; state standard is monthly average ≥ 1.5 µg/m3. Lead standards were not exceeded.

j) State sulfate standard is 24-hour ≥ 25 µg/m3. There is no federal standard for sulfate. Sulfate data is not available at this time.

+ High PM10 (≥ 155 µg/m3) data recorded in Coachella Valley (due to high winds) and the Basin (due to Independence Day fireworks) are excluded in accordance with the U.S. EPA Exceptional Event Rule.

The 1990 amendments to the Clean Air Act (CAA) [42 United States Code 7401 et seq.] established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants, and requires states to submit a State Implementation Plan (SIP) demonstrating how NAAQS would be achieved for areas not in attainment. Table 4 summarizes the attainment status of the study area in Orange County, California. The area is currently not attaining Ozone and Particulate Matter $PM_{2.5}$ national standards, Ozone and PM state standards, and is maintaining Carbon Monoxide, Nitrogen Dioxide, and PM_{10} national standards. Actions of federal agencies must conform to the appropriate SIP, therefore, a General Conformity analysis is required to ensure federal activities do not interfere with the budgets in the SIPs, ensure actions do not cause or contribute to new violations, and ensure attainment and maintenance of the NAAQS.

Table 4: Attainment status for federal and state regulated criteria pollutants in the proposed project area

Pollutant	Federal Nonattainment Classification	Federal Maintenance Classification	State Classification
Carbon Monoxide (CO)	Attainment	Yes	Attainment
Lead (Pb)	Attainment	No	Attainment
Nitrogen Dioxide (NO_2)	Attainment	Yes	Attainment
Ozone (O_3) 8-hour	Extreme Nonattainment	No	Nonattainment
Ozone (O_3) 1-hour	-	-	Nonattainment
Particulate Matter (PM) PM10	Attainment	Yes	Nonattainment
Particulate Matter (PM) PM2.5	Nonattainment	No	Nonattainment
Sulfur Dioxide	Attainment	No	Attainment

2.4.3 Greenhouse Gases

Greenhouse gases (GHGs) warm the Earth by absorbing energy and slowing the rate at which the energy escapes to space. Different GHGs can have different effects on the Earth's warming. Two key ways in which these gases differ from each other are their ability to absorb energy (their "radiative efficiency"), and how long they stay in the atmosphere (also known as their "lifetime").

The USEPA found that GHGs taken in combination endanger both the public health and the public welfare of current and future generations. The USEPA also found that the combined emissions of these GHGs from new motor vehicle engines contribute to air pollution that endangers public health and welfare under CAA Section 202(a). These findings were based on careful consideration of scientific evidence and a thorough review of numerous public comments received on the proposed findings published April 24, 2009. These findings became effective on January 14, 2010.

The Global Warming Potential (GWP) was developed to allow comparisons of the global warming impacts of different gases. Specifically, it is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of carbon dioxide ($C0_2$). The larger the GWP, the more that a given gas warms the Earth compared to $C0_2$ over that time period. The time period usually used for GWPs is 100 years (Table 5).

Table 5: Global warming potentials and atmospheric lifetimes of select greenhouse gases

		Global Warming Potential		
Gas	**Lifetime (Years)**	**20 Years**	**100 Years**	**500 Years**
Carbon Dioxide ($C0_2$)	Variable	1	1	NA
Methane (CH_4)	12 ± 3	56	21	6.5
Nitrous Oxide (N_2O)	120	280	310	170
HFC-23	264	9,100	11,700	9,800
HFC-134a	14.6	3,400	1,300	420
HFC-152a	1.5	460	140	42
PFC: Tetraflouromethane (CF_4)	50,000	4,400	6,500	10,000
PFC: Hexafluoroethane (C_2F_6)	10,000	6,200	9,200	14,000
Sulfur Hexafluoride (SF_6)	3,200	16,300	23,900	34,900

The California Air Resources Board (CARB) has an extensive GHG monitoring and measurement research program to study the regional and local emission sources of important GHGs in California. Concentrations of GHGs measured in the SCAB (San Bernadino – KVCR Tower) are provided in Table 6.

Table 6: South coast air basin 2018 greenhouse gas summary

GHG	Annual Maximum (ppm)	
	1-Hr Maximum	**1-Day Average**
Carbon Dioxide	557	504
Carbon Monoxide	0.8016	0.4711
Methane	62.376	11.268
Nitrous Oxide	0.3604	0.3369

Source: CARB 2018

Modeling indicates that the continued use of fossil fuels and GSGs for transportation, movement of goods and services, manufacturing, and human and natural sources would continue to increase regionally (Figure 20).

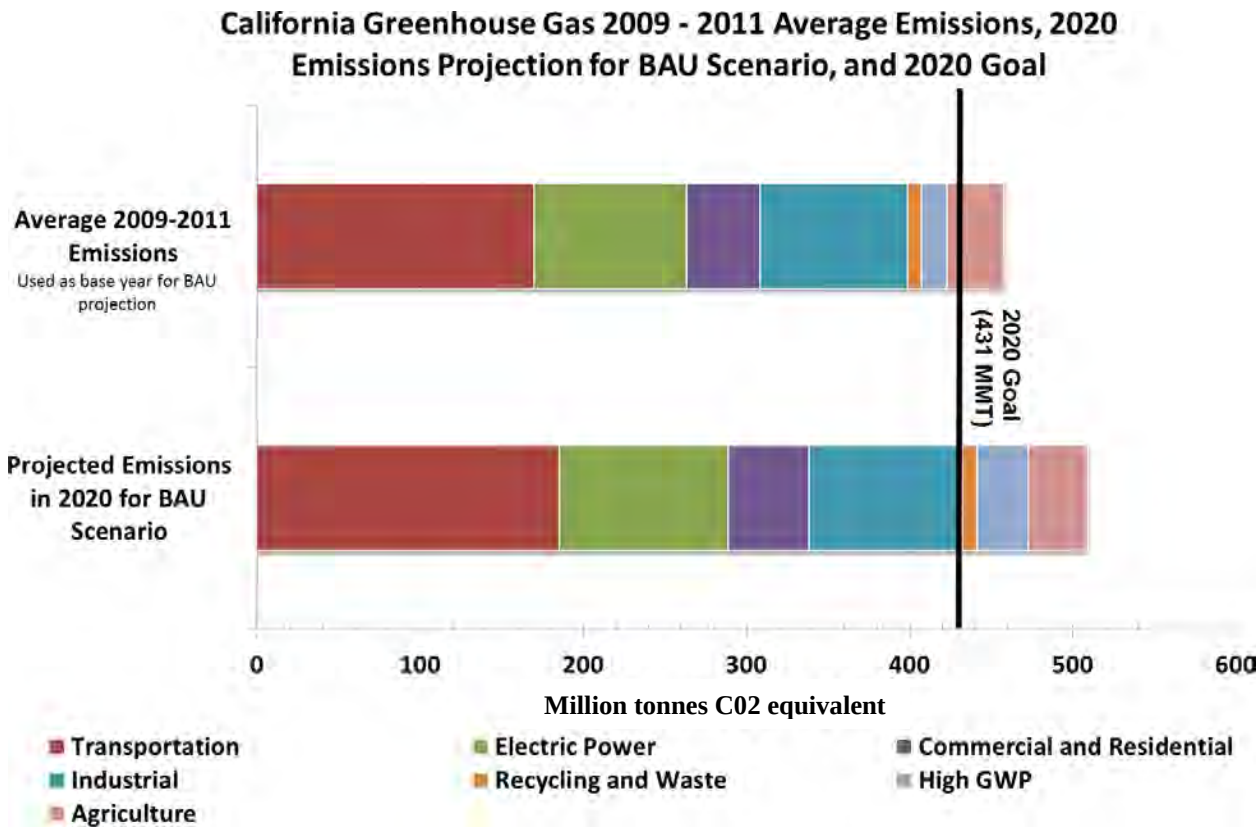


Figure 20: California GHG inventory forecast (CARB 2014)

2.5 Climate Change

2.5.1 Qualitiative Assessment of Climate Change Impacts on Hydrometeorology

USACE Engineering and Construction Bulletin (ECB) 2018-14 (Guidance for Incorporating Climate Change Impacts to Inland Hydrology in Civil Works Studies, Designs, and Projects), "provides guidance for incorporating climate change information in hydrologic analyses in accordance with the USACE overarching climate change adaptation policy. Climate change is anticipated to affect sea level rise, temperatures, precipitation, and droughts in southern California. An ECB 2018-14 analysis has been conducted as part of this study. The analysis consists of a literature review, a first or statistical analysis, an assessment of nonstationarity, a screening level vulnerability assessment, as well as an evaluation of residual risk due to climate change. Refer to Appendix H – Hydrology and Hydraulics for additional detail.

Based upon the literature review, evidence in observed precipitation records suggests increases in both annual average, and minimum and maximum temperature in the California Region over the past century. Trends in observed annual precipitation totals have been variable within the California Region in the 20th century. Similarly, variability has been observed in historical streamflow trends and other hydrologic data for the California Region with relatively low consensus across the literature. The majority of the studies report no statistically significant trends in historical streamflows over the second half of the 20th century. There is strong consensus in the literature that air temperatures will increase in the study basin, and throughout the country, over the next century. Projections of precipitation in the study basin are less certain than those associated with air temperature. The dominant trend appears to suggest an increase in precipitation in the northern areas of the region and a decrease in precipitation in the southern areas of the

California Region. Future storm events in the California Region are predicted to increase in frequency and intensity compared to the recent past. Hydrologic projections, such as streamflow and runoff are harder to compare, with seasonal variabilities, model variabilities, and spatial variabilities in results.

Within the study area, a first order statistical analysis was performed to characterize trends in observed temperature, precipitation and streamflow records. It was found that there is a statistically, significant increasing trend in maximum daily temperature. No statistically significant trend was found in precipitation data within the study area. Trends in annual, peak streamflow were analyzed for three locations within and in the vicinity of the study area. There is some evidence of an increasing trend in peak streamflow, but it is difficult to discern whether this trend is due to climate change or the significant land use changes that have occurred in the basin. An evaluation of unregulated, projected climate changed hydrology for the HUC04 watershed which encompasses the study area indicates that projected streamflow is not anticipated to increase overtime.

In accordance with the Corps' Nonstationarity Detection guidance (ETL 1100-2-3, USACE, April 2017), an evaluation of nonstationarities in annual peak streamflows and annual maximum 24 hour rainfall was carried out. No nonstationarities were detected in 24 hour peak rainfall. Of the three gages investigated, two showed strong evidence of nonstationarities in annual instantaneous peak streamflow datasets. A nonstationarity in annual peak runoff was identified in 1977 for USGS 11048500 San Diego Creek at Culver Drive, and for the Westminster Channel gage operated by Orange County. No nonstationarity was detected for the Anaheim Barber Channel.

The USACE Vulnerability Assessment Tool was applied for the 1807-Southern California Coastal HUC-4 to assess the study area's vulnerability to climate change impacts relative to the other 201 HUC-4 Watersheds within the continental United States. For the flood risk reduction business line, the study area was determined to be relatively vulnerable to climate change.

2.5.2 Relative Sea Level Change Assessment

USACE policy requires that planning studies and engineering designs over the project life cycle, for both existing and proposed conditions, consider a range of possible future rates of Relative Sea Level Change (RSLC) when formulating and evaluating alternatives. Current USACE guidance (ER 1100-2-8162 and ETL 1100-2-1) specifies the procedures for incorporating RSLC into planning studies and engineering design projects. Relative sea level change (RSLC) is an important variable in flood risk management studies impacted by sea level outlet conditions, because sea level change can potentially affect a proposed project (if constructed) and performance of that proposed project. Table 7 and Figure 21 show the estimated relative sea level change projections from 1992 to 2100 (stream gauge 9410660, Los Angeles, CA) within the study area. Refer to Appendix H – Hydrology and Hydraulics for additional detail.

USACE (ETL 1100-2-1, 2014) recommends an expansive approach to considering and incorporating RSLC into civil works projects. It is important to understand the difference between the period of analysis (POA) and planning horizon. Initially, USACE projects are justified over a period of analysis, typically 50 years. However, USACE projects can remain in service much longer than the POA. The climate for which the project was designed can change over the full lifetime of a project to the extent that stability, maintenance, and operations may be impacted, possibly with serious consequences, but also potentially with beneficial consequences. Given these factors, the project planning horizon (not to be confused with the economic period of analysis) should be 100 years, consistent with ER 1110-2-8159. Current guidance considers both short- and long-term planning horizons and helps to better quantify RSLC. RSLC must be included in plan formulation and the economic analysis, along with USACE expectations of climate change and RSLC, and their impacts. Some key expectations include:

- At minimum 20-, 50-, and 100-year planning horizons should be considered in the analysis.
- Reinforces the concept that a thorough physical understanding of the project area and purpose is required to effectively assess the projects sensitivity to RSLC.
- Sea level changes should be incorporated into models at the mean and extreme events.
- Identification of thresholds by the project delivery team and tipping points within the impacted project area will inform both the selection of anticipatory, adaptive, and reactive options selected and the decision/timing strategies.

Table 7: Relative Sea Level Change for Gage 9410660, Los Angeles, CA through 2100

Year	Low (ft)	Intermediate (ft)	High (ft)
2020	0.08	0.15	0.37
2030	0.10	0.23	0.64
2040	0.13	0.34	0.99
2050	0.16	0.46	1.41
2055	0.17	0.52	1.64
2060	0.19	0.60	1.90
2070	0.21	0.75	2.47
2080	0.24	0.93	3.11
2090	0.27	1.12	3.83
2100	029	1.33	4.62

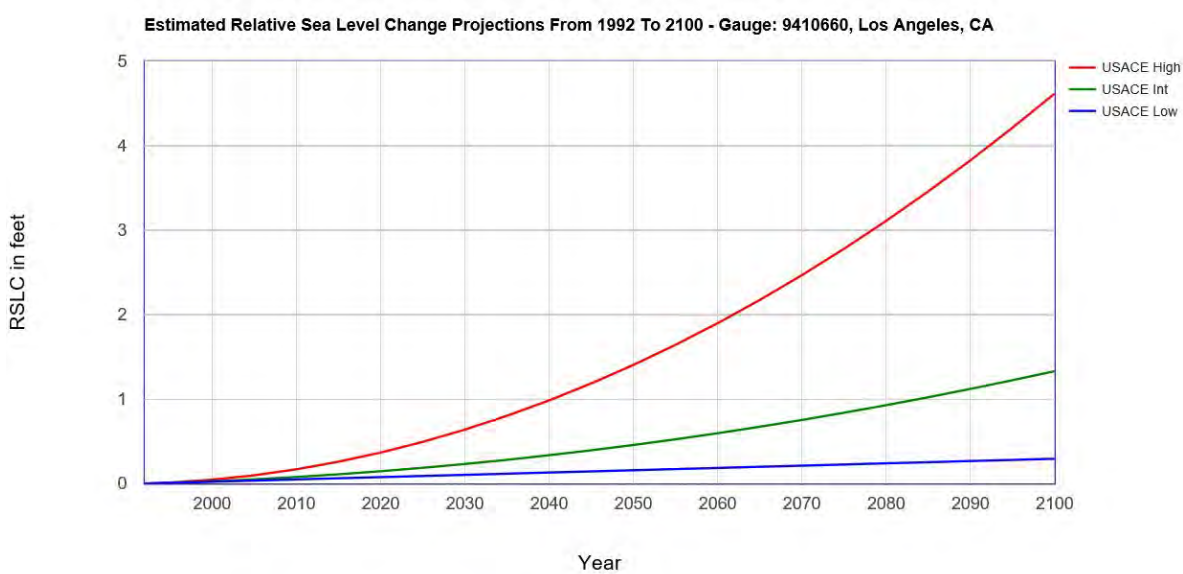


Figure 21: RSLC for Gage 9410660, Los Angeles, CA; NOAA's published rate: 0.83 mm/yr

2.5.3 Residual Risk Due to Climate Change & Considerations of Climate Change Impacts in Project Planning

Sea Level Change is likely to impact the study area. Sea Level Change will result in increased loading to the levees and floodwall being proposed as part of the project. This has the potential to reduce the level of protection that the levees and floodwalls will provide; increasing their probability of overtopping in the future. Levee and flood wall overtopping has the potential to generate economic damages, cause interior flooding and to disrupt transportation infrastructure. There is also some potential for increased water levels and runoff due to higher intensity rainfall in the future. While there is less consensus with regards to projections of future rainfall, some climate models project an increase in the frequency of heavy downpours. In addition to increased loading on levees and floodwall, increases in heavy precipitation could undermine the effectiveness of several project features including the diversion channel, gravity drains, and channel capacity. Future, climate change effects may necessitate the implementation of project modifications to maintain the same level of storm damage reduction as is estimated based on present day conditions. The recommended plan includes several project features that could be adapted to increase the level of protection in the future including the ability to increase floodwall heights and channel capacity.

Hydraulic analysis was performed using boundary conditions that represent the ‘high’ scenario for future years to determine if project adaption would be required within the 50-year period of economic analysis. For this analysis, a downstream boundary condition representing the ‘high’ scenario was used with a target date of 2085, the end of the 50 year period of economic analysis. Based on the water surface profile elevations in the downstream reach of C02 and C05, the conditional non-exceedance probability (assurance) was computed to determine if the levee elevations could be reasonably expected to contain the 1% ACE event from overtopping. On the downstream end of both C02 and C05, the calculated assurance is greater than 95% for the 1% ACE event. Based on the results of this analysis, no adaption is expected throughout the 50 year economic life of the project.

Hydraulic modeling was performed with a downstream boundary condition one foot higher to represent the year 2100 with the ‘high’ scenario. With this one additional foot of backwater, the water surface profile is below the levee crest, but the computed assurance is reduced from 95% to 80% for the 1% AEP. This reduction in assurance indicates lower confidence that the 1% ACE water surface profile will be contained within the floodwalls beyond the year 2100.

If the capacity of the floodwall system is exceeded due to higher sea level conditions, overtopping of the floodwalls on the downstream reaches of C05 and C02 is expected. On C05, this would result in overtopping into the Bolsa Chica Ecological Reserve. Since the Reserve is tidally connected like Anaheim Bay, high water levels in the Reserve would provide some energy dissipation, but overtopping may still result in some scour on the backside of the floodwall. Similar scour may occur in the muted tidal pocket on the north side of the channel. On C02, overtopping of the floodwall would result in additional overbank flooding in Huntington Beach. Since ground elevations on the landward side of the floodwall are only three to four feet below the top of the floodwall, scour on the landward side of the floodwall would be less of a concern.

2.5.4 Health Issues

Communities-of-color and economically disadvantaged communities have historically borne a disproportionate impact of climate change burden of pollution and health disparities. The incidence of morbidity and premature mortality associated with mounting physical, biological impacts, and economic consequences of climate change are projected to increase. A community’s vulnerability to climate change is determined by the community’s ability to anticipate, cope with, resist, and recover from the impact of extreme weather events such as hurricanes, flood, heat waves, air pollution, and infectious diseases. The

vulnerability of neighborhoods with low-income and minority inhabitants will be exacerbated by lack of adequate social and material resources to cope with these impacts.

2.6 Energy

Southern California Edison (SCE) provides electrical services to the study area through State-regulated public utility contracts. SCE, the largest subsidiary of Edison International, is the primary electricity supply company for much of Southern California. It provides 14 million people with electricity across a service territory of approximately 50,000 square miles. SCE has met or exceeded all Renewable Portfolio Standard requirements to date, procuring renewable energy from diverse sources, including biomass, biowaste, geothermal, hydroelectric, solar, and wind. This Standard requires all California utilities to generate 33 percent of their electricity from renewables by 2020, 60 percent of their electricity from renewables by 2030, and 100 percent by 2045.

The Southern California Gas Company (SoCalGas) provides natural gas services to the project area. As the nation's largest natural gas distribution utility, SoCalGas delivers natural gas energy to 212.6 million consumers through 5.9 million meters in more than 500 communities. SoCalGas's service territory encompasses approximately 20,000 square miles throughout Central and Southern California, from Visalia to the Mexican border.

Electricity use is measure in kilowatt-hours (kWh), and natural gas is measured in therms. Vehicle fuel use is typically measure in gallons (e.g., of gasoline or diesel fuel), although energy use for electric vehicles is measured in kWh.

The electricity consumption attributable to non-residential land uses (commercial and industrial) in Orange County from 2013 to 2017 is shown in Table 8. As indicated, the demand has decreased since 2013.

Table 8: Non-Residential Electricity Consumption in Orange County 2013-2017

Year	Non-Residential Electricity Consumption (kilowatt hours)
2017	13,285,465,398
2016	13,479,185,717
2015	13,799,566,708
2014	13,807,333,656
2013	13,571,280,615

Source: ECDMS 2018

The natural gas consumption attributable to non-residential lands uses in Orange County from 2013 to 2017 is shown in Table 9. As shown, natural gas demand has declined slightly since 2013.

Table 9: Non-Residential Natural Gas Consumption in Orange County 2013-2017

Year	Non-Residential Natural Gas Consumption (therms)
2017	232,285,127
2016	232,223,485
2015	227,551,930
2014	225,550,853
2013	237,982,223

Source: ECDMS 2018

Automotive fuel consumption in Orange County from 2013 to 2018 is shown in Table 10.

Table 10: Automotive Fuel Consumption in Orange County 2013-2018

Year	On-Road Automotive Fuel Consumption (gallons)	Off-Road Equipment Fuel Consumption (gallons)
2018	1,398,074,830	15,744,768
2017	1,425,711,535	15,320,669
2016	1,437,461,980	14,905,956
2015	1,438,960,670	14,354,158
2014	1,441,593,050	13,799,890
2013	1,437,010,475	13,353,561

Source: CARB 2014

2.7 Noise

The Proposed Project area is located in an urban setting surrounded by residential and commercial uses. Ambient noise levels in the Proposed Project area consist of traffic noise and noise associated with residential and commercial operations. Roadway traffic consisting of cars, buses, and commercial trucks generate the highest ground vibrations. These vibrations vary with pavement conditions. Pot holes, pavement joints, and the differences in the settlement of pavement all increase vibration levels from traffic.

Federal regulations (29 C.F.R. Part 1910.95) safeguard the hearing of workers exposed to occupational noise, and are enforced by the Occupational Safety and Health Administration (OSHA). Table 11 shows the permissible noise exposures and duration as set forth in 29 C.F.R. 1910.95. When workers are subjected to sound levels exceeding those listed in Table 11, feasible administrative or engineering controls should be utilized. If the controls fail to reduce sound levels then personal protective equipment should be provided to reduce sound levels. For comparison, Table 12 includes average decibel levels for common noises. The California Division of OSHA also has regulations, based on USEPA occupational guidelines, to protect the hearing of workers. Each city within the proposed project area has ordinances to minimize impacts to residents, regulating hours per day and maintained noise levels during construction.

Table 11: Permissible noise exposures.

Duration Per Day (Hours)	Sound Level (dBA)
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
$\leq$ 0.25	115

[a] When the daily exposure is composed of two or more periods of noise exposure of different levels, their combined effect is considered, rather than the individual effect of each.

Table 12: Noise levels for common sounds.

Noise	Average Decibels (dB)
Library	40
Large Office	50
Normal Conversation	60
Freeway Traffic	70
Handsaw	85[a]
Factory Machinery	100
Power Saw	110
Ambulance Siren	120
Jackhammer	130
Airplane Taking Off	140
Rocket Launch	180

[a] Sounds above 85 dB are considered harmful depending on how long and how often someone is exposed to them and whether hearing protection is being used.

2.8 Biological Resources

This biological section provides a preliminary assessment of the biological resources existing within the project boundary of the Westminster watershed, Orange County, California. The section identifies the plant and animal resources including potential sensitive flora and fauna in the vicinity of the project channels and existing assessment of the channels for habitat value, which includes vegetation types as well as animal assemblages.

Channels within the Proposed Project area have been modified as discussed in Section 2.1 and illustrated in Figure 9, Figure 10, Figure 11**,** and Figure 12. Elevations in the watershed range from 10 to 107 feet. Nearly all of the watershed tributaries to the channels are fully developed for residential, commercial, industrial, educational, and recreational uses. Modifications to the channels are being considered to increase the system's capacity to handle flood events. Therefore, the biological baseline description will describe the project limits in terms of what is presently there, concentrating on the channels that have some remaining biological resources.

Historically, thousands of acres of highly productive estuaries (e.g., saltwater and freshwater marshes) extended from Anaheim Bay to the Huntington Beach bluffs, including the area known as Bolsa Chica. In 1899, Bolsa Chica was diked to create the Bolsa Chica Gun Club, and later diked further and drained for oil extraction that began in the 1940s. Since then, much of the adjacent wetland and aquatic areas have been drained or filled for development. In the early 1970s, the remaining wetlands at Bolsa Chica were proposed for large-scale residential and commercial developments; however, these developments did not come to realization. In 1997, under a State-federal interagency agreement, most of the remaining lowland portions of Bolsa Chica were purchased by the State of California using mitigation funds from the Ports of Los Angeles and Long Beach for the purpose of wetland restoration.

Nearly 600 acres of marine and wetland habitat at Bolsa Chica have been restored or rehabilitated south of the C05 channel. Major components include: 1) removal and clean-up of oil extraction facilities from part of the wetlands area; 2) restoration of full tidal influence through a new inlet, bridge construction and excavation of a tidal basin; 3) creation and enhancement of aquatic habitats and intertidal wetlands; 4) creation of nesting and feeding areas for threatened and endangered birds; and 5) preservation of non-tidal wetlands.

The vegetation resources are typical of constructed flood damage reduction channels (channels) in the geographic urban environment. The vegetation in the channels is dominated by annual, weedy, and ruderal species. Correspondingly, native as well as non-native and invasive vegetation types are found here. The vegetation in channel is providing some value as habitat containing vertebrate and invertebrate wildlife species can be observed in channel. Ongoing vegetation management activities are taking place throughout the channels, which has some impacts on extant biological communities. In some areas (C04 Reach 22) it appears that habitat is being altered via vegetation management activities, and in other places (C06 Reach 18) vegetation management is maintaining the existing habitat conditions.

2.8.1.1 C02

Reach 23

Coastal salt waters are conveyed from the Pacific Ocean through Anaheim Bay and the northern edge of Huntington Harbour into C02 near Edinger Avenue. The vegetation type of Reach 23 is low-lying grasses in mudflats that appear to be influenced by tidal action. A major part of Reach 23 is tidal mudflat at low tide, and tidal ponds and creek during high tide (twice daily).

2.8.1.2 C04

Reach 22

This channel reach is largely unvegetated, although small pockets of vegetation exist in isolated areas. However, there is no vegetation type that would be considered dominant for any part of this reach. A freshwater marsh was previously documented from between Brookhurst Street and Magnolia Avenue. This marsh was removed as part of regular channel maintenance activities.

Reach 21

There is no vegetation along the flood damage reduction channel except for the urban landscape plantings that are part of Westminster Memorial Park. Some portions of the low flow channel are supporting green algal mats and some weedy non-native grasses, but these areas are relatively isolated.

Reach 20

Reach 20 incorporates a gradient of apparent salt marsh vegetation at the downstream portion of the channel to brackish, freshwater marsh at the mid-point of the channel. Continuing downstream paralleling Springdale Street, the flood damage reduction system continues as trapezoidal riprap armor stone wall on both sides, earthen bed, and with tidal inundation. Sporadic vegetation is present throughout the reach, but a significant amount of emergent vegetation is present from McFadden Avenue until approximately Graham Street. Commonly observed species were smartweeds (*Polygonum spp.*), Sprangletop (*Leptochloa fusca*), and bulrushes (*Scirpus spp.*).

These plants are well developed and inhabiting the edges as well as the center of the channel**.** Earthen trapezoidal sides are, at times, vegetated with ruderal plant species, which the local sponsor manages through a weed abatement program. At the lower portion of Reach 20, vegetation consists of pockets of low stature, and sometimes prostrate plant assemblages not more than a few feet in width distributed throughout the channel. Algal mats tend to form at the lower edges of the mudflat habitat. The lower end of channel C04, Reach 20, confluences with the lower portion of channel C02, Reach 24 in the northwest quadrant of the intersection of Bolsa Chica Road and Edinger Avenue.

2.8.1.3 C05

Reach 12 and 11

The headwaters of C05, Reach 12 is the south parking lot of the Crystal Cathedral. The flow conveyance system is a concrete covered conduit that leads into a concrete trapezoidal channel of which both types of channels have a concrete bottom. Reach 11 is concrete covered conduit. No vegetation is found along these sections of C05.

Haster Basin

Haster Basin is downstream of Reaches 12 and 11 and is used as a flood damage reduction detention basin and secondarily as a recreation park (formerly known as Twin Lakes Park) for the local residents. The basin is vegetated with turf grass and various ornamental trees.

Reach 10

This reach is a concrete covered conduit that conveys water out of the south side of Haster Basin to Garden Grove Boulevard.

Reach 9, 8, 7, and 6

Reach 9 through Reach 6 is a concrete trapezoidal channel with concrete bottom that has a few isolated pockets of vegetation. Most of these pockets appear to have grown in accumulated sediment, and could be washed away under heavy flow conditions.

Reach 5, 4, 3, and 2

Where vegetation occurs, it is primarily non-native grasses and other adventive vegetation. Distribution of vegetation in the channel is sporadic and typically confined to the toe of the slope where it meets the water. Water within these reaches is believed to be primarily run-off from the surrounding area. However, it could also be the upper tidal inundation level or a combination of both. Reaches 3 and 2 are inundated by tidal waters from BCER.

Reach 2 continues downstream with concrete rectangular walls and bottom which then transitions to concrete rectangular walls. The lower portion of the reach is seen with water, and some floating algal mats, but the bottom is concrete. Vegetation is sparse with intermittent cattails and ruderal plants, such as fan palms. Further downstream there are significant parcels of bulrush (*Scirpus spp.*) and cattail (*Typha domingensis*) along the water's edge. These species dominate large segments of the riparian corridor along the edges of the channel, or occasionally as islands in the middle of the channel. Breeding migratory birds were observed utilizing this in channel habitat. Some of the levee slopes are covered with crabgrass; however, the majority are barren.

Reach 1

A variety of vegetation types are present within C05, Reach 1. The channel starts with a concrete bottom at its uppermost extent and 1,350 feet downstream (west) of Goldenwest Avenue, the channel becomes an earthen trapezoidal levee with an earthen bottom. In this earthen section there is a meandering channel with large banks of wetland vegetation growing in sediment deposited along the sides of the channel. Downstream of Springdale Street, the channel deepens and the amount of side channel sediment and vegetation declines significantly. With the exception of a single mid-channel patch of cattails, the vegetation from this point to the entrance of OBB is scattered sparse and ruderal species. There is likely

infiltration of saltwater due to a non-functional tide gate structure at the entrance to OBB, and this tidal influence appears to be influencing the vegetation composition in the lower reaches of C05, Reach 1.

2.8.1.4 C06

Reach 19

The headwaters of C06 daylight approximately 205 feet west of Newhope Street in the city of Fountain Valley (2,400 feet east of Mile Square Park). There is sparse vegetation in this channel comprised of ruderal weed plant species.

Reach 18

Reach 18 encompasses all of Mile Square Park from Euclid Street on the upstream and Brookhurst Street on the downstream side. The channel appears to be regularly maintained and the vegetation is almost entirely mowed grass.

Reach 17, 16, 15, and 14

No vegetation other than small patches of ruderal grasses and other weeds can be found in this reach.

Reach 13 – confluence with C05

Both structure types have earthen bottoms until the C06 confluences with C05, Reach 3. Vegetation is present in both types of channel structures indicative of a diminished quality freshwater marsh and a mixture of ruderal plant species.

Eelgrass Beds

Eelgrass provides important biological, physical, and economic benefits, and is also important to species managed under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). Vegetated shallows that support eelgrass are also considered special aquatic sites under the 404(b)(1) guidelines of the Clean Water Act ([CWA] 40 C.F.R. § 230.43). Pursuant to the MSA, eelgrass is designated as Essential Fish Habitat (EFH) area of particular concern for various federally-managed fish species within the Pacific Coast Groundfish Fishery Management Plan (Pacific Fishery Management Council 2016). A Habitat Area of Particular concern (HAPC) is a subset of EFH that is rare, particularly susceptible to human-induced degradation, especially ecologically important, and/or located in an environmentally stressed area.

Within the study area, eelgrass is found within the Anaheim Bay/Huntington Harbour area (Figure 22). An eelgrass survey was conducted within the Anaheim Bay/Huntington Harbour area in 2013 by Merkel & Associates (Merkel & Associates 2014). Eelgrass was found on 11% of the area surveyed (89.2 acres out of 800.7 acres. A little over 91% of the eelgrass mapped (i.e., 81.4 acres) was located in northern Anaheim Bay within NWSSB. The remaining 8.7 percent (i.e., 7.8 acres) of eelgrass mapped during the survey was located within Huntington Harbour. The 2014 report also stated that small pockets of eelgrass are known to occur in the unsurveyed lower portion of Bolsa Chica Channel (i.e., C02) and within OBB (Merkel & Associates 2014).

Eelgrass is also found within the BCER. As part of the monitoring for the Bolsa Chica Lowlands Restoration project, the presence/absence of eelgrass has been surveyed. The monitoring regimen generally conforms to the Bolsa Chica Lowland Restoration Project Biological Monitoring and Follow-up Plan prepared by the USFWS in 2001 (USFWS 2001). The Monitoring Plan calls for most biological monitoring (including eelgrass) to be conducted during the 2nd, 5th, and 10th years after completion of

construction (i.e., 2006). Additional biological monitoring may be conducted as warranted by conditions observed at the site or the need for additional data. According to the Merkel & Associates 2013 monitoring report, in 2007 0.9 acre of eelgrass was transplanted in the full tidal basin of the BCER. By 2008 the eelgrass area in the full tidal basin had expanded to 2.0 acres (0.8 hectare), by 2009 it was 35.5 acres and by 2011 it was 105.4 acres (Figure 23). A more recent survey of eelgrass within Bolsa Chica Basin was not readily available; however, according to the BCER Manager there are currently approximately 140 acres of eelgrass within BCER (personal communication Kelly O'Reilly, 2018).

In regards to eelgrass within the channels of the Westminster watershed, there is minimal survey data. In 2012 (the most recent survey data), Chambers Group, retained by OCPW, surveyed the majority of C05's Reach 1 (tide gates at the downstream end of Reach 1 C05 upstream approximately 1.8 miles to where Warner Avenue crosses Reach 1 C05 in Huntington Beach) for the presence of eelgrass and the invasive algae *Caulerpa taxifolia*. Neither species were observed during the survey. Prior to 2012, the same area of Reach 1 C05 was surveyed in 2009 and neither species was observed then either. The only other known sampling to have occurred within one of the channels is related to the survey that occurred in 2013 of the Anaheim Bay/Huntington Harbour area. As shown in Figure 22, C02 was surveyed from Huntington Harbour upstream approximately 0.3 miles to where Edinger Bridge crosses C02 and eelgrass was observed.

Figure 22: Location of eelgrass in the Anaheim Bay/Huntington Harbour area, surveyed by Merkel & Associates (2014)

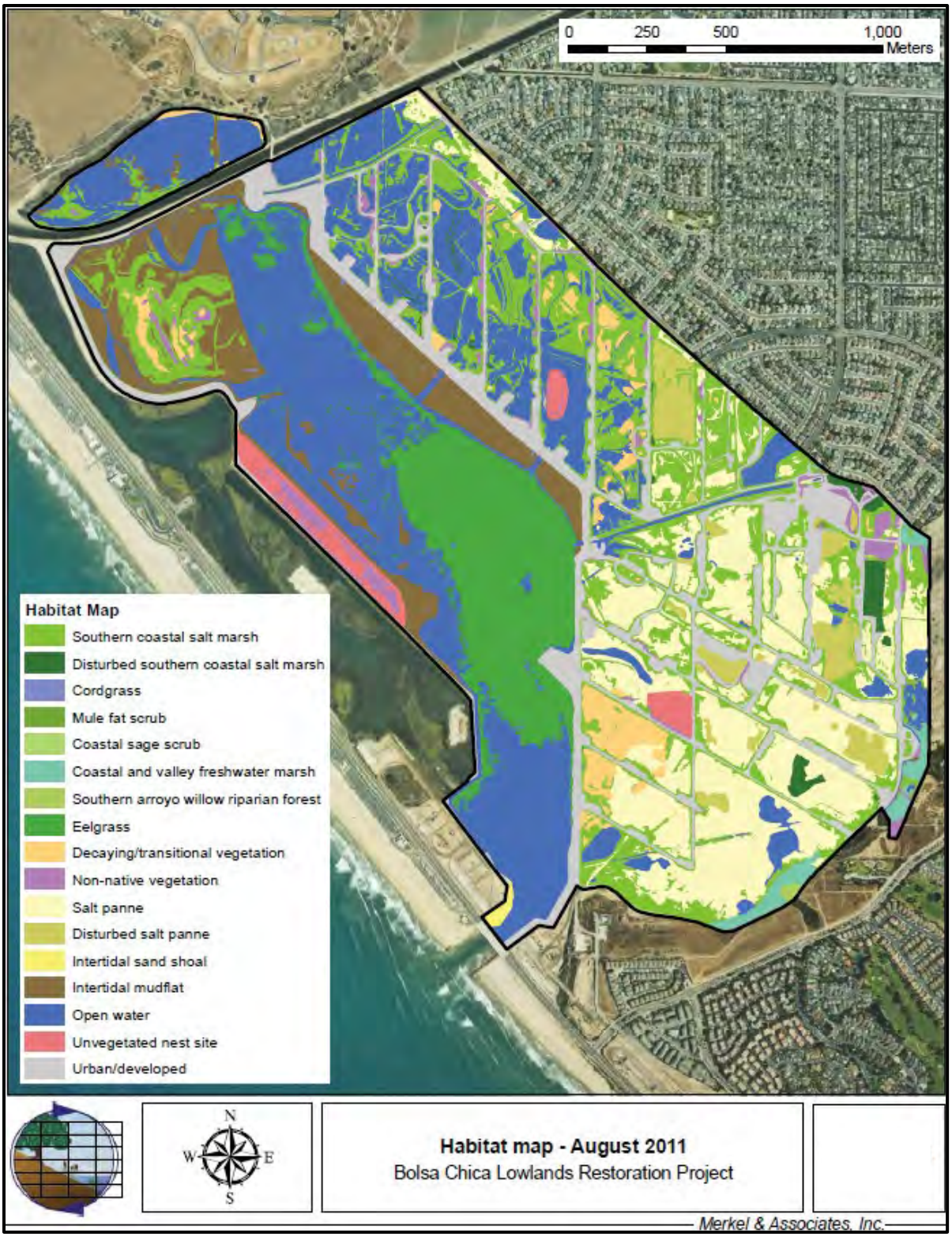


Figure 23: Habitats present within the Bolsa Chica Lowlands Restoration Project, including eelgrass (Merkel & Associates 2013)

2.8.2 Animal Resources

Watercourses within the project boundary include flood control channels. These watercourses are dynamic, high-energy systems and typically form the active part of the channel. They are generally devoid of vegetation either as a result of scouring, or from flood control channel maintenance activities. The specific wildlife species associated with the channels depends on the location and type of channel (e.g., earthen versus concrete, natural stream versus man-made drainage channel, etc.), intermixing with upland, ornamental landscapes, wetland communities, and availability of perennial and ephemeral water sources. Flood control channels with perennial and ephemeral water provide habitat (e.g., forage, movement corridor, etc.) for common species such as California king snake (*Lampropeltis getula californiae*), California striped racer (*Coluber lateralis lateralis*), Pacific ring-necked snake (*Diadophis punctatus amabilis*), southwestern pond turtle (*Actinemys pallida*), western toad (*Anaxyrus boreas*), Pacific treefrog (*Pseudacris regilla*), mallard (*Anas platyrhynchos*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), and coyote (*Canis latrans*).

While the flood control channels, which comprise a majority of the proposed project's action area, provide primarily low quality habitat for common species in a highly urbanized area, there are higher quality areas that are adjacent to the proposed project's action area. Those higher quality areas are the Bolsa Chica Ecological Reserve and the Seal Beach National Wildlife Refuge. The below sections generally describe the flora and fauna that have been observed within these adjacent higher quality areas.

2.8.2.1 Bolsa Chica Ecological Reserve

Vegetation

The BCER contains remnants of a once extensive wetland system. A tributary of the SAR called Freeman Creek flowed into the wetlands, creating a mixture of fresh and saltwater marsh, tidal sloughs, and swampland that supported dense vegetation; tulles, arroyo willows and thickets. Beginning in 2004, more than 500 acres of the Bolsa Chica Lowlands were reconstructed to its original conditions in the 1800s. The restoration has and will continue to gradually improve the habitat quality of BCER.

Within BCER there are plant species indicative of approximately six plant communities: sea grass beds, salt marsh, coastal strand/sand dune, coastal sage scrub, freshwater wetlands, and riparian woodland. The majority of BCER is salt marsh. Similar to Animal Resources, special-status species were considered as those species that are 1) listed, proposed for listing, or candidates for listing under the FESA as threatened or endangered, 2) listed or candidates for listing under the CESA as threatened or endangered, 3) a CDFW fully protected species, 4) a CDFW species of special concern, 5) a CDFW watch list species or 6) species that have a California Rare Plant Rank of 1A, 1B, 2A, or 2B. Four special-status species are found in the reserve including eelgrass (*Zostera marina*), California seablite (*Suaeda californica*), eastuary seablite (*Suaeda esteroa*), and southern tarplant (*Hemizonia parryi ssp. australis*). Eelgrass is a unique underwater plant which creates its own multi-use habitat type for fish and which is protected by National Marine Fisheries Service (NMFS) as a Habitat of Particular Concern (a subset of EFH). California seablite is a federally listed endangered species. In addition, California seablite, southern tarplant, and estuary seablite are all California Rare Plant species that are considered either seriously endangered or fairly endangered in California. For a complete list of plants provided by the CDFW — and the plant communities that they are associated with — that are found at the BCER refer to *Appendix L – Environmental Considerations*.

Birds

The Bolsa Chica wetlands host numerous species of wildlife. The wetlands are an especially important migratory stop as well as nesting grounds for many avian species. Out of 420 bird species recorded for

Orange County, California, 321 of those species have been sighted at BCER in the past decade. Approximately 189 bird species are frequently sighted at BCER. Of those birds that are frequently sighted, 27 are considered special-status species. See Section 2.8.2, for a description of what are considered special-status species for this report. The 27 species of special-status include brant (*Branta bernicla*), redhead (*Aythya americana*), common loon (*Gavia pacifica*), American white pelican (*Pelevanus erythrorhynchos*), brown pelican (*Pelecanus occidentalis*), least bittern (*Ixobrychus exilis*), white-faced ibis (*Plegadis chihi*), osprey (*Pandion haliaetus*), white-tailed kite (*Elanus leucurus*), Cooper's hawk (*Accipiter cooperii*), peregrine falcon (*Falco peregrinus*), long-billed curlew (*Numenius americanus*), California gull (*Larus californicus*), light-footed Ridgway's rail (*Rallus obsoletus levipes*), black tern (*Chlidonias niger*), elegant tern (*Thalasseus elegans*), black skimmer (*Rynchops niger*), burrowing owl (*Athene cunicularia*), Vaux's swift (*Chaetura vauxi*), olive-sided flycatcher (*Contopus cooperi*), willow flycatcher (*Empidonax traillii*), loggerhead shrike (*Lanius ludovicianus*), coastal California gnatcatcher (*Polioptila californica californica*), Belding's savannah sparrow (*Passerculus sandwichensis beldingii*), California least tern (*Sternula antillarum browni*), song sparrow (*Melospiza lincolnii*), and western snowy plover (*Charadrius nivosus nivosus*). Six of these species are listed, proposed for listing, or candidates for listing under FESA or CESA as threatened or endangered: light-footed Ridgway's rail, willow flycatcher, coastal California gnatcatcher, Belding's savannah sparrow, California least tern, and western snowy plover.

Approximately 112 bird species are infrequently sighted at BCER. Of those birds that are infrequently sighted, 16 are considered special-status species for this report. The 16 species of special-status include fulvous whistling duck (*Dendrocygna bicolor*), harlequin duck (*Histrionicus histrionicus*), Barrow's goldeneye (*Bucephala clangula*), bald eagle (*Haliaeetus leucocephalus*), ferruginous hawk (*Buteo regalis*), prairie falcon (*Falco mexicanus*), mountain plover (*Charadrius montanus*), laughing gull (*Leucophaeus atricilla*), short-eared owl (*Asio flammeus*), black swift (*Cypseloides niger*), vermilion flycatcher (*Pyrocephalus rubinus*), purple martin (*Progne subis*), bank swallow (*Riparia riparia*), summer tanager (*Piranga rubra*), tricolored blackbird (*Agelaius tricolor*), and yellow-headed blackbird (*Xanthocephalus xanthocephalus*). Of the aforementioned 16 special-status species, the tricolored blackbird is listed as threatened under the CESA. The bald eagle was formerly listed on the FESA, but was de-listed in 2007. However, it is still afforded protections from collection and "take" under the Bald and Golden Eagle Protection Act, as amended (16 U.S.C. § 668 et seq.). For complete lists of bird species provide by the CDFW that are frequently and infrequently observed at BCER refer to *Appendix L – Environmental Considerations*.

Fish

The Bolsa Chica wetlands serve as a nursery for many fish and shark species. Approximately 80 species of fish inhabit southern California bays and estuaries. At least 67 species of fish have been observed within the BCER, of which none are considered special-status species as defined in Section 2.8.2 of this report. However, the BCER does provide nesting/spawning habitat for various species including the California Grunion (*Leuresthes tenuis*). For a complete list of fish species that have been documented at the BCER by the CDFW refer to *Appendix L – Environmental Considerations*.

Aquatic Invertebrates

Numerous marine invertebrates inhabit Bolsa Bay and provide a food source for the plethora of avian species that come to the wetlands. Additionally, fish that breed and spawn in the Bolsa Chica wetlands also depend on these organisms as a food source. The CDFW provided a list of native invertebrates that inhabit in the BCER (refer to *Appendix L – Environmental Considerations*. The list includes copepods, amphipods, mussels, clams, horn snails, worms, and crabs. None of the invertebrate species are

considered special-status species as defined in Section 2.8.2 of this report. Non-native species that are found within the ecological reserve include oriental shrimp (*Palaemon macrodactylus*), burrowing Australasian isopod (*Sphaeroma quoyanum*), a bryozoan (*Zoobotryon verticillatum*), chain sea squirt (*Botrylloides* spp.), leathery tunicate (*Styela plicata*), Pacific oyster (*Cassostrea gigas*), ribbed horse mussel (*Geukensia demissa*), Japanese mussel (*Musculista senhousia*), and Mediterranean mussel (*Mytilus galloprovincialis*).

Terrestrial Invertebrates

Terrestrial invertebrates also utilize the BCER as documented by the CDFW (refer to *Appendix L – Environmental Considerations*). The non-native brown widow spider (*Latrodectus geometricus*) has also been documented at the ecological reserve. None of the terrestrial invertebrate species are considered special-status species as defined in Section 2.8.2 of this report.

Reptiles and Amphibians

Reptiles may also often be seen at BCER. Lizards may be seen on the ground or along the wooden fences, basking in the sunlight. Snakes are seen less frequently, but are occasionally spotted from the walking trails. Rattlesnakes (*Crotalus sp.*) are also present at the ecological reserve. One amphibian has been documented at the ecological reserve, the Garden Slender Salamander (*Batrachoseps major*). The CDFW provided a list of common reptiles and amphibian that have been observed at the BCER (refer to *Appendix L – Environmental Considerations*). Three of the species on the list are considered special-status species. See Section 2.8.2 for a description of what are considered special-status species for this report. The three special-status species are the two-striped garter snake (*Thamnophis hammondii*), silvery legless lizard (*Anniella pulchra pulchra*), and green turtle (*Chelonia mydas*). Two of these species are listed, proposed for listing, or candidates for listing under the FESA or CESA as threatened or endangered: California legless lizard and green turtle.

Mammals

Several species of mammals may be seen at BCER. Eleven species of mammals have been observed at the reserve of which one is considered a special-status species. See Section 2.8.2 for a description of what are considered special-status species for this report. Only one mammal is considered a special status specie, the western red bat (*Lasiurus blossevillii*) which is a CDFW species of special concern. A non-native mammal that has been observed at the ecological reserve is the Virginia opossum (*Didelphis virginiana*). Refer to *Appendix L – Environmental Considerations* for a list of mammals found at BCER, as provided by the CDFW.

2.8.2.2 Seal Beach National Wildlife Refuge

The SBNWR was established in 1972 and is administered by the USFWS. The 965 acre refuge is located within the NWSSB in Orange County. The refuge serves as a critical stopover and wintering habitat for thousands of birds that migrate up and down the Pacific Flyway each year. It also serves as an island of habitat in the midst of a dense urban setting for a wide variety of fish, wildlife, and plants. Figure 24 shows the habitat types found within the NWR.

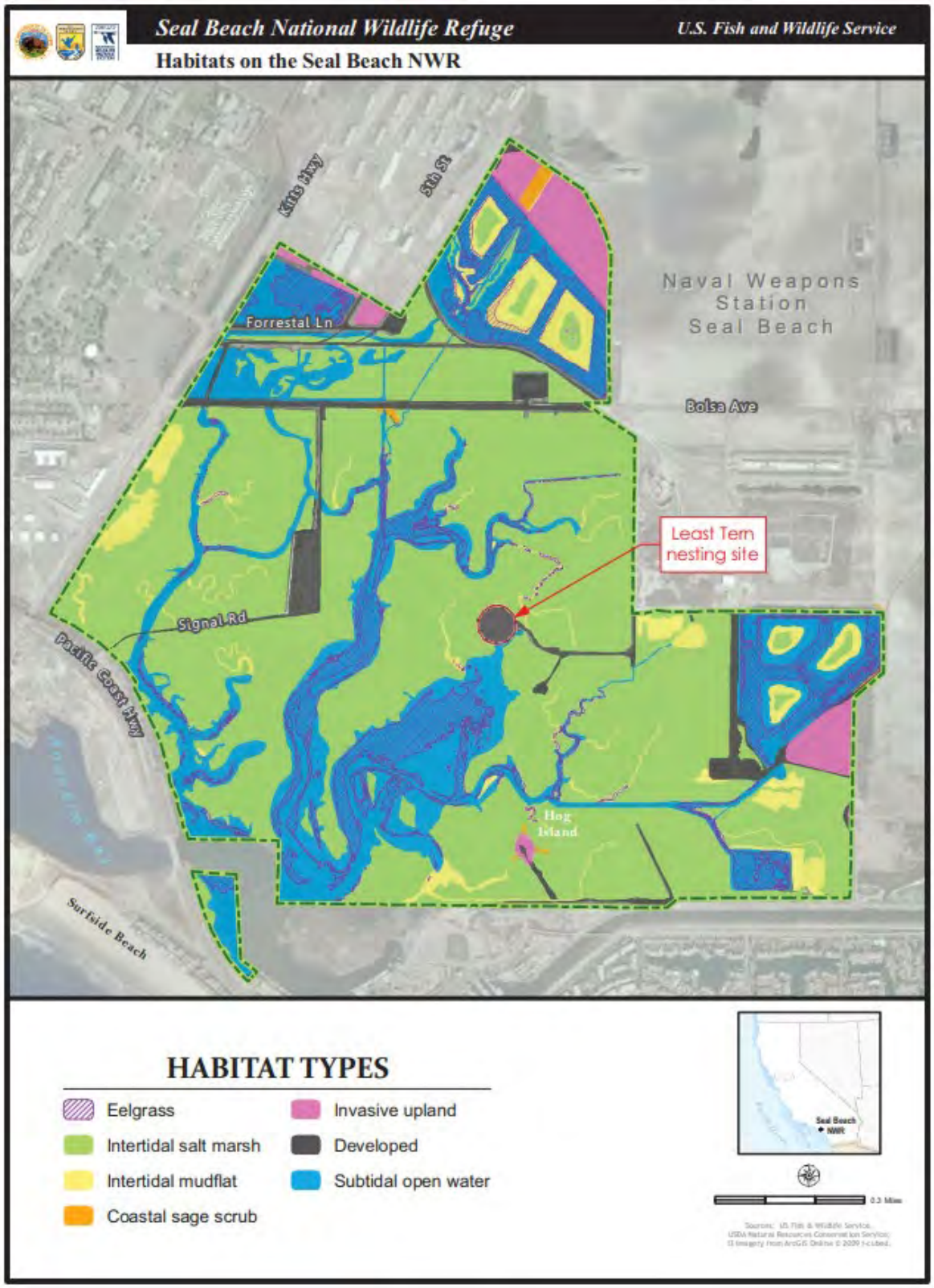


Figure 24: Habitat types in the SBNWR (Map from USFWS 2018)

Birds

The north coast of Orange County supports some of the most important remnant wetlands in southern California. Up until the early 1900s, this area was a vast network of coastal marshes. Today, portions of this coast are included in the Orange Coast Wetlands Important Bird Area (IBA). This IBA protects some of southern California's most extensive wetlands, and is most notable for its number of breeding terns. Huge flocks of migrating shorebirds (15-20,000 in fall, winter and spring, Page and Shuford 2000) and waterfowl, wintering geese, and foraging raptors travel freely up and down the coast here. Included in the IBA is SBNWR.

Two federally endangered bird species are known to breed at SBNWR, the California least tern and the light-footed Ridgway's rail. In regards to the California least tern, between 1986 and 1998 the NWR supported an average of 150 breeding pairs. The light-footed Ridgway's rail in 2017 had 60 breeding pairs at SBNWR, ranking it the third largest subpopulation in 2017 (Zembal et al. 2017). Other bird species that are considered USFWS birds of conservation concern, BLM sensitive species, and/or CDFW fully protected species/watchlist may be observed utilizing the habitat at SBNWR. The extensive grassland and open country habitat types present at SBNWR, along with the other wetlands included in the Orange Coast Wetlands IBA, represent a majority of the raptor habitat along the immediate coast of the Los Angeles Basin, with the hawk and owl community of SBNWR potentially being the largest and most diverse. Ferruginous hawk, prairie falcon, and short-eared owl are scarce, but regular winter residents of SBNWR, and burrowing owl nests in weep holes in the weapons storage units of NWSSB (one of two breeding colonies in coastal southern California). The sparse, flat grassland at SBNWR is one of just four sites in the U.S. that supports wintering Pacific golden-plover, and a handful of mountain plover has recently rediscovered the NWR as a wintering area. Hundreds of geese, representing all four regularly-occurring species, winter at SBNWR, the largest concentration in coastal southern California.

Approximately 222 bird species have been observed at SBNWR. Of those 222 bird species, 29 are considered special-status species for this report. The 29 special-status bird species include brant (*Branta bernicla*), redhead (*Aythya americana*), common loon (*Gavia immer*), American white pelican (*Pelecanus erythrorhynchos*), brown pelican (*Pelecanus occidentalis*), white-faced ibis (*Plegadis chihi*), Osprey (*Pandion haliaetus*), white-tailed kite (*Elanus leucurus*), bald eagle (*Haliaeetus leucocephalu*s), golden eagle (*Aquila chrysaetos*), Cooper's hawk (*Accipiter cooperii*), Ferruginous hawk (*Buteo regalis*), merlin (*Falco columbarius*), prairie falcon (*Falco mexicanus*), peregrine falcon (*Falco peregrinus*), light-footed Ridgways rail (*Rallus longirostris levipes*), mountain plover (*Charadrius montanus*), long-billed curlew (*Numenius americanus*), California gull (*Larus californicus*), California least tern (*Sternula antillarum browni*), black tern (*Chlidonias niger*), elegant tern (*Thalasseus elegans*), black skimmer (*Rynchops niger*), short-eared owl (*Asio flammeus*), burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanius ludovicianus*), Belding's savannah sparrow (*Passerculus sandwichensis beldingii*), song sparrow (*Melospiza melodia*), and yellow-headed blackbird (*Xanthocephalus xanthocephalus*). Three of these species are listed, proposed for listing, or candidates for listing under FESA or CESA as threatened or endangered: light-footed Ridgway's rail, California least tern, and Belding's savannah sparrow. The bald eagle was formerly listed on the FESA, but was de-listed in 2007. However, it is still afforded protections from collection and "take" under the Bald and Golden Eagle Protection Act, as amended (16 U.S.C. § 668 et seq.). For complete lists of bird species observed at SBNWR refer to *Appendix L – Environmental Considerations*.

Aquatic Invertebrates

In 2013, benthic invertebrate surveys were conducted within Anaheim Bay, including portions of SBNWR. During the surveys a total of 56 species were captured, and of these, 20 species were captured

within the vicinity of SBNWR. Abundant species over the length of the surveys included the bubble snail (*Bulla gouldiana*), green shrimp/grass shrimp (*Hippolyte californiensis*), broken back shrimp (*Heptacarpus sp.*), and speckled scallop (*Argopecten ventricosus*). Also observed on the NWR in previous surveys was the California brackish water snail (*Tryonia imitator*), a species identified by the State of California as imperiled. None of the aquatic invertebrate species observed during the 2013 surveys are considered special-status species as defined in Section 2.8.2 of this report. For a complete list of the aquatic invertebrate species observed during the 2013 surveys refer to *Appendix L – Environmental Considerations*.

Fish

In 2013, fish surveys were also conducted within Anaheim Bay, including portions of SBNWR. A total number of 57 fish species were captured during the surveys, with 36 species identified within the vicinity of SBNWR. Abundant species over the length of the surveys included topsmelt (*Atherinop affinis*), northern anchovy (*Engraulis mordax*), and queenfish (*Seriphus politus*). Of the fish species observed, none are considered special-status species as defined in Section 2.8.2 of this report. For a complete list of fish species that were observed during the 2013 surveys within the vicinity of the SBNWR refer to *Appendix L – Environmental Considerations*.

2.8.3 Essential Fish Habitat (EFH)

EFH means those waters and substrate necessary to fish for spawning, breeding, feedings, or growth to maturity. For interpreting the definition of EFH, “waters” includes aquatic areas and their associated physical, chemical, and biological properties used by fish, and may include areas historically used by fish where appropriate. “Substrate” includes sediment, hard bottom, structures underlying the water, and associated biological communities. The term “necessary” means the habitat required to support a sustainable fishery and a healthy ecosystem. The term “spawning, breeding, feeding, or growth to maturity” covers a species full life cycle.

EFH potentially present within the project area was queried using GIS data made available by the National Oceanic and Atmospheric Administration’s (NOAA) NMFS. It was found that EFH for groundfish, coastal pelagic species, finfish, and market squid is present within Anaheim Bay, Huntington Harbour, and Outer and Inner Bolsa Bay. EFH for these species also extends upstream into reaches of channels C02 and C05 (Table 13). Outside of the project area, but within Anaheim Bay and along the coastline, EFH also exists for krill (i.e., *Euphausia pacifica*, *Thysanoessa spinifera*, and other krill species) as well as for the aforementioned species.

Coastal pelagic species that may be found in the area include Pacific sardine (*Sardinops sagex*), Pacific (chub) mackerel (*Scomber japonicus*), northern anchovy (*Engraulis mordax*), and jacksmelt (*Atherinopsis californiensis*). Coastal pelagic species tend to be most common in the upper mixed layer of the ocean (above the thermocline) in a broad band (up to hundreds of miles wide) along the coast. Coastal pelagic species may occur in shallow embayments and brackish water, but do not depend on these habitats to any significant degree.

No Pacific Salmon EFH, HAPC, or EFH Areas Protected from Fishing (EFHA) were identified within the vicinity of the project. Additionally, EFH for Pacific Highly Migratory Species (PHMS) — thresher shark, bluefin tuna, dolphinfish (*Coryphaena hippurus)*, and swordfish (*Xiphias gladius*) — is located approximately 1 mile off the coast; therefore, these species are not anticipated to be within the vicinity of the project area.

Table 13: Channel reaches with potential Essential Fish Habitat.

Channel	Species	Reach with EFH
C02	Groundfish	Reach 23
	Coastal Pelagic Species	
	Finfish and Market Squid	
C05	Groundfish	Reach 1
		Reach 2
	Coastal Pelagic Species	Reach 1
	Finfish and Market Squid	Reach 1

2.8.4 Federal Listed Species and Species of Special Concern

A query of the USFWS's Environmental Conservation Online System Information for Planning and Consultation (ECOS-IPaC) on November 2, 2017 resulted in a list of federally-listed species that may be present within the study area. A species list from the Service was obtained November 2, 2017 (Consultation Code 08ECAR00-2018-SLI-0137). Thirteen federally-listed threatened, endangered, or candidate species are identified as potentially occurring within the study area (Table 14). Critical habitat for the western snowy plover also exists within the study area. Four hundred seventy-five acres within the BCER have been designated as critical habitat for this species (77 FR 36727).The California Natural Diversity Database (CNDDB) was also queried for federally-listed species, in addition to state listed species which are discussed in Section 2.8.5.

A comprehensive biological survey has not been conducted for a majority of the project area. In 2014, a nesting bird survey was conducted by LSA Associates for OCPW along C05 Reach 1. The survey area extended from the tide gates on C05 upstream to the Graham Street Bridge. During the survey, 15 bird species were confirmed as nesting within 500 feet of the channel. Nesting special status species included Belding's savannah sparrow and Cooper's hawk (CDFW watch list). A burrowing owl (CDFW species of special concern) was also observed roosting within approximately 1,300 feet upstream of the C05 tide gates. In 2019, a reconnaissance level biological survey was conducted in the downstream reaches of C02/C04 and C05 where it is likely that sensitive species may be present. The surveys were conducted on July 6-7, 2019 at which time no sensitive species were observed. Refer to *Appendix L – Environmental Considerations* for the complete Reconnaissance Level Biological Survey Report.

Table 14: Federal listed species potentially within the project area.

Common Name	Scientific Name	Federal Status	Potential to Occur
Salt Marsh Bird's-beak	*Cordylanthus maritimus* sp. *maritimus*	Endangered	**Not expected to occur**; lack of suitable habitat
San Diego Button-celery	*Eryngium aristulatum var. parishii*	Endangered	**Not expected to occur**; lack of suitable habitat.
Ventura Marsh Milk-vetch	*Astragalus pycnostachyus var. lanosissimus*	Endangered	**Not expected to occur**; lack of suitable habitat.
California seablite	*Suaeda californica*	Endangered	**Not expected to occur**; lack of suitable habitat. Does occur adjacent to the study area in BCER.

Common Name	Scientific Name	Federal Status	Potential to Occur
California Least Tern	*Sterna antillarum browni*	Endangered	**Known to occur**; forages within the downstream reach of C05. Nests adjacent to the study area in BCER.
Coastal California Gnatcatcher	*Polioptila californica*	Threatened	**Known to occur**; sspecies forages adjacent to the study area in BCER.
Least Bell's Vireo	*Vireo bellii pusillus*	Endangered	**Not expected to occur**; lack of suitable habitat.
Light-footed Ridgway's Rail	*Rallus obsoletus levipes*	Endangered	**Known to occur**; forages and nests adjacent to the study are in BCER.
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	Endangered	**Not expected to occur**; lack of suitable habitat.
Western Snowy Plover	*Charadrius alexandrinus nivosus*	Threatened	**Known to occur**; nests and forages adjacent to the study area in BCER. In addition, 475 acres within the BCER have been designated as critical habitat for the species (77 FR 36727).
San Diego Fairy Shrimp	*Branchinecta sandiegonensis*	Endangered	**Not expected to occur**; lack of suitable habitat.
Green Turtle	*Chelonia mydas*	Endangered	**Known to occur**; forages adjacent to the study area in BCER and Huntington Harbour.
Pacific Pocket Mouse	*Perognathus longimembris pacificus*	Endangered	**Not expected to occur**; lack of suitable habitat.

Plants

Salt Marsh Bird's-beak

Status. The salt marsh bird's-beak (*Cordylanthus maritimus sp. maritimus*) is federally listed as endangered. The species is also listed as endangered by the State of California.

Distribution and Habitat. Salt marsh bird's-beak is found in the coastal marshes of northern Baja California and southern California from San Diego to Santa Barbara Counties (USFWS 1984). The species is a branched annual with leaves that are typically purple in color. Each plant bears terminal indeterminate inflorescences and appears to continue to flower as long as conditions are appropriate. Flower color can vary depending on location. Plants located in the north tend to have flowers with conspicuous purple tri-lobed floral bracts while plants located south tend to have bare pale cream flowers with faint purple lines (USFWS 1984).

Salt marsh bird's-beak occurs in variable habitats throughout its range (USFWS 1984). The major marshes of southern California typically harbor the species in low lying areas. Colonies infrequently grow behind barrier dunes, and on dunes, mounds, and old oyster shell dredge spoils. Most areas, however, harbor well-drained and well-aerated soils that dry during the summer. The extremely restricted amount of available and suitable marshland limits the distribution of the salt marsh bird's-beak (USFWS 1984).

Potential for Occurrence in Project Area. The closest population of salt marsh bird's-beak is located at the Huntington Beach Wetlands Conservancy's Magnolia Marsh (HBWC 2019). In their Draft

Coordination Act Report (CAR) (2019) the USFWS stated the following: "No sensitive or listed plant species are expected to occur within the likely Project footprint, due to a lack of suitable habitats, owing to substantial past and ongoing disturbance, periodic vegetation maintenance within the channels, and existing structures." In addition, the CDFW did not mention salt marsh bird's-beak as occurring within the BCER in their letter dated January 12, 2018 (Sevrens 2018). The BCER and SBNWR, which are adjacent to the project action area, are the only two locations that have coastal marshes that would support this species; therefore, it is unlikely the species occurs within the project action area.

San Diego Button-celery

Status. The San Diego button-celery (*Eryngium aristulatum var. parishii*) is federally listed as endangered. The species is also listed as endangered by the State of California.

Distribution and Habitat. Historical distribution of San Diego button-celery included a coastal swath from Mesa de Colonet and San Quintin in Baja California, Mexico, north to Los Angeles County, California in the United States (USFWS 2010a). San Diego button-celery is a biennial or longer lived perennial gray-green herb. It has a spreading shape and reaches a height of approximately 16 inches. The stems and leaves give the plant a prickly appearance. It is a clay soil, surface and non-surface hard pan, vernal pool obligate and relies on ephemerally wet conditions to reproduce; blooming from April to June. This species reproduces exclusively by seeds (USFWS 2010a).

Potential for Occurrence in Project Area. In 2010, San Diego button-celery was known to occur in 14 geographic areas in Riverside and San Diego Counties (USFWS 2010a). Collection records documented occurrences at four sites on the Santa Rosa Plateau in Riverside County. The majority of the occupied range of the species in the United States occurs in ten regional locations in San Diego County, including MCB Camp Pendleton, Carlsbad, San Marcos, Ramona, Del Mar Mesa, Carmel Mountain, Mira Mesa, MCAS Miramar, Otay Lakes, and Otay Mesa (USFWS 2010a). No occurrences of the species were documented for Orange County in 2010. The closest population is located south of the project action area near Costa Mesa and Newport Beach (USFWS 2019b). The Final CAR (USFWS 2020) states: "No sensitive or listed plant species are expected to occur within the likely project footprint, due to a lack of suitable habitats owing to substantial past and ongoing disturbance, periodic vegetation maintenance within the channels, and existing structures." In addition, the CDFW did not mention San Diego button-celery as occurring within the BCER in their letter dates January 12, 2018 (Sevrens 2018). Since there is no documentation of the species occurring within Orange County recently, and no vernal pool habitat present within the project action area, it is unlikely the species occurs within the project action area.

Ventura Marsh Milk-vetch

Status. The Ventura marsh milk-vetch (*Astragalus pycnostachyus var. lanosissimus*) is federally listed as endangered. The species is also listed as endangered by the State of California.

Distribution and Habitat. The Ventura marsh milk-vetch was first collected in 1882 at "La Bolsa" (USFWS 2010b). It has been suggested that "La Bolsa" either referred to the Ballona marshes in Los Angeles County of Bolsa Chica in Orange County. In the five decades following its discovery, the species was collected only a few times, always from locations in coastal Los Angeles and Ventura counties. Floristic surveys and focused searches conducted in the 1970s and 1980s at historical locations did not locate any populations of Ventura marsh milk-vetch and the plant was presumed extinct. In 1997, the species was rediscovered in a degraded coastal dune system near Oxnard, California. Since its rediscovery, plants have been introduced in three locations in Ventura County and two locations in Santa Barbara County (USFWS 2010b).

Ventura marsh milk-vetch is a short-lived herbaceous perennial, believed to have a 3 to 4-year life span (USFWS 2010b). The species occurs in low-elevation coastal dune-swale areas where freshwater levels (in the form of saturated soils or groundwater) are high enough to reach the roots of the plants. Soils associated with the species are well-drained, yet contain a mix of sand and clay (USFWS 2010b).

Potential for Occurrence in Project Area. The species is presumed extirpated from the vicinity since it has not been collected since 1882 (USFWS 2010b) within the BCER. The Final CAR (USFWS 2020) states: "No sensitive or listed plant species are expected to occur within the likely project action area, due to a lack of suitable habitats owing to substantial past and ongoing disturbance, periodic vegetation maintenance within the channels and existing structures." In addition, the CDFW did not mention Ventura marsh milk-vetch as occurring within the BCER in their letter dated January 12, 2018 (Sevrens 2018). Due to the species being believed extirpated from the area, it is unlikely the species occurs within the project action area.

California Seablite

Status. The California seablite (Suaeda californica) is federally listed as endangered. The species has no State status.

Distribution and Habitat. Historically, the California seablite was known only from the San Francisco Bay area and Morro Bay/Cayucos along the central coast of California (2010c). In 2010, there were at least eight recorded occurrences of California seablite ranging from Morro Bay north to Cayucos. Also in 2010, there were no known new occurrences of the species outside of its historic distribution. There have been attempts to re-establish the species at a number of sites in the San Francisco Bay area, as well as augment populations occurring along the central coast of California (USFWS 2010c).

California seablite is a succulent-leaved perennial plant of the goosefoot family (*Cheopodiaceae*) endemic to the coastal zone of California (USFWS 2010c). Although described as a salt marsh species, California seablite is most commonly found in the narrow ecotone between salt marsh and stable dune scrub communities occurring at the edge of the salt marsh (USFWS 2010c).

Potential for Occurrence in Project Area. The Final CAR (USFWS 2020) states: "No sensitive or listed plant species are expected to occur within the likely Project footprint, due to a lack of suitable habitats, owing to substantial past and ongoing disturbance, periodic vegetation maintenance within the channels and existing structures. However, the CDFW noted in a letter dated January 12, 2018, that California seablite does occur within the BCER (Sevrens 2018), which is adjacent to the project action area. The species has been noted as being present within SBNWR. A study of light-footed Ridgway's rail nesting habitat in southern California noted that saltmarsh within SBNWR included California seablite (Massey et al. 1983). Therefore, California seablite is found adjacent to the project action area, but suitable habitat does not likely exist within the action area to support this species.

Birds

California Least Tern (*Sterna antillarum browni*)

Status. The California least tern (Sterna antillarum browni) is federally listed as endangered. The species is also listed as endangered by the State of California.

Distribution and Habitat. The historical breeding range of the California least tern extended along the Pacific Coast from Moss Landing, Monterey County, California, to San José del Cabo in Baja California

Sur, Mexico (USFWS 2006a). Since 1970, nesting sites have been document in California from San Francisco Bay area to the Tijuana River at the Mexican Border and in Mexico within the Gulf of California and on the western coast of Baja California from Ensenada to San José del Cabo at the tip of the peninsula (USFWS 2006a).

The California least tern is the smallest of the North American terns (USFWS 2006a). The species nests in colonies on relatively open beaches kept free of vegetation by natural scouring from tidal action. The majority of nesting sites for the species have been concentrated in southern California. Nests of the California least tern can be a simple scrape in the sand or shell fragments. It is possible for the species to re-nest up to two times if eggs or chicks are lost early in the breeding season. Fall migration for the California least tern typically commences the last week of July and the first week of August (USFWS 2006a).

Potential for Occurrence in Project Area. The California least tern is known to nest within the BCER (Sevrens 2018), which is adjacent to the project action area. Nesting islands (i.e., north and south tern island) were created in 1978 within the BCER prompting the California least tern to begin nesting on north tern island. In 2015, the CDFW noted that 204 nests were initiated at the BCER; however, only two of the five nesting colonies were successful. Based on field surveys it was estimated that the number of fledglings at BCER in 2015 was between 55 and 65 (Bolsa Chica Land Trust 2015). Nesting and fledgling numbers were lower in 2015 than they were in 2014 when there were 301 nests and an estimated 80 fledglings (Bolsa Chica Land Trust 2015). Also in 2015, the Sea and Sage Audubon Society estimated the number of breeding pairs (i.e., minimum and maximum), nests and number of fledglings (i.e., minimum and maximum) for California least tern at SBNWR/Anaheim Bay. It was estimated that there were between 50-94.5 breeding pairs, 106 nests, and 51-53 fledglings (Sea and Sage Audubon 2016).

Coastal California Gnatcatcher

Status. The coastal California gnatcatcher (Polioptila californica californica) is federally listed as threatened. The species is also listed as a species of special concern by the State of California.

Distribution and Habitat. The distribution of the coastal California gnatcatcher is coastal southern California and northwestern Baja California, Mexico, from southern Ventura and San Bernardino Counties, California, south to approximately El Rosario, Mexico, at about 30 degrees north latitude (USFWS 2010d). The coastal California gnatcatcher is a small, long-tailed member of the thrush family *Muscicapidae*. The distribution of the species is closely aligned with coastal scrub vegetation (USFWS 2010d).

The breeding season of the coastal California gnatcatcher extends from late February through July with the peak of nest initiations occurring from mid-March through mid-May (USFWS 2010d). Nests are composed of grasses, bark strips, small leaves, spider webs, down, and other materials, and are often placed in coastal sagebrush about three feet above the ground (USFWS 2010d).

Potential for Occurrence in Project Area. There is marginally suitable habitat present along portions of the Bolsa Chica Mesa which is adjacent to C05 Reach 1. The species has been sighted at BCER as recently as 2019 (eBird 2019) and according to the Bolsa Chica Conservancy website has nested at the BCER although the occurrence of the species is listed as rare for all seasons (Bolsa Chica Conservancy 2019). The CDFW noted that the coastal California gnatcatcher does occur within the BCER (Sevrens 2018); however, the Draft CAR did not mention this species as a concern for impacts due to the proposed project.

Least Bell's Vireo

Status. The least Bell's vireo (*Vireo bellii pusillus*) is federally listed as endangered. The species is also listed as endangered by the State of California.

Distribution and Habitat. Historically, the least Bell's vireo ranged from interior northern California near Red Bluff (Tehama County), south through the Sacramento-San Joaquin Valleys and Sierra Nevada foothills, and in the Coast Ranges from Santa Clara County south to approximately San Fernando, Baja California, Mexico (USFWS 1998a). Populations were also found in the Owens Valley, Death Valley, and at scattered oases and canyons throughout the Mojave Desert (USFWS 1998a). As of 2010, greater than 99 percent of the population occurred within southern California. Of the population within southern California, 54 percent of the population occurred in San Diego County and 30 percent of the population occurred in Riverside County (USFWS 2006b).

Least Bell's vireos are obligate riparian breeders, typically inhabiting structurally diverse woodlands along watercourses (USFWS 1998a). They occur in a number of riparian habitat types, including cottonwood-willow woodlands/forests, oak woodlands, and mule fat scrub. Although least Bell's vireos are tied to riparian habitat for nesting, they have been observed extending their activities into adjacent upland habitats. In regards to breeding, least Bell's vireos arrive at southern California breeding grounds typically in mid-March to early April and are generally present on the breeding grounds until late September (USFWS 1998a).

Potential for Occurrence in Project Area. Riparian habitat within the project action area is absent due to loss of the floodplain, channelization, and presence of urban dwellings. The closest river system where least Bell's vireo persists is the SAR (USFWS 1998a), which the Westminster watershed has been hydrologically separated from since the mid-20th century when channelization occurred. In addition, neither the USFWS (USFWS 2019a) nor the CDFW (Sevrens 2018) mentioned the southwestern willow flycatcher as a species potentially occurring within the project action area. Due to a lack of suitable habitat owing to substantial past and ongoing disturbance, it is unlikely that least Bell's vireo occurs within the project action area.

Light-footed Ridgway's Rail

Status. The light-footed Ridgway's rail (*Rallus obsoletus levipes*) is federally listed as endangered. The species is also listed as endangered by the State of California.

Distribution and Habitat. The historical range of the light-footed Ridgway's rail extended from Santa Barbara County, California to San Quintin Bay, Baja California, Mexico (USFWS 2009). As of 2009, the distribution of the species within California extended from Ventura County in the north to the Mexican border in the south. The species had not been detected in Santa Barbara County since 2004 or in Los Angeles County since 1983 according to the USFWS light-footed Ridgway's rail 5-Year Review (USFWS 2009).

The light-footed Ridgway's rail uses coastal salt marshes, lagoons, and their maritime environs (USFWS 2009). Nesting habitat includes tall, dense cordgrass (*Spartina foliosa*) and occasionally in pickleweed (*Salicornia virginica*) in the low littoral zone, wrack deposits in the low marsh zone, and hummocks of high marsh within the low marsh zone. In regards to breeding, nesting by the light-footed Ridgway's rail usually begins in March with late nests hatching by August (USFWS 2009).

Potential for Occurrence in Project Area. The light-footed Ridgway's rail does occur within the SBNWR and the BCER (USFWS 2013), which are adjacent to the project action area. In addition, it was noted by the CDFW in their letter dated January 12, 2018 that light-footed Ridgway's rail nests within the BCER (Sevrens 2018).

Southwestern Willow Flycatcher

Status. The southwestern willow flycatcher (*Empidonax trailii extimus*) is federally listed as endangered. The species is also listed as endangered by the State of California.

Distribution and Habitat. The historical breeding range of the southwestern willow flycatcher included southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, southwestern Colorado, and extreme northwestern Mexico (USFWS 2002). The current range of the species is similar to the historical range, except the quantity of suitable habitat within that range is reduced from historical levels. Within California, the southwestern willow flycatcher persists along the Colorado, Owens, Kern, Mojave, Santa Ana, Pilgrim Creek, Santa Margarita, San Luis Rey, San Diego, San Mateo Creek, San Timoteo Creek, Santa Clara, Santa Ynez, Sweetwater, San Dieguito, and Temecula Creek river systems (USFWS 2002).

The southwestern willow flycatcher is a small Neotropical migratory bird, whose nesting habitat is restricted to relatively dense growths of trees and shrubs in riparian ecosystems of the arid southwestern United States (USFWS 2002). These riparian habitats are associated with rivers, swamps, and other wetlands, including lakes and reservoirs. Flycatchers generally are not found nesting in confined floodplains where only a single narrow strip of riparian vegetation (less than 33 feet) exists (USFWS 2002).

Potential for Occurrence in Project Area. Riparian habitat within the project action area is absent due to loss of the floodplain, channelization, and presence of urban dwellings. The closest river system where the flycatchers persists is the SAR (USFWS 2002), which the Westminster watershed has been hydrologically separated from since the mid-20th century when channelization occurred. In addition, neither the USFWS (USFWS 2019a) nor the CDFW (Sevrens 2018) mentioned the southwestern willow flycatcher as a species potentially occurring within the project action area. Due to a lack of suitable habitat owing to substantial past and ongoing disturbance, it is unlikely that the southwestern willow flycatcher occurs within the project action area.

Western Snowy Plover

Status. The western snowy plover (*Charadrius nivosus nivosus*) is federally listed as threatened. The species is also listed as a species of special concern for the State of California.

Distribution and Habitat. The Pacific coast population of the western snowy plover breeds primarily on coastal beaches from southern Washington to southern Baja California, Mexico (USFWS 2007). As of 2002 within California, there were eight geographic areas that supported over three-quarters of the California coastal breeding population: San Francisco Bay, Monterey Bay, Morro Bay, the Callendar-Mussel Rock Dunes area, the Point Sal to Point Conception area, the Oxnard lowland, Santa Rosa Island, and San Nicolas Island. Main coastal habitat for nesting include sand spits, dune-backed beaches, beaches at creek and river mouths, and salt pans at lagoons and estuaries. The breeding season for the western snowy plover extends from approximately March 15 through September 15 (USFWS 2007).

Potential for Occurring in Project Area. The western snowy plover does nest within the BCER which is adjacent to portions of the project action area. In addition, 475 acres within the BCER were also designated as critical habitat for the species (77 FR 36727).

Invertebrates

San Diego Fairy Shrimp

Status. The San Diego fairy shrimp (*Branchinecta sandiegonensis*) is federally listed as endangered. The species has no state status.

Distribution and Habitat. San Diego fairy shrimp were known to historically inhabit a minimum of 25 vernal pool complexes in coastal areas of San Diego, Orange, and Santa Barbara counties in California, and northwestern Baja California, Mexico (USFWS 2008). As of 2008, there were approximately five complexes harboring San Diego fairy shrimp in Orange County, approximately 132 complexes harboring the species in San Diego County, and approximately one complex harboring the species in Baja California (Mexico) (USFWS 2008).

San Diego fairy shrimp occur in groups of vernal pools referred to as vernal pool complexes (USFWS 2008). Vernal pool complexes tend to average between 5 and 50 vernal pools, although some contain as few as two vernal pools and others contain several hundred vernal pools. Vernal pools within a complex are generally hydrologically connected, such that water flows over the surface from one vernal pool to another and/or water flows and collets below ground such that the soil becomes saturated with water, thus filling the vernal pool with water (USFWS 2008).

Potential for Occurring in Project Area. The CDFW did not mention the San Diego fairy shrimp as inhabiting the BCER in their letter dated January 12, 2018 (Sevrens 2018). The USFWS noted in their PAL that the San Diego fairy shrimp has a substantial potential to occur within the project study area based on a preliminary search of the project area (Avery 2018). Based on the location of the five complexes that harbored San Diego fairy shrimp in Orange County in 2008, it is unlikely that the San Diego fairy shrimp occurs within the project area.

Reptiles

Green Turtle

Status. The green turtle (*Chelonia mydas*) is federally listed as threatened. The species has no State status.

Distribution and Habitat. The green turtle has a circumglobal distribution, occurring throughout tropical, subtropical waters, and, to a lesser extent, temperate waters (NMFS and USFWS 2007). It is believed that green turtles inhabit coastal waters of over 140 countries. Green turtles spend the majority of their lives in coastal foraging grounds, which include both open coastline and protected bays and lagoons. These marine habitats are often highly dynamic and in areas with annual fluctuation in seawater and air temperatures (NMFS and USFWS 2007).

Potential for Occurring in Project Area. The green turtle is known to forage within the BCER and SBNWR, both of which are adjacent to the project action area.

Mammals

Pacific Pocket Mouse

Status. The Pacific pocket mouse (*Perognathus longimembris pacificus*) is federally listed as endangered. The species has no State status.

Distribution and Habitat. The Pacific pocket mouse is endemic to the immediate coast of southern California from Marina del Rey and El Segundo in Los Angeles County, south to the vicinity of the Mexican border in San Diego County (USFWS 2010e). Range-wide surveys and all other relevant information indicate that the Pacific pocket mouse remains a patchily-distributed species that was never more than locally common. Historically, the species was known from two locales in Orange County California — Newport Beach ("Spyglass Hill") and Dana Point. The Newport Beach location ("Spyglass Hill") was developed in 1972 and likely no longer supports the species. The Dana Point location in Orange County still supports the species (USFWS 2010e). The Pacific pocket mouse has occurred on fine-grain, sandy substrates in open coastal sage scrub, coastal strand, coastal dune, and river alluvium habitats (USFWS 1998b).

Potential for Occurring in Project Area. Both the USFWS (USFWS 2019a) and CDFW (Sevrens 2018) did not mention the Pacific pocket mouse as inhabiting the BCER or being present within the project action area. Based on the Dana Point location appearing to be the only known area within Orange County where Pacific pocket mouse is found, it is unlikely that the Pacific pocket mouse occurs within the project action area. Dana Point is located approximately 26 miles south of the BCER.

2.8.5 State Listed Species and Species of Special Concern

The study area falls within the Seal Beach, Newport Beach, and Anaheim U.S. Geological Survey 1:24,000-scale, 7.5-minute by 7.5-minute quadrangle maps. These three quadrangles were queried on the CDFW's California Natural Diversity Database (CNDDB) for the presence of species listed as state threatened, endangered, candidate, special concern, fully protected, watch list, and rare plant. Approximately 42 state special status species were identified that could potentially occur within the study area. For a complete list of the species, please refer to *Appendix L – Environmental Considerations*.

The CDFW, in a letter dated January 12, 2018, listed the following state special status species and habitats as occurring within the BCER, which is adjacent to the study area: western snowy plover (*Charadrius nivosus nivosus*), light-footed Ridgway's rail (*Rallus obsoletus levipes*), California least tern (*Sternula antillarum browni*), Belding's savannah sparrow (*Passerculus sandwichensis beldingii*), peregrine falcon (*Falco peregrinus*), burrowing owl (*Athene cunicularia*), coastal California gnatcatcher (*Polioptila californica californica*), Cooper's hawk (*Accipiter cooperii*), osprey (*Pandion haliaetus*), black skimmer (*Rynchops niger*), white-faced ibis (*Plegadis chihi*), California seablite (*Suaeda californica*), estuary seablite (*Suaeda esteroa*), coast woolly-heads (*Nemacaulis denudata var. denudata*), southern tarplant (*Centromadia parryi ssp. australis*), and green turtle (*Chelonia mydas*). Per the letter, sensitive marine resources include eelgrass (*Zostera marina*) beds, beach habitat, intertidal and subtidal habitat, nesting/spawning habitat (including grunion, *Leuresthes tenuis*, habitat), mud flats, sand flats, dunes, coastal strand, and salt marsh.

Sensitive vegetation communities present within the most current reports of the CNDDB for the Seal Beach, Newport Beach, and Anaheim U.S. Geological Survey 1:24,000-scale, 7.5-minute by 7.5-minute quadrangle maps were also queried. No sensitive vegetation communities were found within the Anaheim quadrangle. The Seal Beach quadrangle contained southern coastal marsh, southern dune scrub, and

southern foredunes. The Newport Beach quadrangle included the same sensitive vegetation communities as Seal Beach with the addition of one community — southern cottonwood willow riparian forest.

2.8.6 Wildlife Corridors

Situated within the coastal lowland valley, the project sites are located within a highly urbanized area of Orange County. Although CDFW BCER presents a vast open space in a coastal landscape urban environment, the most significant natural wildlife corridor is C02 and the adjacent Alamitos Bay, NWSSB and the SBNWR co-located at the NWSSB.

The project area is surrounded in all other directions by urban development. However, the various flood damage reduction channels may perform as wildlife corridors (e.g., C02, C04) for some wildlife taxa, principally birds. C02 is an earthen channel bottom, with various earthen and rip rap trapezoid sides, tidal inundation occurs for nearly its entire length. Similarly, C04 has an earthen channel bottom, various rip rap trapezoid sand concrete rectangular sides, conveys tidal inundation for several miles with open water ponds as well as large stands of fresh water marsh growth providing habitat for a variety of birds.

Medium size megafauna, such as coyotes, non-native red fox (*Vulpes vulpes*) have been observed and recorded for the NWSSB, USFWS SBNWR, and the BCER. C02 is immediately adjacent to the NWSSB/SBNWR in which red fox still inhabit, but in small populations and abundance (Richard Zembal, Director of Natural Resources, OCWD, personal communication, 19 March 2007). Coyotes are still found inhabiting the NWSSB/SBNWR as well as the BCER also, but in relatively larger numbers as they are able to move freely from BCER to the SAR corridor. Haster Basin is at the upstream portion of C05. Haster Basin is only 1.3 miles from the SAR corridor and coastally, BCER is approximately five miles from the mouth of the SAR corridor, which is considered relatively easy movement for coyotes.

Most secretive megafauna taxa such as mountain lion (*Puma concolor*) and bobcat (*Lynx rufus*) have been stopped from their movement through various wildlife corridors due to the project location in a highly urbanized area. Although it is not expected that many species will utilize the project site as a corridor, a few ubiquitous species such as raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), and striped skunk (*Mephitis mephitis*) may move through the properties on a local basis utilizing the resources found in urban areas. The project site provides limited native riparian vegetation type and more profound assemblage of brackish and freshwater marsh through the various flood damage reduction channels. Finally, several features recognized as facilitating movement of wildlife, including a portion of the floodplain, concrete-lined channels, a brackish and freshwater marsh corridor, and many concrete rectangular culverts are found within the Proposed Project area.

The most significant natural feature potentially facilitating wildlife movements within the Proposed Project area are the confluences of C02 and C04, which are hydrologically connected to Anaheim Bay. Comparatively, C05 and C06 are hydrologically connected to BCER. Observations of wildlife or wildlife signs (e.g., scat, tracks, scratching) during general surveys were limited. Still, the presence of many common species such as coyote, raccoon, striped skunk, Virginia opossum, and a myriad of bird species are likely due to the presence of associated open space upstream of the Proposed Project area. The presence of these species in the Proposed Project area would indicate that local wildlife movement is occurring. Local wildlife movement includes movement of individual animals that are resident on or adjacent to the Proposed Project area. This type of movement consists of traveling to and from foraging and resting areas usually along a consistent route. Movement of this type is common wherever open space is sufficient enough to support wildlife. For medium and large mammal species, the likely travel routes on-site are limited to drainage features and dirt roads. Birds are less restricted but more frequently move through contiguous habitat connections.

In conclusion, at the regional level, wildlife movement in the project site area is minimal. This type of movement would be indicated by animals moving through the area in an effort to reach resources upstream in other parts of the watershed. Although the SAR exists off-site to the east, and the San Gabriel River is to the west of the Proposed Project area, past channelization continues through a highly developed urbanized environment creating an impediment.

2.8.7 Conservation Plans

Habitat conservation plans (HCPs) are designed to conserve and protect federally listed and unlisted species while allowing for changes or alterations to wildlife habitats. They are developed by any non-federal landowner in cooperation with the USFWS when certain project activities may result in the take of a listed species.

The project study area falls within the Orange County Transportation Authority (OCTA) Natural Communities Conservation Plan (NCCP)/HCP (Figure 25). The purpose of the OCTA NCCP/HCP is to provide an effective framework to protect native biological diversity, habitat for native species, natural communities, and local ecosystems throughout Orange County, while improving and streamlining the environmental permitting process for impacts of covered activities on sensitive, threatened, and endangered species and their habitats. The OCTA NCCP/HCP is also intended to complement existing conservation planning efforts of the Orange County Central-Coastal NCCP/HCP (Figure 26) and the Orange County Southern subregion HCP. A planning agreement was originally completed in 2009, but amended in December 2016. The implementing agreement was signed in 2017 by the following agencies: CDFW, USFWS, OCTA, and California Department of Transportation. Table 15 lists the natural communities and land cover types present and Table 16 lists the species that are covered under the NCCP/HCP.

Figure 25: Boundary of the Orange County Transportation Authority NCCP/HCP (map from CDFW)

Figure 26: Boundary of the Orange County Central-Coastal NCCP/HCP (map from CDFW)

Table 15: Natural communities and land cover types found within the Orange County Transportation Authority NCCP/HCP.

Natural Communities and Land Cover Types			
California Walnut Woodland	Canyon Live Oak Ravine Forest	Riversidean Alluvial	Southern Coast Live Oak Riparian Forest
Southern Cottonwood Willow Riparian Forest	Southern Mixed Riparian Forest	Southern Willow Scrub	Valley Needlegrass Grassland

Source: CDFW 2016/2017

Table 16: Species covered under the Orange County Transportation Authority NCCP/HCP.

Common Name	Scientific Name		Common Name	Scientific Name
Plants				
Intermediate Mariposa Lily	*Calochortus weedii var. intermedius*		Southern Tarplant	*Centromadia parryi* sp. *australis*
Many-stemmed Dudleya	*Dudleya multicaulis*			
Animals				
Arroyo Chub	*Gila orcuttii*		Least Bell's Vireo	*Vireo bellii pusillus*
Bobcat	*Lynx rufus*		San Diego Coast Horned Lizard[a,b]	*Phrynosoma blainvillii*
Coastal Cactus Wren	*Campylorhynchus brunneicapillus cousei*		Southwestern Willow Flycatcher[c,d]	*Empidonax traillii extimus*
Coastal California Gnatcatcher[a]	*Polioptila californica*		Western Pond Turtle[a,b,e]	*Emys marmorata*

Source: CDFW 2016/2017
[a] CDFW species of special concern
[b] BLM sensitive species
[c] federal listed species - endangered
[d] state listed species - endangered
[e] USFS sensitive species

To the southeast and east of the project study area are the boundaries for the Orange County Central-Coastal NCCP/HCP. This subregional NCCP, approved in July 1996, establishes a 37,380 acre reserve system in a 208,000 acre planning area. The plan protects significant areas of 12 major habitat types and covers 39 sensitive plant and animal species. Reserve lands are managed and monitored by The Nature Reserve of Orange County. Table 17 lists the natural communities and land cover types present and

Table 18 lists the species that are covered under the NCCP.

Table 17: Natural communities and land cover types found within the Orange County Central-Coastal Natural Communities Conservation Plan/Habitat Conservation Plan.

Natural Communities and Land Cover Types			
Agriculture	Chaparral	Cliff and Rock	Developed
Disturbed	Dunes	Forest (incl. Tecate Cypress Forest)	Grassland
Lakes and Reservoirs	Marine and Coastal	Marsh	Riparian

Natural Communities and Land Cover Types			
Scrub (incl. Coastal Sage Scrub)	Vernal Pools	Watercourses	Woodland (incl. Oak Woodland)

Source: CDFW 2016/2017

Table 18: Species covered under the Orange County Central-Coastal Natural Communities Conservation Plan/Habitat Conservation Plan.

Common Name	Scientific Name		Common Name	Scientific Name
Plants				
Ahart's Dwarf Rush	*Juncus leiospermus var. ahartii*		Nuttall's Scrub Oak	*Quercus dumosa*
Blochman's Dudleya	*Dudleya blochmaniae ssp. blochmaniae*		Palmer's Grapplinghook	*Harpagonella palmeri*
Catalina Mariposa Lily	*Calochortus catalinae*		Santa Monica Dudleya	*Dudleya cymosa ssp. ovatifolia*
Cliff Spurge	*Euphorbia misera*		Scrub Oak	*Quercus berberidifolia*
Coulter's Matilija Poppy	*Romneya coulteri*		Small-flowered Mountain Mahogany	*Cercocarpus minutiflorus*
Heart-leaved Pitcher Sage	*Lepechinia cardiophylla*		Tecate Cypress	*Hesperocyparis forbesii*
Intermediate Mariposa Lily	*Calochortus weedii var. intermedius*		Western Dichondra	*Dichondra occidentalis*
Laguna Beach Dudleya	*Dudleya stolonifera*			
Animals				
American Peregrine Falcon[a,b,c]	*Falco peregrinus anatum*		Prairie Falcon[c,f]	*Falco mexicanus*
Arboreal Salamander	*Aneides lugubris*		Quino Checkerspot Butterfly[g]	*Euphydryas editha quino*
Arroyo Toad[d]	*Anaxyrus californicus*		Red-diamond Rattlesnake[d,i]	*Crotalus ruber*
Blackbelly Slender Salamander	*Batrachoseps nigriventris*		Red-shouldered Hawk	*Buteo lineatus*
Coast Horned Lizard[d,e]	*Phrynosoma blainvillii*		Riverside Fairy Shrimp[g]	*Streptocephalus woottoni*
Coastal Cactus Wren	*Campylorhynchus brunneicapillus cousei*		Rosy Boa	*Charina trivirgata*
Coastal California Gnatcatcher	*Polioptilla californica*		Rough-legged Hawk	*Buteo lagopus*
Coastal Western Whiptail	*Aspidoscelis tigris interparietalis*		San Bernardino Ringneck Snake[i]	*Diadophis punctatus modestus*
Coyote	*Canis latrans*		San Diego Desert Woodrat[d]	*Neotoma lepida intermedia*

Common Name	Scientific Name		Common Name	Scientific Name
Golden Eagle[a,b,c,e,f]	*Aquila chrysaetos*		San Diego Fairy Shrimp[g]	*Branchinecta sandiegonensis*
Gray Fox	*Urocyon cinereoargentus*		Sharp-shinned Hawk[f]	*Accipiter striatus*
Least Bell's Vireo[g,h]	*Vireo bellii pusillus*		Southern California Rufous-crowned Sparrow[f]	*Aimophila ruficeps canescens*
Northern Harrier[d]	*Circus cyaneus*		Southwestern Willow Flycatcher[g,h]	*Empidonax traillii extimus*
Orange-throated Whiptail[f]	*Aspidoscelis hyperythra*		Western Spadefoot[d,e]	*Spea hammondii*
Pacific Pocket Mouse[d,g]	*Perognathus longimembris pacificus*			

Source: CDFW 2016/2017
[a] CDFW fully protected species
[b] CDF sensitive species
[c] USFWS birds of conservation concern
[d] CDFW species of special concern
[e] BLM sensitive species
[f] CDFW watch list
[g] federal listed species - endangered
[h] state listed species – endangered
[i] USFS sensitive species

The Orange County Southern Subregion HCP is the most recent plan to be completed in southern California. It represents a voluntary program that established a permanent habitat reserve and perpetual land management program. The document was prepared by Orange County in cooperation with the CDFW and the USFWS and responsibly addressed long-term land use and natural resources conservation. In the planning stages for more than a decade, this regional HCP includes large tracts of adjoining lands owned by the family-held Rancho Mission Viejo (RMV) and Orange County. The HCP planning area included approximately 132,000 acres and was approved in 2007 for a 75 year permit. The HCP covers 32 animal species and 10 vegetation communities, including seven federally listed species, and creates a preservation area totaling 32,818 acres.

Bolsa Chica Lowlands Restoration Project

According to the California State Lands Commission website, the Bolsa Chica Lowlands Restoration Project created or rehabilitated nearly 600 acres of marine and wetland habitat in Orange County, California, restoring part of what had historically been a vast estuarine ecosystem (California State Lands Commission 2015) (Figure 27). Restoration culminated in 2006 when the new full tidal basin to the ocean opened. Post-restoration monitoring has shown that this basin has meaningfully increased the availability of bay habitat, thus improving the southern California fishery resources. BCER is also a critical stop for migrating shorebirds on the Pacific Flyway. With the introduction of tidal influence, the mudflats created by the restoration provide a rich invertebrate community that is a food source to these birds. Over 10,000 shorebirds have been observed on the restored mudflats during a single survey. The project also created three nesting sites for the threatened western snowy plover and the endangered California least tern (California State Lands Commission 2015).

Figure 27: Bolsa Chica Lowlands Restoration Project map (California State Lands Commission 2015).

2.9 Cultural Resources

For the purpose of identifying existing cultural resources for this project, the study area includes the four non-federal channels that would be modified, staging areas to be used for construction activities, disposal areas for any removed materials, and any other rights-of-way or other easements required to construct the project. As noted in the Real Estate Plan (*Appendix D – Real Estate*), some areas, such as staging areas, will be developed during the next phase of the study, although most are expected to fit within the right of way.

Local prehistory and history are not summarized herein; the reader is referred to several online references below in order to provide a context for further discussion of the known archaeological and historical remains within the project area:

- *Hunter-Gatherers of Early Holocene Coastal California* (https://ioa.ucla.edu/press/hunter-gatherers-early-holocene-coastal-california)
- *Revisions to the Palomar Tradition Model in Southern California Prehistory* (http://www.pcas.org/documents/RevisiontoPalomarTradition.pdf)
- *Ecosystems past: prehistory of California vegetation* (https://www.fs.fed.us/psw/publications/millar/psw_2016_millar001.pdf)

Also provided here is a list of local Orange County museums, historical societies, and vocational societies:

- https://scahome.org/counties/orange/.

2.9.1 Records and Literature Searches

Records and literature searches conducted at the South Central Coastal Information Center, California State University, Fullerton were completed in 2006 and 2019. These record searches encompassed a 0.5-mile radius around the Proposed Project area as defined above. Historical information resources include the *National Register of Historic Places* (2019), the *California State Historic Resources Inventory* (2019), the *California Points of Historical Interest* (2019), and the *California Historical Landmarks* (2019). The area of the records search included a 0.5 mile radius area around each channel. Historic topographic maps and aerial photographs were examined to determine if any extant historic aged (i.e., over 50 years of age) structures or buildings or clusters could be seen adjacent to the channel.

As noted above, the study area includes the four non-federal channels that would be modified, staging areas to be used for construction activities, disposal areas for any removed materials, and any other rights-of-way or other easements required to construct the project. Some areas, such as staging areas, will be developed during the next phase of the study, although most are expected to fit within the right of way. For the purpose of identification of cultural resources for this project, the project Area of Potential Effects (APE) is limited to an area within 30 feet on either side of each channel.

The Anaheim, Los Alamitos, Newport Beach, and Seal Beach U.S.G.S. 7.5 minute topographic quadrangles were referenced for the records search. The results of the records search are presented in tabular format below in Table 19 and discussed generally by area.

Table 19: Cultural Resources within 0.5 Mile of the APE

Channel/Reach (USGS 7.5' Quad)	**Site/Structure(s)**	**Distance from APE**	**Comments**
C02 Reach 23* (Seal Beach)	CA-ORA-298	0.2+ mile	• Site is within the Naval Weapons Station Seal Beach • Site has been determined eligible for listing on the NRHP
	Channel	**Structure itself**	• **Channel has been determined to be not NRHP eligible; consultation in progress**
C04, all reaches	**Channel**	**Structure itself**	• **Channel has been determined to be not NRHP eligible; consultation in progress**
C04 Reach 20	**Bridges**	**Within**	• **Bridges at 55C0456, 55C0074, & 55C0457M McFadden & Bolsa avenues, Edwards St., determined not eligible as part of Caltrans state bridge inventories**

Channel/Reach **(USGS 7.5' Quad)**	**Site/Structure(s)**	**Distance from APE**	**Comments**
C04 Reach 21 & Westminster Mall diversion channel (Seal Beach & Los Alamitos [diversion channel only])	**CA-ORA-113**	**Within**	• **No longer extant due to prior construction (I-405 on-ramp and channel improvements)** • Based on knowledge of the construction, the site was likely graded prior to deposition of two to 30 feet of fill for freeway construction
	CA-ORA-162	0.2+ mile	• No longer extant due to prior construction (I-405 on-ramp and channel improvements) • Based on knowledge of the construction, the site was likely graded prior to deposition of two to 30 feet of fill for freeway construction • No resources on Los Alamitos quad
	Westminster Memorial Park and Cemetery	**Adjacent to Reach 21**	• No buildings NRHP listed • May be NRHP or California Register of Historical Resources (CRHR) eligible as a historic landscape or a cultural property
C04 Reach 21	**Bridges**	**Within**	• **Bridges 55C0547, 55C0546, & 55 0282 at Chesnut & Hoover street, & SR39 (Beach Boulevard), determined not eligible as part of Caltrans state bridge inventories**
C04 Reach 22 (Anaheim)	Garden Grove Main Street	0.2-0.5 mile	• Historic center of Garden Grove, including the Blakey Historical Park & Museum and about 10 other historic buildings • The closest to the channel is the Blakey house, about 0.2 mile north of the channel

Channel/Reach (USGS 7.5' Quad)	Site/Structure(s)	Distance from APE	Comments
			• Some buildings may be listed on CRHR • No buildings NRHP listed
C04 Reach 22	**Bridge**	**Within**	• Bridge 55C0545 at Newland Street, determined not eligible as part of Caltrans state bridge inventories
C05, all reaches	**Channel**	**Structure itself**	• **Channel has been determined as non-eligible with State Historic Preservation Officer (SHPO) concurrence.**
C05 Reach 1 **Proposed Mitigation:** **Muted Tidal Pocket** **Tern Islands** **Outer Bolsa Bay**	**CA-ORA78/H** **And /-1442**	• Near muted tidal pocket • 0.2-0.4 mile from tern islands	• CA-ORA-78/H: World War II gun emplacements and the Bolsa Chica Gun Club (1899-1964) • CA-ORA-1442: non-cultural shell scatter • 1990s/2000s surveys recommended the site(s) as not NRHP eligible due to a lack of integrity; consultation with the SHPO did not reach any conclusion • **NRHP eligible under both criteria A (association with important events in local history) and D (data potential) in 2010** • Older surveys indicate more widespread debris from the club
(Seal Beach)	**CA-ORA-83 &** **CA-ORA-86/144**	• Near muted tidal pocket • 0.2-0.4 miles from tern islands	• **NRHP listed – the "Cogged Stone Site"** • Continuous distribution of artifacts & shellfish remains, resulting in the entire area now identified as CA-ORA-83

Channel/Reach (USGS 7.5' Quad)	Site/Structure(s)	Distance from APE	Comments
			• Portions of the site remain although much has been excavated and housing is constructed
	CA-ORA-84/289	• Near muted tidal pocket • 0.2-0.4 mile from tern islands	• **Considered "significant" by recorders, not yet formally evaluated** • Shell midden and lithic artifacts, including milling tools and flaked stone artifacts
	CA-ORA-85	• Near muted tidal pocket • 0.2-0.4 mile from tern islands	• **Considered "significant" by recorders, not yet formally evaluated** • Shell midden and lithic artifacts, including milling tools and flaked stone artifacts • California State College Los Angeles (now California State University) excavated 369 ft^2 of units, finding sterile sand at 16 to 24 inches in depth • Artifacts and radiocarbon dates suggest occupation during the Millingstone and Intermediate horizons
	P-30-100052	Near muted tidal pocket	• Canal constructed between 1926 and 1935, likely in conjunction with Slater Avenue • Half the canal is destroyed, the remnant half impacted by C05 and other construction • **Not considered significant under CEQA by recorder**
	P-30-179858	• Near muted tidal pocket	• Signal Bolsa Lease roads and levee system

Channel/Reach (USGS 7.5' Quad)	Site/Structure(s)	Distance from APE	Comments
		• 0.2-0.4 mile from tern islands	• Remnant of oil field located on lower terrace, consists of a gridded system of roads on top of levees maximizing the location of one oil well per every five acres • Drilling began in 1940, partially constructed by 1950, complete by 1965 • Portions of the north half subsumed by residential development by 1981 • **Not considered significant under CEQA by recorder**
C05 Reach 1	**Bridges**	**Within**	• Bridges 55C0109, 55C0428, & 55C0432 at Warner Avenue, & Springdale & Edwards streets, determined not eligible as part of Caltrans state bridge inventories
C05 Reach 2	**Bridge**	**Within**	• Bridge 55C0134 at Golden West Street, determined not eligible as part of Caltrans state bridge inventories
C05 Reach 3	**Bridge**	**Within**	• Bridge 55 0281 at SR39 (Beach Blvd.), determined not eligible as part of Caltrans state bridge inventories
C05 Reach 4	**Bridges**	**Within**	• Bridges 55C0427 and 55C0424 at Magnolia and Bushard streets, determined not eligible as part of Caltrans state bridge inventories
C05 Reach 5	**Bridges**	**Within**	• Bridges 55C0093, 55C0426, 55C0429, & 55C0100 at Brookhurst, Ward, & Deming streets, & Euclid Avenue, determined not eligible as part

Channel/Reach (USGS 7.5' Quad)	Site/Structure(s)	Distance from APE	Comments
			of Caltrans state bridge inventories
C05 Reach 6	**Bridge**	**Within**	• Bridge 55C0447 at 5th Stret, determined not eligible as part of Caltrans state bridge inventories
C05 Reach 7	**Bridges**	**Within**	• Bridge 55C0446M at Hazard Avenue, determined not eligible as part of Caltrans state bridge inventories
C05 Reaches 3-8 (Newport Beach)	No Resources	—	—
C05 Reaches 4/5	CA-ORA-1151H	0.5+ mile	• Test excavations and data recovery indicated occupation during the 1860s (cattle ranching) and in the 1880s • Determined not eligible for listing on the NRHP
C05 Reach 9 (Anaheim)	No Resources	—	—
C05 Reaches 10-11	±34 historic structures	0.2-0.5 mile	• No NRHP listed buildings • All located along Garden Grove Street
C06, all reaches	**Channel**	Structure itself	• **Channel has been determined not NRHP eligible; consultation is in progress**
C06 Reach 13, near the confluence with C05 Reach 3 (Newport Beach)	Wintersburg Japanese Church & associated church/family buildings	0.2+ mile	• Not NRHP listed; evaluated in 2002 for the City of Huntington Beach • Recommended as eligible for listing on the CRHR under Criterion 1 at the local level on the CRHR, and that each building is eligible for listing to

Channel/Reach (USGS 7.5' Quad)	Site/Structure(s)	Distance from APE	Comments
			the NRHP as a contributor to a historic district • The National Trust for Historic Preservation considers the site NRHP eligible as well as a "National Treasure"
C06 Reaches 14-19 (Newport Beach)	No Resources	—	—
Tern Island (South)	CA-ORA-290	0.5 mile	• Portions of the site destroyed by a road, but test excavation in early 1970s revealed a shell lens • Has not been formally evaluated for NRHP eligibility
	CA-ORA-291	0.5 mile	• Site mapped as two loci, on top of mesa and below • Extensive test excavations in the early 1970s revealed midden up to 1.4 meters deep • Occupied from Millingstone through Late Prehistoric periods • Has not been formally evaluated for NRHP eligibility
	P-30-100047, -100049, -100050	Varies	• Isolated artifacts located in the Signal Bolsa Lease roads and levee system • Suggests re-deposition in the area
Warner Avenue Bridge	**Bridges**	**Within**	• **Bridge 55C0417 at Warner Avenue, determined not eligible as part of Caltrans state bridge inventories**

* Resources within or adjacent to the APE are highlighted in bold.

Topographic Maps and Aerials

All project areas show extensive change between the 1940s and 1950s maps and later maps. Earlier maps show widespread orchards, presumably citrus groves, with occasional houses, and small town centers. By the mid-1960s, most groves are gone and in most places, fairly dense suburban housing has taken its place. Topographic map symbolization changes from individual buildings to pink or red block areas to show dense infrastructure, rendering it impossible in most areas to determine if original individual buildings from the 1950s and earlier remain today.

C02

Although only one sensitive site is found within 0.5 mile of C02, the area is considered sensitive as it is located in and near the original estuary at Anaheim Bay.

C04

C04 may be less sensitive than areas in and around estuaries, however, the two sites that were previously recorded near I-405 illustrate that buried sites are not uncommon in inland Orange County and other areas of this channel should also be treated as sensitive.

As with C05, buildings shown on the 1960 Anaheim topographic quadrangle map do not appear to be extant when checked online in Google Earth. One exception is the Westminster Memorial Park and Cemetery (formerly the Central Memorial Park Cemetery) located adjacent to C04 Reach 21, along the south side of Hazard Avenue in Westminster. Graves within this active cemetery/mortuary are covered by California Public Health Codes (i.e., are the responsibility of the County Medical Examiner and not project archaeologists), however, the cemetery may also be considered a historic landscape or traditional cultural property that could be eligible for listing on the NRHP, as it also serves as a community park and social center. Just recently, 81 unknown South Vietnamese airmen were honored in a ceremony at the facility (https://news.usni.org/2019/10/28secnav-spencer-jim-webb-honor-lost-south-vietnamese-soldiers-in-california-ceremony).

Diversion Channel

The diversion channel is planned to be constructed in the right-of-way for the “U.S. Government” railway, which is no longer extant in this location. This small railway originated from the Southern Pacific Railroad and goes to the Seal Beach naval base, presumably to carry munitions and other supplies, as numerous spurs within the base are visible on USGS topographic maps. The railway segment in the proposed diversion channel area has been recorded and has been determined ineligible for listing on the NRHP as the rails have been removed and it is lacking in integrity.

C05

No previously recorded National Record of Historic Places (NRHP) listed or eligible properties are recorded within one-half mile of C05. There is an additional small group of historic buildings in Garden Grove near, although not adjacent to, Reach 10, in addition to the Garden Grove Main Street.

C05 Reach 10 also cuts through an area labeled “POW [prisoner of war] Camp (Aban’d)” on the USGS 1950 Anaheim 7.5′ topographic map, however, by 1965 on the next issued topographic map, the POW camp area is built over with a trailer park and other buildings, possibly housing. An “H” shaped building,

typical of military hospitals, remains on later topographic sheets, possibly a precursor to the current hospital building and parking lot on the parcel.

C05 reaches 1 through 9 all show sporadic individual houses on early topographic maps in the 1930s through the 1950s, replaced by larger, "dense," population areas on the 1960s maps. In all cases, where individual buildings were checked on Google Earth, it appeared that most have been replaced by later suburban development, although some may remain. Reach 2 passes near the Wintersburg area of Huntington Beach, where the Wintersburg Japanese Church is situated a couple of blocks from the channel. Reach 3 passes through the Huntington Beach community of "Boulevard Gardens," which was labeled on topographic maps from 1932 through 1951, but is now subsumed into the larger suburban sprawl.

The terminus of C05 is at the Bolsa Chica Mesa. Several significant archaeological sites, one NRHP listed and several NRHP eligible, are located in the vicinity and there may be buried sites in the area. This area is extremely sensitive and important to our knowledge of the prehistory of southern California as far back as 14,000 years ago. CA-ORA-83 has been described as having "world-class" archaeological value. As noted by Dr. William Hildebrandt in summary of this site (Hildebrandt 2016):

> "Excavations within the now developed portions of the site found: (1) a clam shell bead making industry dating between 10,100 and 8320 cal BP1, making it the oldest in California and, perhaps, North America; (2) a cemetery area dating between 8500 and 6850 cal BP [before present], which is also the oldest in California and maybe North America as well; (3) house depressions dating between 8850 and 7600 cal BP, which are among the oldest in the state; (4) cogged stone manufacturing and caching areas dating between 8300 and 6300 cal BP; and (5) only sporadic use of the site thereafter. The cogged stones, which number in the hundreds at the site, represent a beautiful form of portable stone sculpture. I am unaware of this level of artistic expression, this deep in antiquity, elsewhere in North America."

Other sites may be almost as spectacular and are as important. The area is of utmost importance to the Native American Tribes of the area.

2.9.2 Native American Concerns

Section 306108 (known as "Section 106") of the National Historic Preservation Act (Public Law 89-665; P.L. 113-287 54 U.S.C. 300101 et seq., and 36 C.F.R. 800), NEPA, and the American Indian Religious Freedom Act of 1978 (Public Law 95-341; 42 U.S.C. 1966), and Executive Order 13175 of November 6, 2000 (Consultation and Coordination with Indian Tribal Governments) all require that government agencies consult with Native Americans to determine their interests in federal projects. Orange County is also required to consult under Public Resources Code section 21080.3.1 (CEQA).

For the purpose of identification of existing cultural resources for this project, the project Area of Potential Effects (APE) is limited to an area within 30 feet on either side of each channel. A search at the California Native American Heritage Commission (NAHC) determined that no sacred sites are recorded within the project area, however, Native American consultation conducted to date strongly indicates that the Proposed Project area should be considered sensitive for Native American resources. Consultation under Section 106 of the NHPA and CEQA is ongoing.

An updated scoping effort was conducted November 30, 2017, during which scoping letters were sent to 26 federally recognized Native American tribal nations in the local area for comments regarding the study; a complete list of tribes contacted for scoping is found in *Appendix J - Coordination*. From the

updated scoping effort, negative responses were received from the following tribes as not being affiliated with the area, deferring to more local tribes, or similar responses. No other responses were received.

- Augustine Band of Cahuilla Indians
- Jamul Indian Village of the Kumeyaay Nation
- Pala Band of Mission Indians
- San Manuel Band of Mission Indians
- Twenty-Nine Palms Band of Mission Indians

For the 45-day NEPA public review of the Draft Report (October 2018) and the 45-day CEQA public review of the Draft Report (December 2019), notice of availability letters were sent to federally recognized and non-federally recognized Native American tribal nations. Refer to *Appendix J – Coordination* for the complete list of Native American tribal nations sent notice of availability letters. Following the public review in October 2018, the Gabrieleño Band of Mission Indians – Kizh Nation (Kizh Nation) requested consultation per California Assembly Bill 52. A summary of consultation with the Kizh Nation as an interested party under Section 106 with the Corps and with Orange County under AB 52 is summarized below. Following the public review in December 2019, the Juaneño Band of Mission Indians, Acjachemen Nation requested consultation per California Assembly Bill 52.

Summary of Native American Consultation

The OCPW initiated consultation on November 21, 2018 and sent letters to tribal nations identified in *Appendix K – Coordination*. OCPW received a request from the Kizh Nation on November 30, 2018. On December 10, 2018, OCPW responded to the Kizh Nation request and asked when the Kizh Nation representatives would like to schedule a consultation appointment. The consultation conference call was held on March 20, 2019. Following the consultation conference call in March 2019, USACE Los Angeles District Archaeologist, Meg McDonald, and Kizh Nation Tribal Chairman Andrew Salas and Tribal Biologist Matthew Teutimez discussed the project via a teleconference meeting on July 24, 2019 at 3:00 p.m. In addition to discussion about avoidance of sacred sites and culturally sensitive areas, items discussed included:

- Monitoring of all construction areas.
- Noted that there used to be a lot of wetlands in Westminster and Huntingotn Beach, and some homesites. Mr. Salas has some information from a Garden Grove project that he can share.
- No need to monitor in channels where construction is not taking place.
- Relevant references for village locations in the area.
- Tribal participation in drafting agreement documents and monitoring/discovery plan(s).

2.10 Paleontological Resources

Paleontological resources, of which a discussion is required under CEQA, are the recognizable remains of once-living, non-human organisms and early hominids. Identified as fossils, these resources represent a record of history of life on the planet dating back as far as four billion years ago. Paleontological resources can include shells, bones, leaves, tracks, trails, and other fossilized floral or faunal materials.

In 1996, Petra Resources Inc. (Petra) performed a paleontological resource assessment for Orange County on channels C05 and C06 for proposed channel modifications. For the assessment, an archival records

check was performed at the Los Angeles County Museum of Natural History (LACM), which include the fossil collections data of the University of California, Los Angeles, the California Institute of Technology, and the Museum of Paleontology, Berkeley, California. Pertinent paleontological and geological literature was also reviewed for that study. A field survey was also conducted on July 8, 1996 which included the drainage channels and the area between the existing right-of-way fences. The survey included those parts of the channels with banks and exposed cuts not covered by concrete, rip-rap, loose dirt, slurry rind, rocks, or vegetation.

The archival search revealed a Los Angeles County Museum of Natural History locality (LACM 4018). The materials were recovered from a deposit of historic peat bog and were dated at about 150 years. Earlier surveys in the Bolsa Chica lowlands found the remains of fossil invertebrates as well as prehistoric and recent shell material, in the area. These fossils were not *in situ* as they were considered to be either washed down from deposits on the mesa tops or were brought in through dredging and channeling operations associated with oil company activities. No fossil remains were found within the surveyed part of the C05/C06 system in 1996.

Overall, the assessment found the project area to range from high, low to no sensitivity for paleontological remains. Reaches of C05 and C06 with high sensitivity were near the confluence of C05 and C06. Specifically, C05 reaches with a high sensitivity were Reach 2 and Reach 3 from the C05/C06 confluence upstream to Beach Boulevard; and C06 reaches with a high sensitivity were Reach 13 from the C05/C06 confluence upstream, Reach 14, and Reach 15 upstream to Magnolia Street. A high sensitivity indicates that fossils are currently observed or are recorded within the study area and/or the unit has a history of producing numerous significant fossil remains. The remaining reaches in C05 and C06 were considered low to no sensitivity. A low potential indicates significant fossils are not likely to be found because of random fossil distribution pattern, the extreme youth of the rock unit, and/or the method of rock formation.

A paleontological survey of channels C02 and C04 has not been conducted. During the Preconstruction Engineering and Design (PED) phase, the project paleontologist will consult the results of planned geotechnical investigations performed in PED to inform a paleontological survey on these two channels.

2.11 Socioeconomic/Environmental Justice

The U.S. Census Bureau's American Fact Finder was queried for demographic data on the State of California as well as the following communities within the study area: Fountain Valley, Westminster, Stanton, Cypress, Huntington Beach, Garden Grove, Seal Beach, Anaheim, Los Alamitos, and Santa Ana (United States Census Bureau 2017). The demographics for these communities are summarized in Table 20 and are estimates for 2016 based on the American Community Survey.

Page left intentionally blank
for double-sided printing

Table 20: Populations within the project area.

	Fountain Valley	West-minster	Stanton	Cypress	Huntington Beach	Garden Grove	Seal Beach	Anaheim	Los Alamitos	Santa Ana	State of CA
Population	56,670	91,635	38,594	48,978	198,724	174,676	24,510	346,776	11,661	333,605	38,654,206
White	46.3%	24.9%	18.9%	40.7%	63.7%	20.8%	74.1%	26.0%	51.4%	9.2%	38.4%
Black or African American	0.7%	0.7%	2.2%	4.3%	1.1%	1.0%	1.1%	2.1%	3.8%	0.8%	5.6%
American Indian and Alaska Native	0.2%	0.3%	0.6%	0.3%	0.4%	0.3%	0.1%	0.1%	0.5%	0.1%	0.4%
Asian	33.2%	47.6%	25.0%	31.4%	11.2%	39.1%	8.7%	15.8%	12.8%	10.9%	13.7%
Native Hawaiian and Other Pacific Islander	0.3%	0.2%	0.5%	0.3%	0.3%	0.3%	0.1%	0.4%	0.4%	0.2%	0.4%
Hispanic or Latino	16.1%	24.0%	51.1%	19.4%	19.4%	36.8%	13.0%	53.6%	23.5%	77.9%	38.6%
Some other race alone	0.2%	0.1%	0.0%	0.4%	0.3%	0.1%	0.2%	0.1%	0.2%	0.1%	0.2%
Two or more races	3.0%	2.0%	1.7%	3.3%	3.5%	1.5%	2.6%	1.8%	7.3%	0.6%	2.9%
25+ High School or Higher	90.5%	76.8%	69.5%	92.1%	92.3%	74.0%	94.6%	76.0%	91.3%	55.5%	82.1%
25+BA or Higher	42.2%	22.8%	16.5%	38.8%	41.9%	19.8%	46.9%	24.8%	40.7%	12.4%	32.0%
Average Household Size[b]	2.94	3.40	3.50	3.02	2.55	3.67	1.84	3.38	2.66	4.37	2.9
Median Household Income	84,763	55,287	48,332	84,469	85,312	60,522	60,222	61,826	80,926	54,062	63,783
Below Poverty Level	8.5%	17.9%	22.0%	6.4%	9.0%	16.2%	8.0%	16.2%	9.2%	21.2%	15.8%

Source: U.S. Census Burea 2017.
[a] U.S. Census Bureau, 2012-1016 American Community Survey 5-yr estimates.
[b] U.S. Census Bureau, 2010 Census.

Page left intentionally blank
for double-sided printing

2.11.1 Demographic Survey

Most cities in the watershed have significant white, Hispanic, and Asian populations in various percentages. Stanton, Anaheim, and Santa Ana have dominant Hispanic or Latino populations, whereas Westminster and Garden Grove have dominant Asian populations. Westminster, Stanton, Garden Grove, Anaheim, and Santa Ana have a lower than state average in persons with a high school degree or higher as well as a B.A. or higher. Fountain Valley, Cypress, Huntington Beach, and Los Alamitos are the only cities with a median household income above the state average. Westminster, Stanton, Garden Grove, Anaheim, and Santa Ana have a greater than state average of those below the national poverty level. This may correlate to level of education and the ethnicity of populations.

With the Hispanic population in Stanton, Anaheim, and Santa Ana and the Asian population in Westminster and Garden Grove being a majority of the population, these communities may be considered having a minority population under the definition of a minority population under the definition of Environmental Justice.

2.12 Land Use

Current land use consists of a mix of residential, schools, businesses and a few parks located adjacent to the channels. Commercial uses such as retail and office buildings are scattered throughout almost the entire channel system. Industrial uses include warehouses and distribution centers. Open space along the study channel system consists mainly of parks and a golf course. The only undeveloped area adjacent to the channel system is located at the west end of Reach 1 (Bolsa Chica area), which is currently in oil production. The oil production is operated by CalResources LLP and includes numerous active oil wells and wells for water injectors. Nearly all reaches in the channel system are adjacent to single-family detached residences. Residence setbacks from the channels varies throughout. Numerous structures are located on or within 10 feet of the channel system right-of-way. Multifamily residences, which include condominiums, townhomes, apartments, and trailer parks are also adjacent to the channel system. Commercial uses such as retail and office buildings are scattered throughout almost the entire channel system. Industrial uses include warehouses and distribution centers.

Three reaches in the C02/C04 channel system are within 0.25 mile of schools (Reaches 23, 20, and 22). Nine reaches in the C05/C06 channel system are within 0.25 mile of schools (Reaches 1, 2, 4, 5, 7, 9, 12, 17, and 19). The majority of the schools within 0.25 mile of the channel systems are elementary schools, with only four middle schools and five high schools being within the vicinity. C04 Reach 20 is near Helen Stacey Middle School and Marina High School, while C04 Reach 22 is near Warner Middle School. C05 Reach 1 is near Marine View Middle School and Spring View Middle School, Reach 2 is near Ocean View High School, Reach 5 is near La Quinta High School, Reach 9 is near Santiago High School, and Reach 19 is near Los Amigos High School. School areas that are directly adjacent to the channel system right-of-way are grass recreation fields.

The existing C05/C06 channel system is designated within the General Plans and Zoning. Modifications to the channel system would not conflict with the General Plan or zoning designations of Orange County or the cities of Huntington Beach, Fountain Valley, Santa Ana, Westminster and Garden Grove. For incorporated cities, land use and land development is controlled by the policies of each city's General Plan and the regulations set forth in each city's zoning ordinance. Improvements to the channel system would not conflict with the General Plan or zoning designations of Orange County of the cities of Huntington Beach, Fountain Valley, Santa Ana, Westminster and Garden Grove because change to the zoning districts or general plan designations is not proposed or required.

According to Orange County's Environmental Resources Service Area, the study area falls within the Anaheim Bay – Huntington Harbour Watershed of Orange County which covers an area of approximately 51,422 acres (OCPW 2018). Residential development covers around 19,282 acres, or roughly 37% of the watershed. Commercial and industrial activities occur on approximately 4,788 and 2,575 acres within the watershed. Vacant land comprises nearly 10 acres (Table 21) (OCPW 2018).

Table 21: Land use in the Anaheim Bay/Huntington Harbour Watershed.

Land Use Type	Acres
Residential	19,282
Vacant Land	10
Commercial	4,788
Industrial	2,575
Public	9,072
Agricultural Use	49
No Data Available	5,817

Source: Orange County Environmental Resources Service Area, November 2009 (OCPW 2018)

2.13 Hazardous, Toxic, and Radioactive Waste

Engineer Regulation (ER) 1165-2-132, Hazardous, Toxic, and Radioactive Waste (HTRW) Guidance for Civil Works projects, dated June 26, 1992, provides guidance for consideration of HTRW issues and problems within project boundaries or which may affect/be affected by USACE Civil Works projects. The ER states the USACE policy for addressing HTRW issues and outlines the timing and cost sharing requirements for HTRW encountered during the standard Civil Works project phases. Goals of the ER are to identify the level of detail for HTRW investigation for each phase of a civil works project, promote early detection and response by appropriate responsible parties, determine viable options to avoid HTRW problems, and establish a mechanism for resolution of HTRW issues.

As stated in the ER 1165-2-132, an initial assessment as appropriate for Reconnaissance Study (Phase I Environmental Site Assessment) should be conducted as a first priority for projects with no prior HTRW consideration. In general, HTRW Phase I Environmental Site Assessments should rely on existing information, observations made through database research, an aerial photograph, topographic map, and historical document review, a site visit, and information provided by the land owner. The HTRW Phase I ESA completed for the study area includes a preliminary assessment of database research to determine the risk of encountering HTRW and non-HTRW environmental issues, or recognized environmental conditions (RECs), in the study area. Due to the scale of the project, and the amount of information obtained from the database search, which includes 979 sites entries in Federal and/or State databases, assessment of information collected is broad-scale in nature and only includes a focused assessment of the regulated sites that are on, or directly adjacent to the study area. The limited HTRW Phase I ESA is provided in *Appendix F – Hazardous, Toxic and Radioactive Waste (HTRW) Phase I Environmental Site Assessment*.

Channels C02, C04, C05, and C06

In general, review of Environmental Data Resources (EDR) database returns on or adjacent to channels C02, C04, C05, and C06 suggests that there are leaking underground storage tanks (LUSTs) adjacent to within the study area that have not been fully remediated. In addition, there are several service stations with active underground storage tanks (USTs), and a facility with a potential surface impoundment, directly adjacent to the potential work areas.

Channel C02

The Seal Beach Department of Defense (DoD)/Formerly Used Defense Sites (FUDS)/Unexploded Ordnance (UXO) Remedial Action Sites are adjacent to Channel C02. The Installation Restoration Program (IRP) at NWSSB began in 1985 with an Initial Assessment Study in which 25 locations of potential contamination were identified. A further Resource Conservation and Recovery Act Facility Assessment in 1989 and subsequent discoveries brought this total up to 76 locations. During the course of these and later studies, 49 sites were determined to contain no significant contamination, five currently operating permitted facilities were removed from the program, and two additional sites were transferred to other environmental programs specializing in USTs. Fifteen sites have had remedial actions completed. The remaining five IRP sites are in various stages of active study or remediation. A Military Munitions Response Program (MMRP) Preliminary Assessment was conducted in late 2008, with five MMRP sites recommended for Site Inspections. As a result of these investigations two sites were recommended for no further action and remaining three sites will undergo more detailed analysis. Sites with ongoing remedial actions are presented below:

- Site 7 – Station landfill. Previous disposal of solvents, transformer oil, lubricants, paint sludge, asbestos, photo solutions, and mercury. Remedial action complete, monitoring ongoing,
- Site 22 – Oil Island. Oil production waste-holding impoundments. Site being used and monitored.
- Site 70 – Research, Testing and Evaluation Area. Enhanced bioremediation and monitored natural attenuation ongoing for trichloroethylene (TCE) contamination.
- Site 74 – Old Skeet Range. Final remediation strategy being developed for metals (lead and antimony) and polycyclic aromatic hydrocarbons (PAHs) from previous skeet shooting activities. Close to SBNWR
- Site 75 – Agricultural Groundwater Well (well designation KAYO-SB). Groundwater contamination, chlorinated solvents. Site being inspected and Navy working with regulatory agencies on remedial action plan.
- UXO 1 – Primer Salvage Yard and POLB Mitigation Pond. Remedial investigation ongoing for munitions and explosives of concern, munitions constituents.
- UXO 6 – Westminster Port of Long Beach (POLB) Fill Area. Remedial investigation ongoing for munitions and explosives of concern, munitions constituents. AOC 2 – Explosives Drop Test Tower. Remedial investigation ongoing for munitions constituents.

Channel C05 (including tide gate replacement area, Warner Avenue Bridge and Outer Bolsa Chica expansion, and PCH floodwall)

In 1997, the Bolsa Chica Lowland Restoration Project, adjacent to channel C05, began with the acquisition of private property that had supported oil exploration for decades and a continuing oil field operation. A prerequisite to that acquisition was completion of a voluntary cleanup agreement among the State Lands Commission (SLC), the oil company operating the oil field lease, CalResources LLC, and the property seller, Signal Bolsa Corporation. The cleanup agreement established that the project would characterize the nature and extent of contamination on the site, the parties would agree on remedial goals, and the oil company and seller would see that the contamination was remediated under the oversight of the RWQCB. The project was expected to be under construction by October 1, 2004 and completed in spring of 2007 and would address soils contaminated with metals, oil & grease, petroleum hydrocarbons, and PCBs. Activities to remediate the contamination in the oil fields appear to be ongoing. Recently

developed oil field remedial plans consist of completion of the final elements of remediation and/or removal of contaminated soils that haven't been addressed through previous remedial activities.

2.14 Recreation

2.14.1 C02

Haven View Park

A neighborhood park located in Huntington Beach that sits on 2.95 acres. The park was dedicated in April 1974 and is named after the adjacent Haven View Elementary School. Amenities include playground area, sand volleyball court, large grass area, and numerous shaded areas. The park is located near the south bank of Reach 20 between Waikiki Lane and Melody Lane.

Seabridge Park

A neighborhood park located in Huntington Beach within the Huntington Harbour. The park was named after Huntington Beach City Council Mayor Roy Seabridge and was dedicated in March 1982. The park sits on 3.91 acres and includes the following amenities: playground equipment, open grass area, picnic tables, and park benches. The park is located near the south bank of Reach 20 between Alert Lane and Portofino Circle.

2.14.2 C04

Oasis Park

A small park located in the City of Westminster. The park is located on 0.25 acres and includes play equipment. The park is located along the north bank of Reach 21 between Magnolia and Newland streets.

Sid Goldstein Freedom Park

The Park is located in the City of Westminster and includes 1.45 acres. The park was named for retired U.S. Army Major Sid Goldstein, a winner of the Distinguished Service Cross for heroism in World War II. The park was established in 2002 after his death. The park has a memorial monument to veterans of the Vietnam War, a forever flame, waterfall, statues, park benches, and play equipment. The park is located along the north bank of Reach 21 between Newland Street and Beach Boulevard.

Marina Park

A community park located in Huntington Beach. The park was dedicated on April 6, 1979 and is named after Marina High School, which it is adjacent to. Amenities include play equipment, basketball courts, tennis courts, picnic tables, handball courts, and open field. Marina Park is located along the north bank of Reach 20 between Springdale and Graham streets.

2.14.3 C05

Haster Basin Recreational Park

Haster Basin Recreational Park is a 21.5 acre park located in the City of Garden Grove. The park was formerly known as Twin Lakes Park but was rededicated February 2014 and given a new name. Prior to the rededication, the park underwent a $25 million overhaul from the California Department of Water Resources and Orange County. The overhaul consisted of adding 2 additional acres of usable park area, constructing a new pump station to prevent future flood damage from potential upstream modifications, two new soccer fields, upgrades to jogging trails and exercise stations, new picnic shelters overlooking the lake, and additional shade trees. Haster Basin Recreational Park is not part of the Proposed Project area; however, C05 Reaches 11 and 12 are located upstream of Haster Basin Recreational Park and Reach

10 is located downstream of Haster Basin Recreational Park, all of which are included in the Proposed Project area. Haster Basin Recreational Park is located between Haster Street and South Harbor Boulevard.

Rosita Park

A community park located in Santa Ana and adjacent to the Rosita Elementary School. The park is located on either side of Reach 7 and is located between North Newhope Street and Rosita Street.

Heritage Park

A community park located in Santa Ana and adjacent to the Heritage Elementary School. The park is located on the south side of Reach 5 and is located between South Newhope Street and Euclid Street.

Cloverdale Park

A community park located in the City of Westminster. The park sits on 1.8 acres and includes barbeques, children's play area, and picnic tables. The park is located on the south side of Reach 4 and is located generally between Brookhurst Street and Bushard Street.

Murdy Park and Community Center

Murdy Park is located in the City of Huntington Beach and sits on 16.04 acres. The park was dedicated in September 1971. The park includes group picnic shelters with barbeques, four tennis courts, two softball fields, four basketball courts, skate park, and jungle gym. The first community center built in Huntington Beach is also located at Murdy Park. The community center offers a wide range of recreation programs and classes. The park is located along the north of Reach 2 and is generally located between Gothard Street and Goldenwest Street.

Bolsa Chica Ecological Reserve

The reserve is located on either side of Reach 1. A bike path that is part of the reserve is also located on either side of the reach. The Bolsa Chica Wetlands Brightwater Trailhead is also located within the vicinity of the north channel bank of Reach 1.

2.14.4 C06

Mile Square Park

Early in World War II the United States Navy purchased a square mile of agricultural land in what is today the City of Fountain Valley. Three landing fields were constructed in a triangular shape in the center of this area. After World War II these fields served as military training fields. As Orange County developed its Master Plan of Regional Parks in the 1960's, the Mile Square site was viewed as an ideal location for a regional park in the urbanizing area of Orange County. During the 1970s, two (2) 18-hole golf courses were developed on the site. In 1987 a third 18-hole executive golf course complete with club house, driving range, and banquet facility was developed along with additional recreation amenities including bicycle trails, landscaping, two (2) fishing lakes, soccer fields, an archery range, baseball fields, a nature center, and picnic areas.

Reach 18, within C06, crosses Mile Square Regional Park between Brookhurst and Euclid streets. Public access is provided to the right-of-way portions of C06 Reaches 7, 9, 10, 11, 12, and 15. Except for a portion of Reach 1 and those reaches that have concrete covered conduit (i.e. portions of Reaches 7, 9, 10, 11, 12, and 15), both sides of the existing channel system are fenced at the right-of-way and at street crossings to limit access.

2.14.5 Bolsa Chica Ecological Reserve

The BCER is an approximately 1,300 acre coastal estuary located in the City of Huntington Beach, Orange County, California. The reserve is bordered on the north by Warner Avenue, on the west by PCH and Bolsa Chica State Beach, on the south by Seapointe Avenue, and on the east by residential neighborhoods. There are two public parking lots: the north lot is located at the southeast intersection of Warner Avenue near PCH while the south lot is located on PCH across from the Bolsa Chica State Beach. Both of the parking lots connect to a 4-mile network of public hiking trails, including scenic overlooks. An interpretive center operated by the Bolsa Chica Conservancy is located by the north parking lot.

The BCER has a 4.5-mile trail that loops around portions of the reserve. The trail begins at the north parking lot by the Bolsa Chica Conservancy. Walkers can then cross OBB using the pedestrian bridge that runs parallel to the Warner Avenue Bridge. The trail then heads south along the Bolsa Chica Mesa. At the south end of the Bolsa Chica Mesa the trail forks allowing hikers to either choose the pocket loop or the inner bay loop trails. The inner bay loop trail is accessed by crossing over the tide gates on Reach 1 C05. There are four overlooks that allow viewing of the wetlands and wildlife: mesa trail overlook, footbridge overlook, rabbit island overlook, and east channel overlook. The pocket loop trail that circles around the muted tidal pocket at the south end of the Bolsa Chica Mesa connects to the Brightwater Trail which runs back along the east side of the Bolsa Chica Mesa as well as along portions of Reach 1 C05 to the north. Both the BCER trails and the Brightwater trails are for hiking, no bikes are allowed.

2.14.6 Huntington Harbour

Huntington Harbour is located on the northwest corner of Huntington Beach bordering Seal Beach and Sunset Beach. The harbor encompasses five man-made islands bounded by a network of navigable channels and the land surrounding them. Huntington Harbour also serves as a secluded pleasure craft port, located only 15 minutes from the open waters of the Pacific Ocean, in between Long Beach and Newport Beach harbors. It connects with Anaheim Bay via a waterway that passes under a bridge on PCH, past the NWSSB and the Anaheim Bay NWR. Peter’s Landing Marina, at the Harbour entrance, offers sport fishing, a private charter, and electric boat rentals. The marina provides complimentary two-hour guest slips on a first-come, first-serve basis for boaters who want to enjoy the waterfront boardwalk dining and shopping.

2.14.7 Seal Beach National Wildlife Refuge (SBNWR)

The SBNWR was established in 1972 and is administered by the USFWS to protect and conserve essential habitats for threatened and endangered species. The 965 acre refuge is located within the NWSSB, in Orange County, California and encompasses remnant saltwater marsh in the Anaheim Bay estuary. The Refuge is closed to the public except during special events and escorted tours held on the last Saturday of each month (excluding December). The monthly walking tours are led by the Friends of the SBNWR and Refuge staff. There are also limited, specially arranged tours for large groups (15-20 people) that are conducted on the Refuge throughout the year by request. Figure 28 shows the recreational areas that are discussed above in relation to the channels.

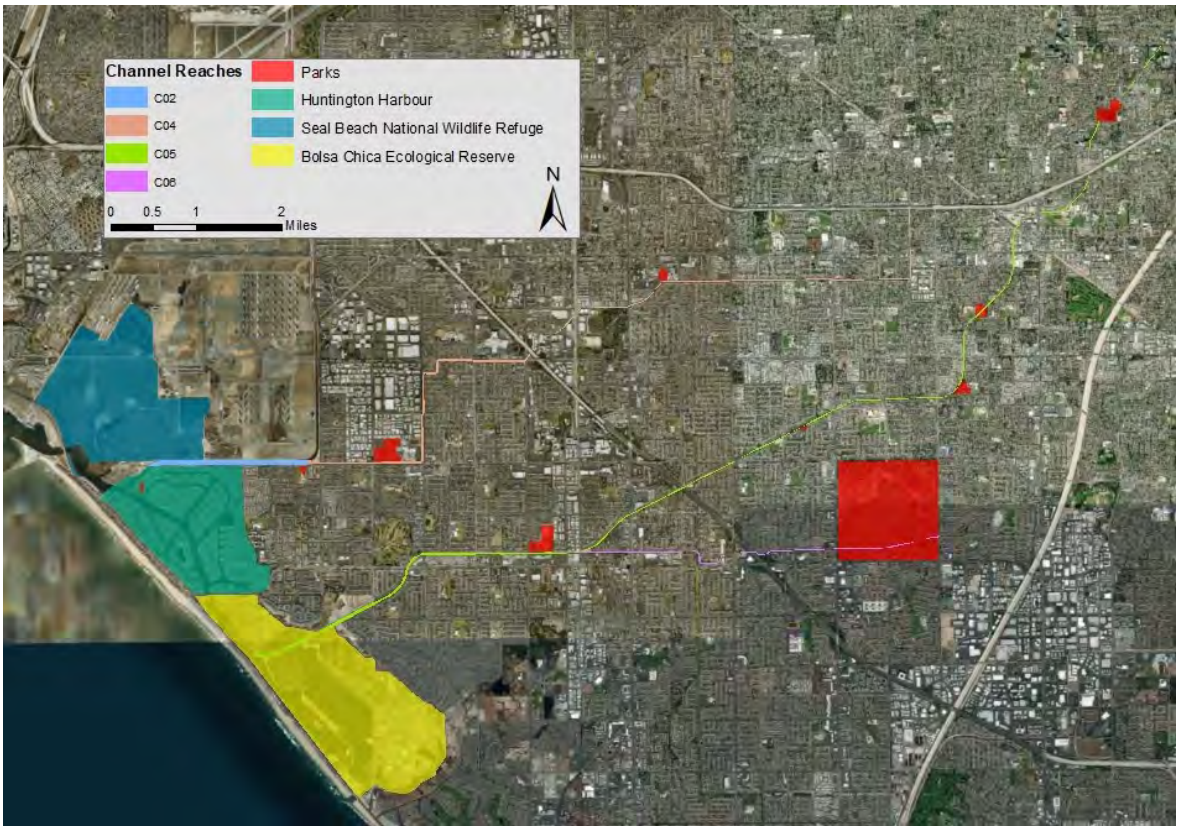


Figure 28: Recreational areas within the vicinity of the drainage channels.

2.15 Aesthetics

The NEPA and the CEQA regulations identify aesthetics as one of the elements that must be considered in determining the effects of a project. Aesthetics are generally described in terms of visual quality, or quality of views. Views can be categorized into three types: the foreground, middleground, and background. Attention to detail at varied distances determines the type of view captured by the viewer. The viewer's attention to detail at less than one-half mile represents the foreground. Attention to vegetative changes, but with less detail, from one-half mile to three to five miles represents the middleground. Attention to large landforms with little or no detail at distances greater than five miles represents the background. Visual quality activities and characteristics in the foreground zone are considered to be most valuable.

Aesthetics analysis considers the existing and future appearance, or perception of views, of the project site and areas surrounding the site, and viewer sensitivity. Aesthetics analysis for the proposed project includes identifying areas considered to contain valuable views (such as scenic vistas, designated scenic resource areas, and scenic highways), describing existing visual characteristics of the region and project area, discussing applicable plans, policies, and regulations, and anticipating the future appearance without implementation of the Proposed Action. Scenic vistas may be defined as viewpoints that provide expansive views of highly valued landscape for the public's benefit. Scenic resources are natural or manmade features that are visually pleasing and contribute to the definition of a community or region. Scenic resources can include trees and landscaping, rock outcroppings, historic buildings, and public art.

The study area is located in western Orange County, California, approximately 25 miles southeast of the City of Los Angeles. The Westminster watershed is approximately 74.1 square miles in area and includes

urbanized areas in the cities of Anaheim, Cypress, Fountain Valley, Garden Grove, Huntington Beach, Los Alamitos, Santa Ana, Seal Beach, Stanton, and Westminster. The watershed lies on a flat coastal plain and is almost entirely urbanized with residential and commercial development (Figure 3). Within the study area, the majority of scenic vistas and scenic resources are located within the City of Huntington Beach and along the coast.

The Pacific Ocean is the area's most prominent scenic vista and scenic resource and is located west of the study area. Also west of the study area and a prominent scenic vista is Bolsa Chica State Beach which extends south from Warner Avenue to just north of Seapoint Street. Bolsa Chica State Beach offers views of the Pacific Ocean, the Ranchos Palos Verdes peninsula to the northwest, Catalina Island to the west, and the BCER to the east.

Views of the channel system are limited to adjacent residential and commercial land uses, and areas where streets and highways cross over the reaches. Views are further limited by landscaping and fencing along the channel system. The various widths and lengths of the channels consist of a combination of earthen, riprap, and concrete lined channels through the cities of Fountain Valley, Garden Grove, Huntington Beach, Santa Ana, Seal Beach, and Westminster. The only grass-lined channel in the system is on C06 where it traverses through Mile Square Park. The downstream reaches of the channels have tidal influence, but little vegetation present. Refer to *Appendix L – Environmental Considerations* for representative photos of views from the study area.

2.16 Public Health and Safety

Except for a portion of Reach 1 on C05 and those reaches that have concrete covered conduit (i.e., portions of Reaches 7, 9, 10, 11, 12, and 15), both sides of the existing channel system is fenced at the right-of-way and at street crossings to limit access. The portion of Reach 1 on C05 (i.e., Graham Street to the BCER) that does not include fencing along the channel right-of-way allows public access to the coast. Public access is provided to the right-of-way portions of Reaches 7, 9, 10, 11, 12 and 15; however, there are no existing public safety concerns as these reaches are below ground.

2.16.1 Flooding

The coastal area is subject to occasional flooding from weather related events such as: (1) King Tide, caused by a unique combination of how the sun, moon, and the earth align, bringing the highest tides of the year; (2) increased surf with swales up to 25 feet from monsoonal storms from hurricanes moving northwest from the western Mexican coast; and (3) larger than normal winter storms. Flooding and closure of local streets causes traffic delays as well as car damages. Local residents experience flooding of building ground floors, yards, and garages.

Flooding within the area, specifically the channels, does create a public safety concern. In January 2018, a deceased male was discovered in one of the flood control channels (Schwebke 2018). On December 12, 2014, one person was found dead in a rain-swollen flood control channel in the City of Garden Grove, Orange County (Foreign Staff, 2014).

2.16.2 West Nile Virus

In 2014, there was an outbreak of the West Nile virus in Orange County that had infected 280 people as of December 31, 2014. Public health experts say the region's prolonged drought may have been a factor. Since 2014, the mosquito populations in southern California have been below normal, owing in part to the persistent drought that has dried up much of the standing water where the insects breed. Scientists believe those same dry conditions have driven more birds into populated areas in search of water, concentrating numbers of the virus' preferred host and the mosquitoes that feed on them closer to people. According to

data collected by the Orange County Health Care Agency, since 2014 total infections by year have decreased: 97 (2015), 36 (2016), and 38 (2017; as of 11/22/2017) (Orange County Health Care Agency 2018).

2.17 Transportation

Several major freeways traverse the study area including the San Diego Freeway (e.g., I-405), the Santa Ana Freeway (I-5) on the northern edge of the study area, and the Garden Grove Freeway (State Route 22 [SR-22])). Local bus services are provided in most of the cities in the County, including OCTA.

Several cities within the study area have designated truck routes for construction activities and long-term business operations. The designated truck routes in the vicinity of the proposed project area provided in Figure 29 and Table 22.

Figure 29: Map of Designated Truck Routes within the Vicinity of the Drainage Channels.

Table 22: Designated Truck Routes within the Vicinity of the Drainage Channels.

City	Designated Truck Route	Approximate Portion Affected
Fountain Valley	Brookhurst Street	All portions in the city
	Edinger Avenue	All portions in the city
	Euclid Street	Edinger St. south to I-405 Freeway
	Garfield Avenue	Newland St. east to Brookhurst St.

City	Designated Truck Route	Approximate Portion Affected
	Harbor Boulevard	All portions in the city
	Magnolia Street	All portions in the city
	Newhope Street	Warner Ave. south to I-405 Freeway
	Slater Avenue	Euclid St. east to Harbor Blvd.
	Talbert Avenue	All portions in the city
	Warner Avenue	All portions in the city
Westminster	Beach Boulevard	All portions in the city
	Bolsa Avenue	All portions in the city
	Bolsa Chica Road	All portions in the city
	Brookhurst Street	All portions in the city
	Garden Grove Boulevard	All portions in the city
	Goldenwest Street	All portions in the city
	Hazard Avenue	Goldenwest St. east to Beach Blvd.
	Magnolia Street	All portions in the city
	Westminster Boulevard	All portions in the city
Garden Grove	Beach Boulevard	Garden Grove Blvd. south to Trask Ave.
	Bolsa Avenue	All portions within the city
	Brookhurst Street	Katella Ave. south to Hazard Ave.
	Cannery Street	Garden Grove Blvd. south to Magnolia St.
	Century Blvd.	Garden Grove Blvd. southeast to Euclid St.
	Chapman Avenue	Valley View St. to Lewis St.
	Edison Way	Belgrave Ave. to Lampson Ave.
	Euclid Street	Katella Ave. south to Hazard Ave.
	Fairview Street	Garden Grove Blvd. south to Westminster Ave.
	Garden Grove Blvd.	City limits west of Beach Blvd. east to Siemon St.
	Harbor Boulevard	Chapman Ave. south to Westminster Ave.
	Haster Street	City limits north of Chapman Ave. south to Garden Grove Blvd.
	Hazard Avenue	All portions within the city
	Industry Street	Chapman Ave. south to Lampson Ave.
	Katella Avenue	Dale St. east to Euclid St.

City	Designated Truck Route	Approximate Portion Affected
	Knott Street	City limits north of Orangewood Ave. south to Garden Grove Blvd.
	Lampson Avenue	Knott St. east to east of Western Ave.
	Lewis Street	Chapman Ave. south to Westminster Ave.
	Magnolia Street	Katella Ave. south to Westminster Ave.
	Monarch Street	Chapman Ave. south to Acacia Ave.
	Nelson Street	Stanford Ave. south to Garden Grove Blvd.
	Newhope Street	Garden Grove Blvd. south to Westminster Ave.
	Nutwood Street	Stanford Ave. south to Garden Grove Blvd.
	Pala Drive	Acacia Ave. north to terminus
	Stanford Avenue	Nutwood St. east to Nelson St.
	Trask Avenue	Beach Blvd. east to Fairview St.
	Valley View	City limits north of Chapman St. Ave. south to Garden Grove Freeway
	Western Avenue	City limits north of Orangewood Ave. south to Garden Grove Blvd.
	Westminster Ave.	Newland St. east to Fairview St.
Santa Ana	17th Street	Westminster Ave., all portions within city
	4th Street	All portions within the city from Grand Ave., easterly
	1st Street	All portions within the city
	Bristol Street	All portions within the city
	Edinger Avenue	All portions within the city
	Euclid Street	All portions within the city
	Fairview Street	All portions within the city
	Grand Avenue	All portions within the city
	Harbor Boulevard	All portions within the city
	MacArthur Boulevard	All portions within the city
	Main Street	All portions within the city
	Memory Lane	All portions within the city from Bristol, westerly

City	Designated Truck Route	Approximate Portion Affected
	Segerstrom Avenue-Dyer Road	All portions within the city
	Standard Avenue	Between Warner Ave. and 1st St.
	Tustin Aveune	All portion within the city
	Warner Avenue	All portions within the city
Huntington Beach	Warner Avenue	Pacific Coast Highway east to I-405
	Edinger Avenue	Bolsa Chica St. east to Newland St.
	Bolsa Avenue	Bolsa Chica St. east to Edwards St.
	Argosy Street	Bolsa Chica St. east to Graham St.
	McFadden Avenue	Graham St. east to Springdale St.
	Graham Street	Bolsa Avenue south to Edinger Ave.
	Bolsa Chica Street	Rancho Rd. south to Warner Ave.
	Springdale Street	Westminster Blvd. south to Warner Ave.
	Goldenwest Street	I-405 south to PCH
	Gothard Street	Edinger Ave. south to Garfield Ave.
	Talbert Avenue	Gothard St. east to Newland St.
	Main Street	Garfield Ave. northeast to Beach Blvd.
	Garfield Avenue	Goldenwest St. east to Brookhurst St.
	Magnolia Street	Garfield Ave. south to PCH
	Brookhurst Street	Garfield Ave. south to PCH
	Adams Avenue	Beach Blvd. east to Warner Blvd.
	Atlanta Avenue	Beach Blvd. east to Newland St.
	Hamilton Avenue	Newland St. east to Brookhurst St.
	Newland Street	Atlanta St. south to PCH

CalTrans and Orange County require transportation management plans where a state or county roadway would be directly affected by construction activities. Traffic management plans would be subject to approval by the responsible jurisdictions. The transportation plans would include traffic control measures and other procedures that may be necessary during construction.

2.18 Utilities

The C05/C06 Channel System bisects numerous utilities. These utility lines provide natural gas, sewer, water, oil, and fiber optic services. The majority of the utility lines that bisect the channel system follow under roadways that extend over the existing channels. The major utility lines that cross the channel system are listed in Table 23.

Table 23: Existing major utilities

Utility	Location
C05 Channel	
14-inch H.P. Gas	2900 feet Southwest of Graham St.
8-5/8-inch oil line, 15-inch VCP Sewer, 16-inch H.P. Gas	Under Golden West Street Bridge
Three 30-inch VCP Sewer Siphon	At C06 Confluence
96-inch RCP Sewer	Under I-405
Two 8-inch Sewer	Ward Street
36-inch Sewer	Euclid Street
12-inch Encased Water	Harbor Boulevard
12-inch Water	Garden Grove Boulevard
12-inch Encased Water	Allard Avenue
C06 Channel	
22-inch Steel Water, 6-foot by 7-foot RCB Sewer Siphon	Newland Street
12-inch Encased Sewer Siphon	Asari Lane
16-inch Encased Water	Magnolia Street
48-inch Sewer	Bushard Street
9-inch Steel Pipe Crossing	600 feet West of Brookhurst Street
12-inch Water	Brookhurst Street
12-inch Water	Euclid Street
C02 Channel	
4-3-1/2” ACD, 8-3-1/2” ACD, 18” Water Main, Aerial Crossing, 30” Sewer Force Main	Westminster Avenue
12” Irrigation Line, 20” Sewer Force Main, 14” H.P. Gas Main	D/S FWY Culvert
12” Water Main	Through Culvert
34” Gas Main	Lampson Avenue
17” Irrigation Line	D/S Cerritos Avenue
Aerial Crossing	Cerritos Avenue

2.19 Future without Project Conditions

The without-project conditions addresses an inventory of historic and existing conditions and a forecast of future without-project conditions. The without-project condition describes the project area’s future if there is no federal action taken to solve the problem at hand, and is synonymous with the No Action Alternative. Every alternative plan that is formulated is compared to the same future without-project condition. Future without-project conditions are based on forecasting, and are considered the most likely future condition. The following is a summary of future without-project conditions for elements that will have the most direct effect on plan formulation.

- Local flooding would continue to occur due to over topping of the drainage channels. The predicted increase in severe storm events (see Section 2.5) with increased stream flow and changes in sea level would increase the risk of flooding throughout the region. Without the implementation of remediation actions, impacts from changes in weather patterns causing increased local precipitation runoff as well as increases in the chance for extreme flooding could significantly increase flooding in the study area. See Section 2.5 and the Climate Change Assessment in *Appendix A – Hydrology & Hydraulics* for more information.
- Earthen drainage channels are expected to continue to experience scour and sedimentation. Substantial scour could undermine concrete and riprap lined drainage channels. In addition, longer, more frequent periods of drought could lead to less water in the drainage channels, thereby exposing earthen drainage channels to erosion by wind.
- Earthquakes/seismic events, especially those associated with the Newport-Inglewood Fault would continue to occur in an unpredictable manner, which if strong enough could induce surface rupture and/or liquefaction within the vicinity of the drainage channels.
- Warming temperatures will likely make it more difficult for the Southwest's rapidly growing cities to meet air quality standards. It is estimated that more than 90% of California's population lives in areas that violate state air quality standards for ground-level ozone or small particles, with air pollutants causing an estimated 8,800 deaths and over $1 billion in health care costs every year. Warmer temperatures are expected to increase the frequency, intensity, and duration of conditions that are conducive to air pollution formation, further exacerbating air quality issues in the southwest. These conditions threaten the health and well-being of people who suffer from respiratory ailments, such as asthma and chronic obstructive pulmonary disease. See Section 2.5 and the Climate Change Assessment in *Appendix A – Hydrology & Hydraulics* for more information.

  Since the study area is "built-out" horizontally, future construction would likely be vertical to increase housing. This would increase local commuting, especially with one of the busiest freeways immediately to the north of the study area. Without the increase in electric and alternative fuel vehicles, air emissions from motor vehicles would continue to increase within the study area. A projected rise in temperature (See Section 2.5) would exacerbate this problem.
- Biological resources would be expected to remain the same within the channels or slightly decrease due to further improvements to the drainage channels by OCPW. Biological resources within BCER and SBNWR would be expected to remain the same or increase slightly due to ongoing restoration efforts.
- Local ambient noise levels would not change significantly. An increase in traffic volume due to increased population along with an increase in development could increase roadway noise levels. An increase in vibration caused by heavy vehicles on the roadways could increase with minimum maintenance of roads, such as filling potholes and cracks due to substrate settlement.
- Based on recent trends in population within the proposed project area, the population breakdown is not expected to change radically. Local forecasts are not available in meaningful estimates, but the California Department of Finance estimates that white populations will increase in size from 2016 to 2036 and then slightly decline by 2060, but will decrease in proportion to the total population (California Department of Finance, 2017). African American populations are expected to increase in size from 2016 to 2060, and maintain their current proportion to the total population (approximately 6%). Currently, approximately 39% of Californians claim Hispanic ethnicity, and by 2060 nearly half (46 percent) of all Californians are projected to be of Hispanic

descent. Asians will also grow in population size, but similar to African American populations are expected to maintain their current proportion to the total population (just over 13 percent) (California Department of Finance, 2017).

- Land use within the study area is not expected to change as the area is considered fully developed. Any additional development within the study area would be vertical rather than horizontal.
- Existing recreation areas would not be expected to change substantially. Future development may occur within the Mile Square Park and other area parks as recreation needs change over time. Since the study area is considered built-out, and while there is approximately only 10 acres of vacant land within the area, there are currently no plans to develop additional parks within the area.
- Flooding would continue periodically and may increase based on the forecast conditions of climate change in southern California. Therefore, there could be increased risk to public safety due to increased flooding associated with an increase in severe storm events. West Nile Virus and other health issues would continue until the virus is eradicated. Other health issues to low income and minority populations are anticipated to increase due to the predicted impacts of climate change over time. See Section 2.5 and the Climate Change Assessment in *Appendix A – Hydrology & Hydraulics* for more information.
- Local traffic including emergency services would not be impacted; however, changes to local traffic could occur in the future with an increase in cars, buses, and other roadway users, depending on the status of the local population.

3.0 Plan Formulation*

Plan formulation is an iterative process resulting in the development, evaluation, and comparison of alternative plans to address identified study problems. Plan formulation for flood risk management studies is challenging because evaluating alternative plans involves estimating both the project costs and flood risk management benefits through rigorous hydrology and hydraulics (H&H) modeling, as well as design, cost, and economic analyses. To facilitate the plan formulation process, an incremental analysis technique was utilized to optimize net benefits by comparing different channel modification measures on a reach-by-reach basis.

3.1 Risk–Informed Planning

This feasibility study followed the six-step planning process defined in the 1983 P&G adopted by the Water Resource Council and the Planning Guidance Notebook, ER 1105-2-100. The six steps are:

- Step 1 – Identifying problems and opportunities
- Step 2 – Inventorying and forecasting conditions
- Step 3 – Formulating alternative plans
- Step 4 – Evaluating alternative plans
- Step 5 – Comparing alternative plans
- Step 6 – Selecting a plan

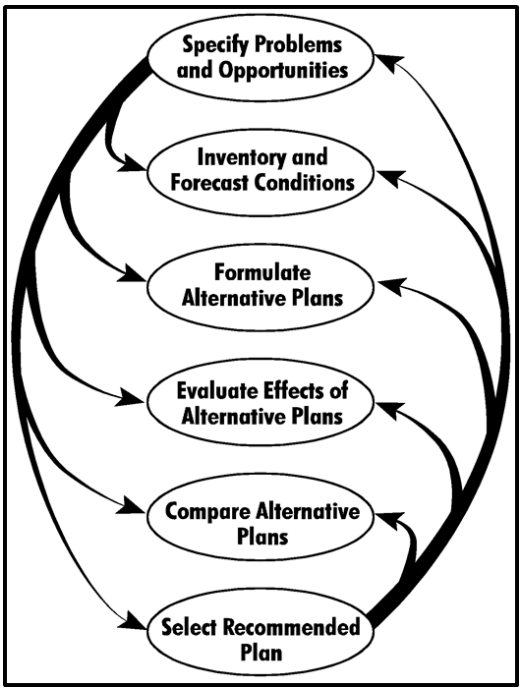


Figure 30: USACE six-step planning process.

Identification of problems and opportunities begins at the outset of the study and forms the foundation of the planning process. The identified problems and opportunities for the Westminster watershed are described in Section 1.11.

Developing a detailed inventory of existing conditions and forecast of future conditions, Step 2, creates a comprehensive picture of the study area. By gathering both qualitative and quantitative data as outlined in Chapter 2.0 of this report, the study team was able to develop and evaluate alternative plans. Forecasted conditions provide a basis for the comparison and evaluation of alternative plans.

Management measures were identified based on the study objectives, screened based on various criteria, and then combined to form an Initial Array of Alternatives.

Planning has continued to evolve since the 1983 P&G, an evolution that now includes its confluence with risk analysis. Risk-informed planning (described in IWR Publication 2017-R-03) pays careful attention to uncertainty, and it uses a set of risk performance measures, together with other considerations, to *inform* planning. Risk-informed planning is an analytic-deliberative process that aims to reduce uncertainty, but acknowledges that it can never be eliminated entirely. The goal, in a world of limited time and budget, is to efficiently reduce uncertainty by gathering only the evidence needed to make the next planning decision and to manage the risks that result from doing so without more complete information. Under risk-informed planning, the six-step planning process may be demonstrated more effectively as shown in Figure 31.

Figure 31: USACE Risk-informed planning process.

Stakeholder involvement is at the center of this planning process, which takes place within a continuous process of evidence gathering and uncertainty reduction. The thread that unites the steps, surrounds the stakeholder engagement, and mirrors the evidence gathering is risk management. The cyclical nature of the figure depicts the iterative nature of the planning process.

3.1.1 Risk Assessment for Flood Risk Planning

Risk is a measure of the probability and consequence of future events occurring. USACE follows a conceptual flood risk model which is a function of hazard, performance, and consequences.

Hazard

The hazard, or potential cause for harm, refers to flooding and erosion caused by flows from the C02, C04, C05, and C06 drainage channels within the Westminster watershed. A more detailed description of the hazard input is included in Sections 2.3.1 and 2.3.2, as well as in *Appendix A – Hydrology & Hydraulics*. Figure 32 shows anticipated flooding in the project area for the without project condition for multiple ACE events.

Performance

Performance refers to the system's reaction to the hazard, or how the existing channels are anticipated to handle various flood loadings. Performance in this study is primarily tied to the conveyance capacity in the study drainage channels and the fragility of levees in the downstream sections of those channels. A description of the existing system's performance during storm events is also included in Sections 2.3.1 and 2.3.2, as well as in *Appendix A – Hydrology & Hydraulics*. Additional information on the fragility of leveed channel reaches in the study area is included in *Appendix G – Geotechnical Engineering*.

Consequence

Consequence refers to the potential economic and/or non-economic harm that results from a single occurrence of the hazard, including risks to life safety, damages to residential and commercial structures and public infrastructure, and time lost due to traffic delays caused by flooded transportation routes. Consequences are summed up as damages; avoided damages that would result from implementing an alternative plan then become benefits of that plan.

These three concepts are utilized to evaluate the effectiveness of potential flood risk reduction measures under consideration for federal investment and each term is discussed more completely in ER 1105-2-101 "Risk Assessment for Flood Risk Management Studies" dated 17 July 2017.

The consideration of risk and uncertainty in the plan formulation process is vital to ensure that plans which are evaluated and potentially recommended are aware of and manage risks. There is uncertainty associated with each of the contributing factors to flood risk (hazard, performance, and consequence) that must be considered during measure development and the formulation process. The risk-based analyses performed for this study attempt to account for these uncertainties quantitatively (where possible) and qualitatively to arrive at a risk-informed recommendation.

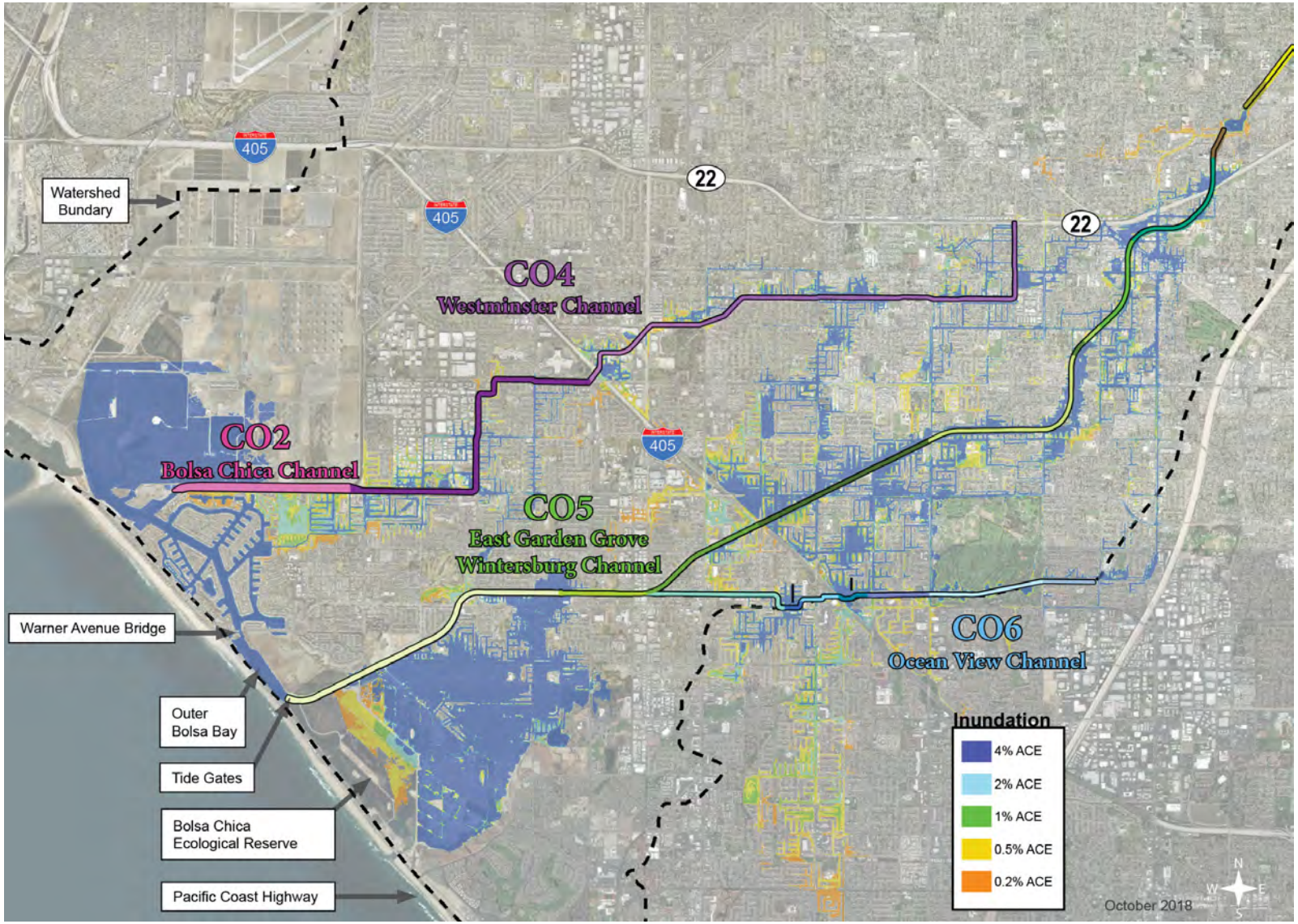


Figure 32: Anticipated flooding in the study area for multiple ACE events under the future without project condition.

Page intentionally left blank
for double-sided printing

3.2 Management Measures

Management measures are features or activities that can be implemented at a specific geographic location to address one or more planning objective. Measures can be either structural or nonstructural. For this study, measures were grouped into the following categories to address flood damage risks in the project area:

- Nonstructural measures
- In-channel measures
- Upstream flood risk reduction measures
- Downstream flood risk reduction measures

3.2.1 Nonstructural Measures

As outlined in PB 2016-01, "Clarification of Existing Policy for Participation in Nonstructural Flood Risk Management and Coastal Storm Damage Reduction Measures," nonstructural measures reduce human exposure or vulnerability without altering the nature or extent of that hazard. In this case, hazard refers to water associated with flooding that can cause harm, exposure is defined as who or what would be impacted by a hazard, and vulnerability is how susceptible exposed people and properties are to damage and harm from the hazard. This group of measures typically includes modifications to existing residential and non-residential buildings, planning activities, maintenance, and behavioral solutions.

Floodplain Regulation

Floodplain regulation is a nonstructural measure that seeks to regulate floodplain uses in order to minimize current and future damages by controlling construction activities and land use. This measure utilizes political and/or social controls to minimize land use activities that are incompatible with floodplain conditions, while maximizing more compatible uses such as recreation, open space, habitat, and parking. Examples of floodplain regulation tools include master plans, zoning controls, and building codes. Local, county, and state governing bodies are typically responsible for floodplain regulation.

Emergency Response

Emergency response is a nonstructural measure that involves the development of an emergency plan that provides for the dispatch of emergency services and a framework within which local agencies would operate during a flood event. It does not solve the issue of flooding; rather it seeks to provide for public safety and spot treatment of problem areas. Emergency response does not reduce damages or prevent emergency costs in the affected floodplain. Police, fire, and sheriff's departments are typically the primary responsible parties for emergency response operations.

Evacuation Planning

Evacuation planning is a nonstructural measure that involves the development of an emergency plan that provides for the physical removal of residents from the floodplain on a temporary basis in the event of flooding. It does not solve the issue of flooding but rather seeks to provide for public safety during hazardous flooding conditions. Evacuation planning reduces the risk of injury or loss of life as a result of flooding, but does not reduce damages in the affected floodplain. Local and county governing bodies are typically responsible for leading evacuation planning efforts.

Flood Warning System

A flood warning system is a nonstructural measure that facilitates the evacuation of flood prone areas during larger storm events. Similar to emergency response and evacuation planning measures, this measure would not reduce damages to structures but it would reduce the risk to life safety.

Flood Proofing

Flood proofing is a nonstructural measure that involves modifying existing structures to prevent damage during flood events. Flood proofing methods include raising buildings, waterproofing or sealing the lowest entry points of a structure, and/or construction of berms or floodwalls.

Razing/Removal of Structures

Razing structures is a nonstructural measure that involves demolishing flood prone structures or relocating such structures outside of the floodplain. For structures that are shown to be regularly impacted by flooding, this course of action may be preferable to flood proofing or filing repeated flood insurance claims.

Removal of Impediments to Flow

Removal of impediments to flow is a nonstructural maintenance measure that involves the removal of vegetation, sediment, and debris that can accumulate in drainage channels and interfere with the conveyance of flood flows. Removing impediments to flow could be implemented on a priority-basis, increasing maintenance investments in locations that are known to require greater capacity during flood events.

3.2.2 In-Channel Modification Measures

In-channel modification measures located within the existing right of way are designed to improve the function of the existing drainage system through increased efficiency and/or capacity.

Lining Channels with Concrete

Channel walls and/or bottoms that are earthen or lined with riprap have uneven surfaces that prevent water from moving efficiently over them. Lining these types of channels with concrete reduces surface roughness and increases channel efficiency. Increasing the efficiency of drainage channels means that they are less likely to back up and overtop during periods of heavy flow.

Altering Channel Geometry

Many channel reaches in the study area have trapezoidal cross-sections. Cutting back the diagonal side slopes of these channels to create a rectangular cross section increases both the efficiency and capacity of the channels.

Floodwalls

Walls built at the edge of an existing channel provide for extra capacity by raising the bank height. Floodwalls can be constructed of a variety of materials, including steel sheet pile and concrete. While floodwalls present a higher risk of failure than other in-channel measures, they can be an effective means of adding capacity where real estate or right of way restrictions prevent further widening of the channel.

Pump Station Modifications

There is a pump station located at Haster Basin. Alterations upstream in C05 would potentially change the demand placed on this pump station. Adapting or retrofitting the station may be required to provide the necessary capacity.

Tunnel System to a new Ocean Outlet

Based on the hydraulic inefficiency of the existing tide gates, the diminishing capacity of Outer Bolsa Bay attributed to continual erosion of the adjacent bluff, and the existing bottleneck at Warner Avenue Bridge, a new ocean outlet could be created to allow flood waters to bypass these restrictions altogether without overtopping the channels. A system of large tunnels (up to ~30ft in diameter) beneath the project area would potentially increase the hydraulic efficiency of the lower reaches of the C05 channel by allowing flows to bypass these existing constrictions via an underwater outfall located offshore from the project area.

3.2.3 Upstream Flood Damage Risk Reduction Measures

Upstream flood damage risk reduction measures seek to address flood waters closer to their source, thus decreasing the amount of water entering the channels and putting less stress on the system downstream.

Diversion or Bypass Channels within the Watershed

Rerouting flood waters may be useful for directing water away from channel segments that are known to be insufficient during periods of high flow. Creating bypass channels likely means additional real estate would be required in order to connect two existing rights of way.

Santa Ana River Diversion

The SAR is a large regional river that could possibly accept flows from channel systems within the watershed. There is a potential opportunity to divert water from the C05 channel to the SAR using the abandoned Pacific Electric Railroad right of way.

Storage or Retention Basins

Depressional landscape features can be used or created to capture and store storm water. Retention basins would decrease the demand on the drainage channels during periods of high flow and then slowly be drawn back down during dry periods. Retention basins also present potential water quality benefits downstream through sedimentation and infiltration. Due to the urbanized nature of the project area, real estate required for the development of a retention basin is scarce. The existing Mile Square Park, a highly utilized regional recreation area, was identified as a potential retention basin location.

Dams

A small dam constructed within a channel(s) or within a basin outside of the channels would function as a water control device, regulating volume in the channels during storm events.

Levees

Levees are designed earthen structures constructed adjacent to the channels to provide elevated flood protection. Levees would serve a similar purpose to constructing floodwalls, but have a wider footprint.

3.2.4 Downstream Flood Damage Risk Reduction Measures

While channel modifications reduce flood risk throughout the watershed, they also increase the volume of flood water that enters Outer Bolsa Bay and Huntington Harbour downstream. Downstream flood damage risk reduction measures are intended to remove impediments to flow associated with these outlets, ensuring that flood water can exit the system efficiently.

Intentional Breaching of the Levee on C05 Adjacent to the Muted Tidal Pocket

The levee separating C05 from the Muted Tidal Pocket in the BCER would be breached to reduce C05 water flow velocities and water surface elevations, attenuating flows to Outer Bolsa Bay. The flushing action of flows into the Muted Tidal Pocket could be beneficial to the habitat despite the urban runoff water source. Currently there is an exchange between the Muted Tidal Pocket and Outer Bolsa Bay that resulted from a previous mitigation effort in the area. Therefore, since C05 flows into Outer Bolsa Bay, there is already some connectivity between C05 and the Muted Tidal Pocket.

Removing the Tide Gates on C05

The tide gates separating lower C05 from Outer Bolsa Bay consist of twelve 84-inch diameter, 28-feet long, corrugated metal pipes with heavy duty flap gates. Available records indicate that the gates are hydraulically inefficient. Removing the tide gates would improve the hydraulic efficiency of the lower reaches of the C05 channel and lower the associated water surface profiles.

Replacing or relocating the Tide Gates on C05

The existing C05 tide gates are hydraulically inefficient and replacing the structure would improve flow conditions through the lower reaches of the C05 channel. Replacing the gates could eliminate the tidal influence on upstream reaches of the C05 channel. If replacement were to occur, some consideration would be given to relocating the gates upstream to avoid the loss of tidally influenced channel habitat near the confluence with Outer Bolsa Bay.

Widening the Existing Bottleneck at Warner Avenue

Widening the Outer Bolsa Bay channel just upstream of the Warner Avenue Bridge would improve conveyance and hydraulic efficiency in the lower reaches of the C05 channel and compensate for increased flows associated with channel modifications upstream in C05/C06. This measure would involve removing approximately 1 acre of land on the east edge of the Bolsa Chica Conservancy parking lot just upstream of Warner Avenue, and it would also require expanding both the Warner Avenue Bridge (automobile traffic) and the pedestrian bridge in BCER.

Raising Pacific Coast Highway

The portion of PCH that runs adjacent to the southern edge of Outer Bolsa Bay is subject to flooding. Raising the highway, which is owned by Caltrans, would remove it from the inundation area during more frequent storm events.

Constructing a Floodwall along Pacific Coast Highway

Constructing a floodwall along the portion of PCH that experiences flooding would protect it from more frequent storm events. An approximately 2,500 foot long and 3 foot tall floodwall would potentially protect the highway from flooding caused by waters conveyed in the C05 and C06 channels.

Dredging in Outer Bolsa Bay

Outer Bolsa Bay is slowly losing capacity as soil erodes away from the adjacent bluffs and is deposited into the bay. Flows through the bay have not been significant enough to remove this sediment. As a result, mud flats are being formed which are beneficial habitat for local shore birds. Dredging the bay may increase its capacity but it would also impact the mudflat habitat. OCPW currently has no rights to Outer Bolsa Bay and any dredging would require a new agreement between OCPW and the California State Lands Commission.

Constructing a New Ocean Outlet

Given the hydraulic inefficiency of the tide gates and the diminishing capacity of OBB from continual mesa erosion, a new ocean outlet could be created beneath PCH. This new outlet would potentially increase the hydraulic efficiency of the lower reaches of the C05 channel by allowing flows to bypass the existing constriction at the Warner Avenue bridge.

3.3 Initial Screening of Measures

Once the initial list of possible flood risk reduction measures was assembled, each measure was then considered in the context of the project area and the Westminster watershed as a whole. The challenges of implementing flood damage risk reduction measures in such an urbanized area reduced the list of viable options.

3.3.1 Screened Nonstructural Measures

Floodplain Regulation

The Water Resources Development Act (WRDA) of 1996 provides that a non-federal interest in a federal flood damage reduction project must participate in and comply with federal flood plain management and flood insurance programs. Local, county, and state governing bodies are typically responsible for floodplain regulation.

The Orange County Flood Control Act was passed in 1927 as *"An Act to create a flood control district to be called "Orange county flood control district"; to provide for the control and conservation of flood and storm waters, and for the protection of harbors, waterways, public highways and property in said district from damage from such waters, and for the construction of works and the acquisition of property therefor."* Further, all of the communities in the Westminster watershed are currently participating in the FEMA National Flood Insurance Program (NFIP). Since the county and the communities are already carrying out floodplain regulation, including it as a measure would be redundant and, therefore, it has been screened out from this study.

However, the analyses carried out for this study, particularly the development of updated H&H models, may be beneficial to local governing bodies in refining their floodplain regulations in the future. While floodplain regulation recommendations are not included in this report, USACE's analyses will be made available, as necessary, to assist other bodies to improve management of the Westminster watershed.

Emergency Response, Evacuation Planning, and Flood Warning System

Emergency response operations primarily fall under police, fire, and sheriff's departments' jurisdiction. Due to the number of potential hazards in Orange County (earthquakes, flooding, wildfires, tsunamis), communities have prepared emergency response plans that include evacuation planning.

Similarly, a flood warning system was screened out because one already exists for the study area. Orange County, in collaboration with local cities, currently operates and maintains the AlertOC system, which is a comprehensive "mass notification system designed to keep Orange County, California residents and businesses informed of emergencies that may require immediate life saving actions." This system provides participants with time-sensitive voice, text, and email messages in the event of an emergency such as flooding.

If the H&H modeling or traffic impacts analysis carried out during this study are determined to be beneficial, USACE will work with these local entities to make sure that the pertinent information is available and accessible for use and/or incorporation into existing emergency response, evacuation planning, and flood warning systems.

Flood Proofing and Razing/Removal of Structures

Significant, basin-wide nonstructural alternatives were screened out because dense development and high real estate values make these measures too expensive to implement on such a large scale when more efficient solutions are viable. There are approximately 44,000 structures within the 0.2% ACE floodplain in the study area. Nonstructural solutions will be considered on a more localized basis, in combination with other measures, if they are likely to increase the net benefits produced by the various alternative plans. Similarly, flood proofing of critical facilities will be considered during detailed design if protection of said facilities would be likely to improve response and recovery, or decrease risks to life safety, in the study area.

3.3.2 Screened In-Channel Modification Measures

All of the identified in-channel modification measures were retained during initial screening of measures with the exception of pump station modifications. At this point, it doesn't appear that pump station modifications will be required to provide the necessary capacity in the study channels, however this measure will be reincorporated into the planning process if future modeling demonstrates a need.

3.3.3 Screened Upstream Flood Damage Risk Reduction Measures

Santa Ana River Diversion

Due to the dense development of the watershed, the only feasible opportunity to divert water from the Westminster watershed to the SAR would be to use the abandoned Pacific Electric Railroad right of way off of C05. This measure was screened out because the invert of the C05 channel is lower than the invert of the SAR channel. The difference in channel inverts would prevent flows from draining the C05 channel into the SAR without additional intervention.

The difference in invert elevations would require pumping in order to transfer flows from C05/C06 to the SAR. This represents an additional cost and an ongoing maintenance concern. Also, such a connection would necessarily occur high up (relative terms) in the Westminster Watershed where it comes into close proximity with the SAR. Therefore it could only create a fairly minor flow reduction on the downstream reaches. Lastly, diversion to the SAR would inherently create interbasin flow, changing the modeling that is being used for the ongoing SAR projects and introducing the potential for induced damages in a separate watershed. While none of these concerns would necessarily support screening a SAR diversion on its own, the combination of them all indicates that this measure is qualitatively a high-cost, low-benefit solution to reducing flood risk in the Westminster watershed.

Storage or Retention Basins

Screened out due to the excessive amount of excavation and difficulty of disposing of spoil material compared to other identified measures. Additionally, the high groundwater elevation means that a potential retention basin would have to be pumped constantly or else be very large and shallow, which is not feasible in such a densely populated area.

Mile Square Park was modeled as a potential storage option but was determined not to be ineffective and, therefore, screened out. This measure would have also had significant adverse impacts on valuable recreation in the project area, as Mile Square Park is one of very few recreational open space areas in the highly urbanized Westminster watershed.

Dams

Screened out due to the flatness of the area, restriction within the rights of way, and limited available real estate in the urbanized project area. Topography in the project area is not conducive to creating storage behind a dam. High real estate values and a lack of available property further reduce the viability of operating dams along the drainage channels.

Levees

Screened out due to limited available real estate in the urbanized project area. High property values in the study area reduce the cost effectiveness of measures that require widespread real estate acquisition. New levees would likely require real estate acquisition for long stretches, through many individual parcels due to existing channel right of way limits. Floodwalls would likely be a suitable substitute in many applications as they provide similar function but require a smaller footprint for construction.

3.3.4 Screened Downstream Flood Damage Risk Reduction Measures

Intentional Breaching of the Levee on C05 Adjacent to the Muted Tidal Pocket

Screened out due to existing habitat restoration and limited potential storage. The existing Muted Tidal Pocket is the result of a previous mitigation project, during which a marine connection was made via a culvert system adjacent to the tide gates on C05. Breaching the levee would alter the balance of fresh and salt water entering the system, likely altering the established habitat and requiring mitigation. Due to the lack of available land and the costs associated with mitigation, the study attempts to minimize impacts to these resources. Further, the area would provide limited storage capacity, especially during high tide.

Raising Pacific Coast Highway

Screened out because the cost of raising this major roadway would be cost prohibitive compared to similar measures that can potentially provide the same level of risk reduction (i.e. floodwalls).

Dredging in Outer Bolsa Bay

Screened out due to habitat concerns and the fact that the NFS has no rights to dredge Outer Bolsa Bay. Dredging would require an agreement between OCPW and the State Lands Commission.

The CDFW further notes that “Dredging Outer Bolsa Bay would convert Outer Bolsa Bay mudflats to open water, reducing foraging opportunities for shallow water foragers and habitat for sensitive rare plants. Routine dredging would have impacts on sight-foraging species due to turbidity and conversion of shallow-subtidal habitat to deeper water habitat. Dredging could result in an increase of invasive species. Dredging Outer Bolsa Bay could severely impact public access to the reserve and could temporarily close the only designated fishing area on the reserve.” Outer Bolsa Bay contains habitat for federally-listed

threatened and endangered (T&E) species and protected eel grass beds. Due to the lack of available land and the costs associated with mitigation, the study attempts to avoid and minimize impacts to these resources.

Constructing a New Ocean Outlet

Construction of the ocean outlet would require a bridge that would span along PCH and a bridge connecting the beach parking lot along the western edge of PCH. This outlet would bisect the state beach. The ocean outlet would be similar to the outlet down coast that connects the Inner Tidal pocket portion of the Bolsa Chica Ecological reserve to the Pacific Ocean. The length of the jetties for the outlet would be limited to ensure they do not adversely impact existing beach nourishment programs that are conducted by the Corps and deposit sediment up-coast of Anaheim Bay. Long term maintenance of the outlet would be a significant cost. The ocean outlet immediately down-coast was originally designed to be dredged once every 5 years; however, significantly more sediment accumulates in the outlet than anticipated and it must be dredged on a yearly basis to maintain the opening. The outlet for the Santa Ana River further down-coast has also experienced significant problems with sediment deposits over the years. This measure was screened out due to the high levels of uncertainty regarding surrounding effectiveness and maintenance costs.

Table 24: Screening of flood damage risk reduction measures. Measures that would not be feasible based on conditions within the project area were screened out from further consideration.

Initial Screening of Measures		Initial Screening Status	
		Retained	Screened Out
Nonstructural Measures	Floodplain Regulation	-	X
	Emergency Response	-	X
	Evacuation Planning	-	X
	Flood Proofing	-	X
	Flood Warning System	-	X
	Razing/Removing Structures	-	X
	Removal of Impediments to Flow	X	-
In-Channel Modifications	Lining Channels with Concrete	X	-
	Altering Channel Geometry	X	-
	Floodwalls	X	-
	Pump Station Modifications	-	X
	Construct new ocean outlet (approx. 30' diam. tunnel)	X	-
Upstream Modifications	Diversion/Bypass Channels	X	-
	Storage/Retention Basins	-	X
	Dams	-	X
	Levees	-	X
	SAR Diversion	-	X
Downstream Modifications	Raising PCH	-	X
	Constructing a Floodwall along PCH	X	-
	Removing Tide Gates on C05	X	-
	Reconstructing/Relocating Tide Gates on C05	X	-
	Widening the Existing Bottleneck at Warner Avenue	X	-
	Dredging in Outer Bolsa Bay	-	X
	Intentional Breaching of the Levee on C05 Adjacent to the Muted Tidal Pocket	-	X
	Constructing a New Ocean Outlet	-	X

3.3.5 Relocation versus Removal of Existing Tide Gates

Only one of the retained measures of tide gate removal or tide gate relocation/replacement shown in Table 24 could be reasonably implemented. In previous conversations with stakeholders and resource agencies, concern was expressed that a tide gate structure was needed to prevent salt water infiltration and tidal fluctuations upstream of the existing structure. However, the current tide gates already leak and therefore allow saltwater habitat to exist upstream in C05 in the future without project condition. This saltwater influence extends upstream of Outer Bolsa Bay for approximately 2.5 miles. Similarly, saltwater intrusion has not been demonstrated in the future without project condition in which the existing tide gates are already leaking and allowing saltwater to pass upstream. Due to these factors, the tide gate relocation/replacement measure was screened out because it would represent an unnecessary project feature and cost. Tide gate removal was retained.

3.3.6 Additional Analysis of a Potential PCH Floodwall

Upon further investigation, H&H analysis showed that a floodwall along PCH at Outer Bolsa Bay was not likely to be economically justified for inclusion in the formulation of alternatives. Regular flooding of the roadway exists in future without project condition due to local flooding and drainage patterns, causing

minor impacts to traffic and no impacts to structures. Therefore, unless the study alternatives themselves induce flooding along PCH that rises to the level of a significant economic impact or real estate taking, inclusion of a floodwall at this location would not likely be included in plan formulation.

3.4 Plan Formulation Strategies

The initial screening of measures demonstrated that the urban nature of the project area (high land values and a lack of available real estate) tended to self-select for measures that do not require property acquisition, such as nonstructural measures and measures that are implemented within existing rights of way. Based on these considerations, the following strategies were used for developing study alternatives

- Focus on Improving Channel Conveyance – This strategy aims to reduce the risk and impacts of flooding by transporting flood waters more efficiently, especially in upstream channel reaches where the watershed has more slope.
- Focus on Increasing Channel Capacity – This strategy aims to reduce the risk and impacts of flooding by increasing the volume of flood water storage within the existing drainage channels.
- Focus on Improving Downstream Conveyance – This strategy aims to reduce the risk and impacts of flooding downstream by improving flow in the receiving waters of the study channels. While downstream conveyance modifications are unlikely to provide significant flood damage risk reduction alone, it is recognized that any modifications to improve conveyance and capacity upstream would exacerbate existing flow restrictions downstream.

3.4.1 Siting Nonstructural Measures and Downstream Modifications

Nonstructural Measures

The retained nonstructural measure is not site-specific. Rather, removal of impediments to flow would occur throughout all of the study channels, as applicable.

Downstream Modifications

The retained downstream modification measures are site specific and based on the location of existing infrastructure in and around Outer Bolsa Bay, including: PCH, the bottleneck at Warner Avenue, and the existing tide gates.

3.4.2 Siting In-Channel Modifications based on Channel Reaches

In-channel measures are site specific and depend upon the existing conditions within the channels. To facilitate developing alternatives that utilize in-channel measures, the drainage channels were divided into reaches based on existing physical characteristics such as cross-sectional geometry, bottom material, and side-slope material.

Alternatives were developed by inventorying the existing conditions in each reach and then applying different channel modification measures (lining the channels or altering channel geometry), where appropriate.

3.4.3 Separability among Measures

Based on the size of the project area, the implementation of flood damage risk reduction measures at different sites may contribute to the overall benefits of a plan but not directly impact the effectiveness of other proposed measures. Where this is the case, measures or groups of connected measures may be considered separately from a budgeting or implementation phasing perspective.

In combining and siting measures to develop study alternatives, the PDT considered C02/C04 and C05/C06 to be separable measures. That is, the majority of the costs and benefits of implementing channel modifications in any location throughout the study area can be applied to just one of these channel systems, not both.

The existing tide gates are not adequate for conveying increased flows. The Warner Avenue bridge is a bottleneck for flows and it currently experiences significant erosion from flood events. Each of these issues will be exacerbated by increased flow volumes and velocities caused by upstream channel modifications in C05/C06. Therefore, these downstream measures are non-separable elements from channel improvements upstream in the C05/C06 system. Each of these measures is necessary to compensate for increased conveyance resulting from the with-project modifications in C05/C06 and, therefore, are included with channel modifications in C05 Reach 1. Per USACE guidance (Planning & Guidance Notebook; ER 1105-2-100; Section 3-3(5)), mitigation should be investigated and recommended when it is economically justified and/or there are overriding reasons of safety, economic, or social concerns, or a determination of a real estate taking has been made.

3.5 Initial Alternative Analysis

Based on the retained measures and the strategies developed for alternative development, five alternative plans were developed for the initial array of alternatives.

1. No action alternative
2. Nonstructural alternative
3. Minimum channel modifications alternative
4. Maximum channel modifications alternative
5. Diversion tunnel alternative

3.5.1 No Action

Flooding will continue throughout the Westminster watershed due to the insufficient capacity of the existing channel systems. This will continue to cause damages to structures and result in road closures in the project due to overtopping of the channels. Additionally, Outer Bolsa Bay will continue to flood during frequent storm events, impacting traffic on PCH. The oil wells in BCER will remain at risk of inundation by flows that overtop the C05 channel upstream of the reserve and travel overland into the Muted Tidal Basin and Seasonal Ponds.

3.5.2 Nonstructural

<u>Removal of Impediments to Flow</u>

Removal of impediments to flow is a nonstructural maintenance measure that involves the removal of vegetation, sediment, and debris that can accumulate in the channel and interfere with the conveyance of flood flows. Removing impediments to flow would be implemented on a priority-basis, increasing maintenance investments in locations that are known to require greater capacity during flood events.

While a standalone nonstructural alternative comprised only of this measure would not provide the benefits necessary to be considered as the NED plan, it should be considered as an additional complementary measure, as applicable, in the remaining alternatives.

3.5.3 Minimum Channel Modifications

The Minimum Channel Modifications Alternative would address flood risk by lining existing drainage channels to improve flow.

Consistent with the formulation strategy to *focus on improving channel conveyance*, this alternative would reduce flood risk within the watershed by improving conveyance efficiency of existing channels. Trapezoidal channels within C02, C04, C05, and C06 that currently have an earthen bottom and either earthen or riprap banks would be lined with concrete. There would be no alteration to reaches that are rectangular in shape or lined with concrete, nor to reaches of in-channel box and pipe structures.

The leveed areas in the downstream reaches of C02 and C05 (reaches 23 and 01, respectively) would be improved to reduce the risk of levee failure. Modifications in reach 01 would include installation of dual-steel sheet pile channel walls and preservation of existing soft bottom, tidally-influenced habitat. In Reach 23, a single line of sheet pile would be driven at the crest of the existing levee along the entire south side of the channel within the reach and tied back into C04 near Bolsa Chica Street. This would reduce the risk of levee failure in this reach.

Figure 33: Typical existing trapezoidal channels. The picture on the left shows a typical existing riprap lined trapezoidal channel in the study area (before). On the right is a trapezoidal channel lined with concrete to improve conveyance efficiency (after).

Additional downstream measures would be combined with the in-channel measures to address existing flooding in Outer Bolsa Bay and to compensate for increased flow volumes that result from increased conveyance capacity in the channels. This downstream area is not considered a separable element, as discussed in 3.4.3.

The tide gates on C05 would be removed in order to improve the flow conditions through the lower reaches of the C05 channel. The current tide gates leak and therefore allow saltwater habitat to exist upstream in C05 in the future without project condition. This saltwater influence extends upstream of Outer Bolsa Bay for approximately 2.5 miles.

This alternative also includes the widening of the Outer Bolsa Bay channel just upstream of the Warner Avenue Bridge. Widening of the channel would require that the Warner Avenue Bridge and the pedestrian bridge at the Bolsa Chica Conservancy be expanded. Widening of the Outer Bolsa Bay channel would improve conveyance as well as the hydraulic efficiency of the lower reaches of C05.

This alternative also includes the nonstructural measure of removing of impediments to flow. This would reduce residence time of floodwaters in the study channels.

Table 25: Minimum channel modifications.

Minimum Channel Modifications	
Nonstructural Measures	Removal of Impediments to Flow
In-Channel Modifications	Lining Channels with Concrete
Downstream Modifications	Removal of Tide Gates on C05
	Widening the Existing Bottleneck at Warner Avenue

3.5.4 Maximum Channel Modifications

The Maximum Channel Modifications Alternative would address flood risk by changing existing trapezoidal channels into rectangular channels in order to increase storage volume and flow for flood waters. This alternative was formulated with consideration of the OCPW's stated goal of containing the 1% ACE storm event.

Consistent with the formulation strategies to *focus on improving channel conveyance* and *focus on improving channel capacity*, this alternative will reduce flood risk within the watershed by improving both conveyance efficiency and capacity of existing channels. Trapezoidal channels within C02, C04, C05, and C06 will be replaced with rectangular concrete (or steel sheet pile) channels to contain a 1% ACE storm event. This would also necessitate making alterations to existing crossings (roads and pedestrian paths) to accommodate the new channel geometry.

Where altering channel geometry is not feasible or would not contain the 1% ACE storm event, the Maximum Channel Modifications Alternative would seek to utilize other retained flood damage risk reduction measures (diversion/bypass channels) to provide the additional capacity required. Westminster Mall is one such area where altering the channel may not be feasible.

Additionally, floodwalls would be constructed in the existing channel right of way where necessary to contain the 1% ACE storm event. Soft channel bottoms would be preserved in the tidally influenced downstream reaches of C02 and C05 to reduce potential impacts to marine habitat.

The leveed areas in the downstream reaches of C02 and C05 (reaches 23 and 1, respectively) would be improved to reduce the risk of levee failure. Modifications in Reach 1 would include installation of dual-steel sheet pile channel walls and preservation of existing soft bottom, tidally-influenced habitat. In Reach 23, a sheet pile and anchor system would be installed on the south side of the channel, and the existing channel slope would be excavated. This would increase channel capacity (and soft-bottom habitat) and decrease the risk of levee failure in this reach.

Figure 34: Examples of channel reaches with rectangular cross-sectional geometry to increase capacity and improve conveyance efficiency. On the left is a typical concrete lined rectangular channel. On the right is a soft bottom rectangular channel reach constructed using steel sheet pile walls.

Additional downstream measures would be combined with the in-channel measures to address existing flooding in Outer Bolsa Bay and to compensate for increased flow volumes that result from increased conveyance capacity in the channels. This downstream area is not considered a separable element, as discussed in 3.4.3.

The tide gates on C05 would be removed in order to improve the flow conditions through the lower reaches of the C05 channel. The current tide gates leak and therefore allow saltwater habitat to exist upstream in C05 in the future without project condition. This saltwater influence extends upstream of Outer Bolsa Bay for approximately 2.5 miles.

This alternative also includes the widening of the Outer Bolsa Bay channel just upstream of the Warner Avenue Bridge. Widening of the channel would require that the Warner Avenue Bridge and the pedestrian bridge at the Bolsa Chica Conservancy be expanded. Widening of the Outer Bolsa Bay channel would improve conveyance as well as the hydraulic efficiency of the lower reaches of C05.

This alternative also includes the nonstructural measure of removing of impediments to flow. This would reduce residence time of floodwaters in the study channels.

Table 26: Maximum channel modifications.

Maximum Channel Modifications	
Nonstructural Measures	Removal of Impediments to Flow
In-Channel Modifications	Altering Channel Geometry
	Floodwalls
Upstream Modifications	Diversion/Bypass Channels
Downstream Modifications	Removal of Tide Gates on C05
	Widening the Existing Bottleneck at Warner Avenue

3.5.5 Diversion Tunnel

This alternative includes the construction of a diversion tunnel within the watershed to improve conveyance efficiency and capacity beyond what is currently provided by the existing channels. The

diversion tunnel would be aligned along C05 and within the existing channel right of way. The tunnel would be approximately 4 to 6 miles in length, approximately 24 to 30 feet in diameter, and excavated 100 feet or more below the ground surface. There would be between 2 to 3 inlets for storm water along the length of the tunnel and one outlet that would be located approximately 0.5 miles offshore of Bolsa Chica State Beach. The main tunnel would be built deep enough to avoid existing infrastructure and the ocean outlet would be placed far enough offshore to prevent impacts to the littoral zone. This alternative includes neither the replacement of the tide gates on C05 nor the modifications to the Warner Avenue Bridge.

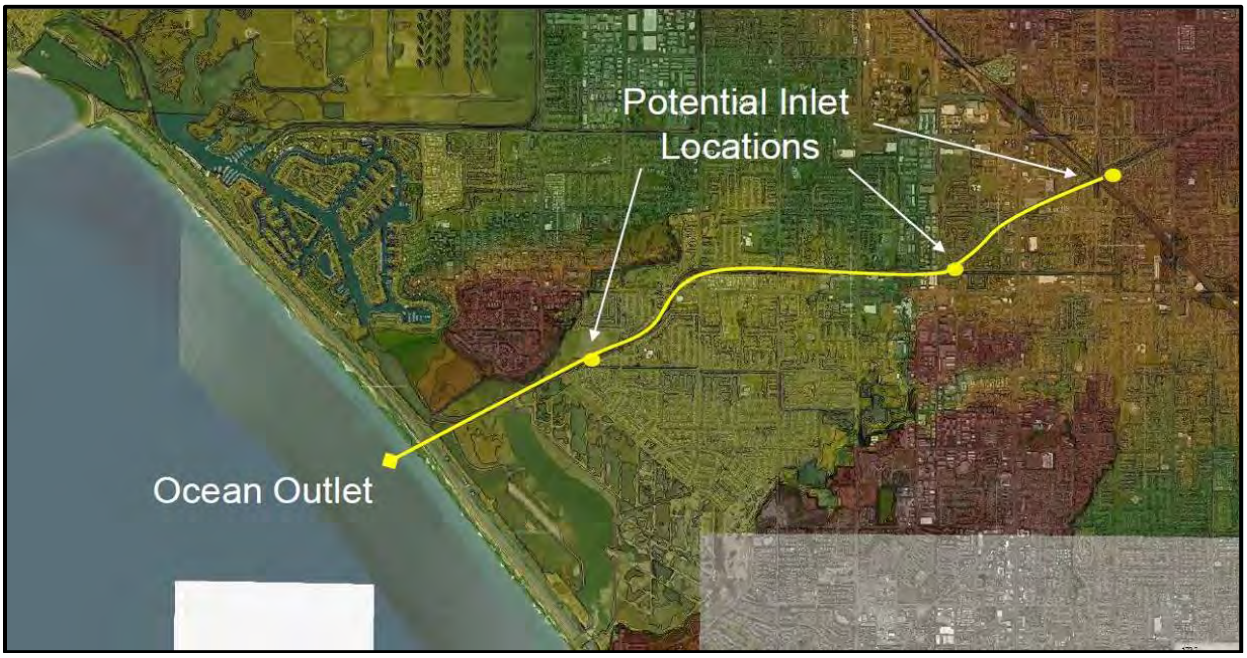


Figure 35: The diversion tunnel alternative would run under C05 from I-405 to Outer Bolsa Bay.

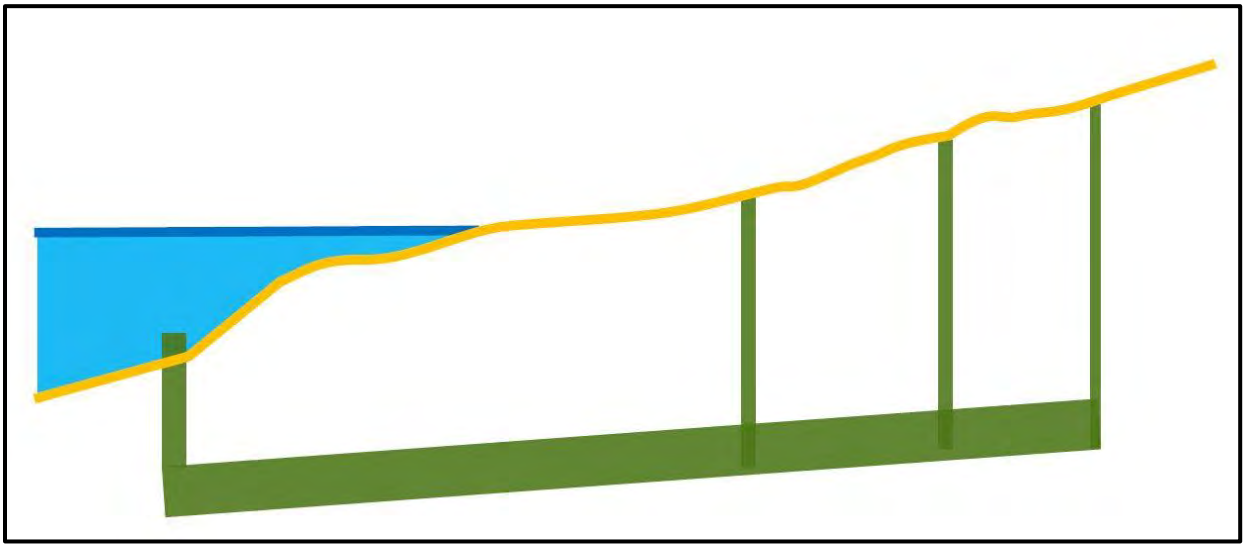


Figure 36: Diversion tunnel conceptual profile with 2-3 Inlets and an outlet offshore of Bolsa Bay.

This alternative is based on previous successful applications of tunnel technology for flood damage risk reduction. USACE-constructed reservoirs, which are part of the regional Tunnel and Reservoir Plan (TARP), are connected to over 110 miles of tunnels up to 35 feet in diameter that were built by the Metropolitan Water Reclamation District in and around Chicago, Illinois. 6600 feet of 10 foot diameter tunnel in Griffith, Indiana have been operational since 2006 as part of the Cady Marsh Ditch project. Examples that are closer to the Westminster watershed project include the Redondo Beach, California Ocean Brine Disposal Tunnel (16-foot diameter) and the Clearwater Project in Los Angeles County, California that is scheduled to begin tunnel construction in early 2021.

The proposed tunnel alternative would be designed at a suitable depth based on geology and the need to avoid existing infrastructure. The outlet would be located approximately one half mile offshore to minimize impacts to or from the littoral zone.

After developing a preliminary rough order of magnitude (ROM) cost estimate, the PDT determined that the Diversion Tunnel Alternative would be significantly more costly than the other alternatives being considered in order to realize equivalent benefits. A preliminary ROM estimate for constructing a 20-ft diameter tunnel in reaches 1-3 of C05 (a total of 31,500 linear feet) came out to more than $1 billion. ROM estimates previously identified in 2016 for in-channel modifications ranged from $265 million to $1.5 billion and addressed the entirety of both channel systems (see Table 27). This tunnel would not address overbanking in the upstream reaches of C05/C06 or provide flood damage risk reduction in the C02/C04 channels. More information about the preliminary cost of this alternative is included in *Appendix C – Cost Engineering*.

Table 27: ROM cost estimates for the structural alternatives in the focused array.

Alternative	Rough Order of Magnitude Cost
Minimum Channel Modifications	$ 650,000,000
Maximum Channel Modifications	$ 1,478,000,000
Diversion Tunnel*	$ 1,793,000,000

[*] The diversion Tunnel includes $1,143,000,000 for the tunnel itself, plus $455,000,000 representing the minimum channel modifications upstream of the tunnel for C04, C06, and upstream of the tunnel on C05, as well as the work required to improve the levees in the downstream reaches of C02 and C05 (reaches 23 and 1). This figure does not include downstream modifications of widening the bottleneck at Warner Avenue Bridge and removing the tide gates.

Since the proposed tunnel would only capture flood waters from a portion of the C05/C06 channels, additional measures would still need to be considered further upstream as well as in C02/C04. The NFS does not favor the Diversion Tunnel Alternative due to the relatively small body of precedent projects and the fact that they run a highly functional program to maintain the surface network of drainage infrastructure. Lastly, through early coordination with the California Coastal Commission, it appears that there would be additional regulatory challenges and study schedule impacts associated with continuing to pursue this alternative. For all of these reasons, the PDT has determined that the Diversion Tunnel Alternative is unlikely to represent either the NED Plan or a Locally Preferred Plan (LPP) and it was not included in the final array of alternatives for the Westminster, East Garden Grove Flood Risk Management Study.

3.5.6 Climate Change Considerations in Alternative Development

Future climate change effects may result in increased peak discharges. In the future, adaptive management strategies may be required to maintain the same storm damage reduction. However, it does not appear that climate change considerations would affect the screening decisions and alternative development presented to this point. See *Appendix A – Hydrology and Hydraulics* for more information on how climate change is accounted for in this study.

3.6 Final Array of Alternatives

The initial alternative analysis resulted in the following plans being carried forward as the Final Array of Alternatives. More detail was then developed for each of these plans in order to make more accurate cost and benefit comparisons.

- No Action Plan
- Minimum Channel Modifications Plan
- Maximum Channel Modifications Plan

All of these alternatives, except for the No Action Plan, include the retained downstream measures of widening the restriction at Warner Avenue and removing the tide gates in Outer Bolsa Bay. H&H modeling determined that these measures would be necessary to offset impacts of increased flows into Outer Bolsa Bay caused by channel modifications being proposed in C05/C06.

The earthen leveed areas on C05 reach 01 are proposed to be converted to the maximum channel condition in each of the channel modifications plans. The earthen leveed areas on C02 reach 23 are also proposed to be modified under both the minimum and maximum plans. However, unlike reach 1on C05, the treatment for reach 23 is different under each plan as described in Section 3.5 (see Table 98 and Table 100 in Chapter 8.0 for more detail). The justifications for these decisions are twofold. First, widening the channel with vertical steel sheet pile walls reduces impacts to valuable marine-influenced soft bottom habitat in these reaches. And second, the unimproved levees are currently overtopped between the 20% and 10% ACE storm events. Due to their condition and makeup, the existing levees are also at risk of failure prior to overtopping, which results in increased likelihood of damages or impacts to life safety at more frequent events than the 20% and 10% ACE. Located in the flattest portion of the project area, failure of these levees would cause widespread damages, affecting approximately 10,000 structures to depths in excess of 5 feet. Increasing capacity and hardening the levee structures reduces these risks.

3.6.1 No Action Plan

Under the No Action Plan, no management measures would be implemented to reduce the current risk of flood damage in the project area. Flooding will continue throughout the Westminster watershed due to the insufficient capacity of the existing channel systems. This will continue to cause damages to structures as well as road closures in the project area as a result of channel overtopping.

Outer Bolsa Bay will continue to flood during frequent storm events, impacting traffic on PCH. The oil wells in the BCER will remain at risk of inundation by flows that overtop the C05 channel upstream of the reserve and travel overland into the Muted Tidal Basin and Seasonal Pond area. Under the No Action Plan, bluff erosion in Outer Bolsa Bay is anticipated to continue, as well as erosion along PCH and at Warner Avenue (where it crosses Outer Bolsa Bay).

3.6.2 Minimum Channel Modifications Plan

Under the Minimum Channel Modifications Plan, earthen or riprap lined channels would be lined with concrete to increase conveyance efficiency. This plan is expected to significantly reduce impacts up to approximately the 2% ACE event.

For a more detailed description of proposed work in each individual reach, see *Appendix H – Plan Formulation*.

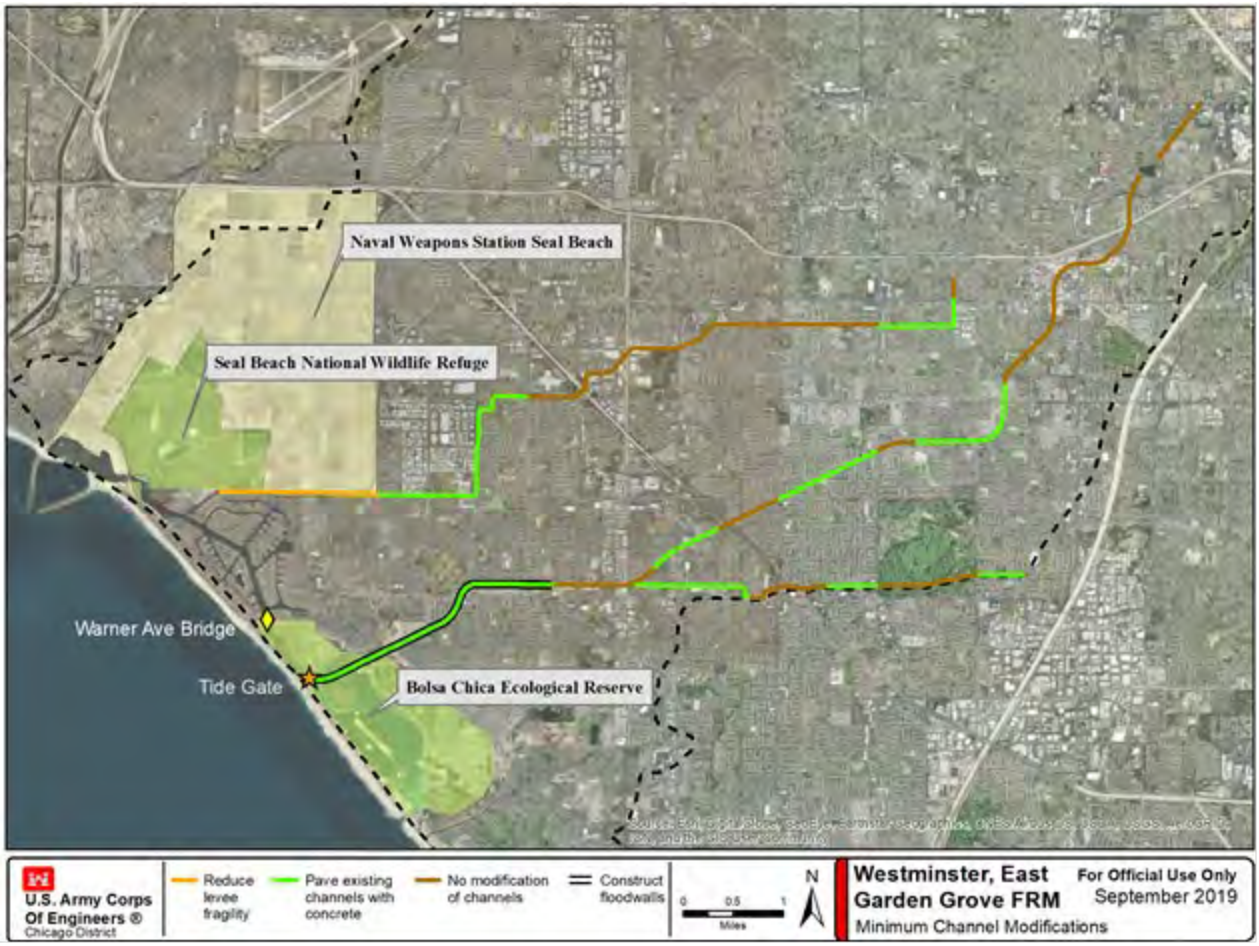


Figure 37: Minimum Channel Modifications Plan.

3.6.3 Maximum Channel Modifications Plan

Under the Maximum Channel Modifications Plan, trapezoidal channels would be reconfigured to have a rectangular cross sectional geometry. This would increase both conveyance efficiency and capacity. This alternative is designed to contain the 1% ACE storm event. For reaches that do not contain the 1% ACE event after conversion to a concrete rectangular channel, floodwalls would be added.

For a more detailed description of proposed work in each individual reach, see *Appendix H – Plan Formulation* and *Appendix B – Civil Engineering*.

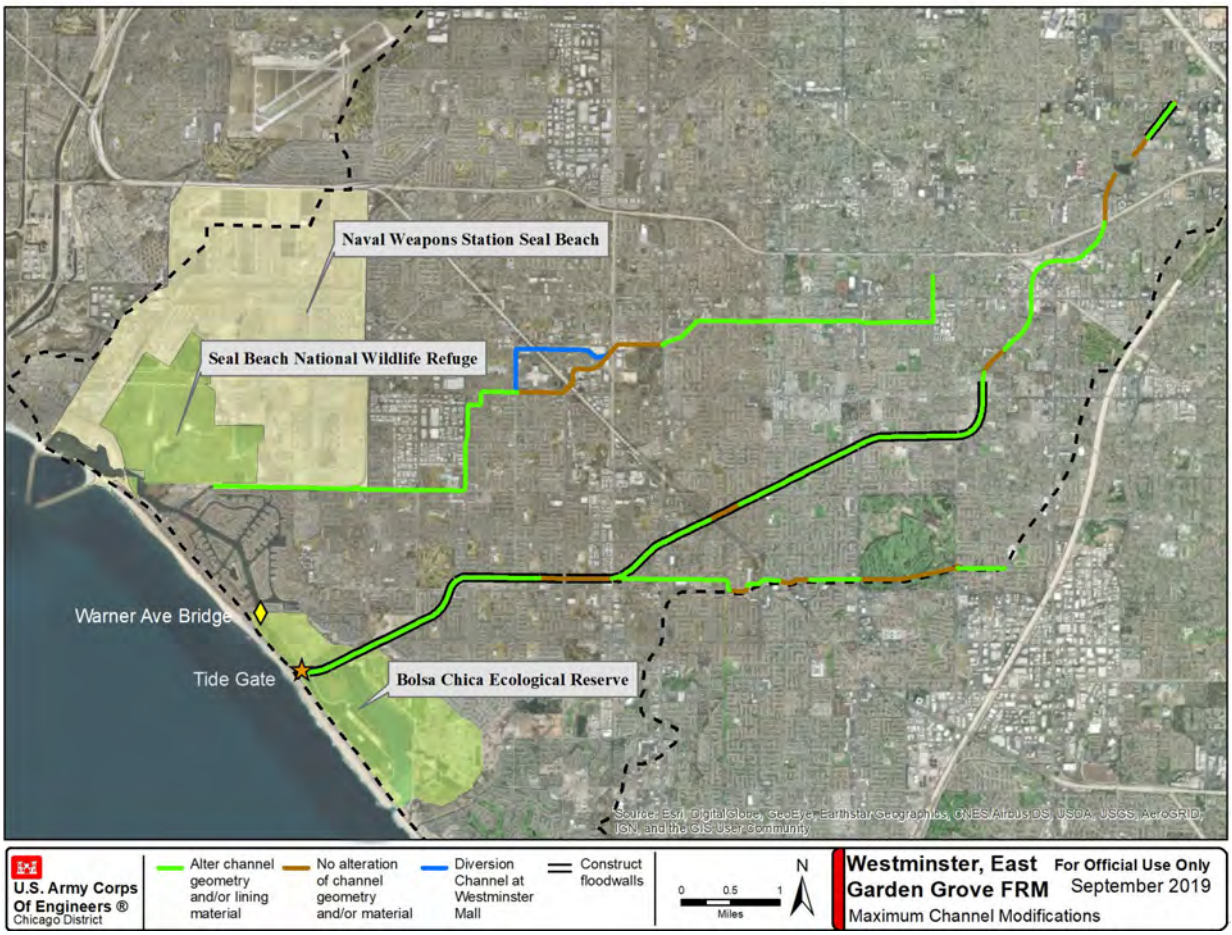


Figure 38: Maximum Channel Modifications Plan.

Diversion Channel at Westminster Mall

To address flooding caused by a restriction where flows in C04 are directed into a long reach of covered conduit that runs under I-405 and the Westminster Mall, a bypass channel would be constructed to direct flows around this existing bottleneck (Figure 38).

This diversion would span 2 reaches in C04 (reaches 20 and 21) and be a combination of open channel and reinforced concrete box (RCB). It would split off of reach 21 at the intersection of Hoover and Hazard streets, run west along an abandoned U.S. Navy railroad line to the north of Westminster Mall,

and then turn south underneath Edwards Street until it reconnects with reach 20 (where reach 20 goes underground) near the intersection of Edwards Street and Bolsa Avenue (Figure 39).

A more detailed description of this diversion that includes channel and RCB dimensions, preliminary drawings, and cost estimates is included as an attachment to *Appendix B – Civil Engineering*.

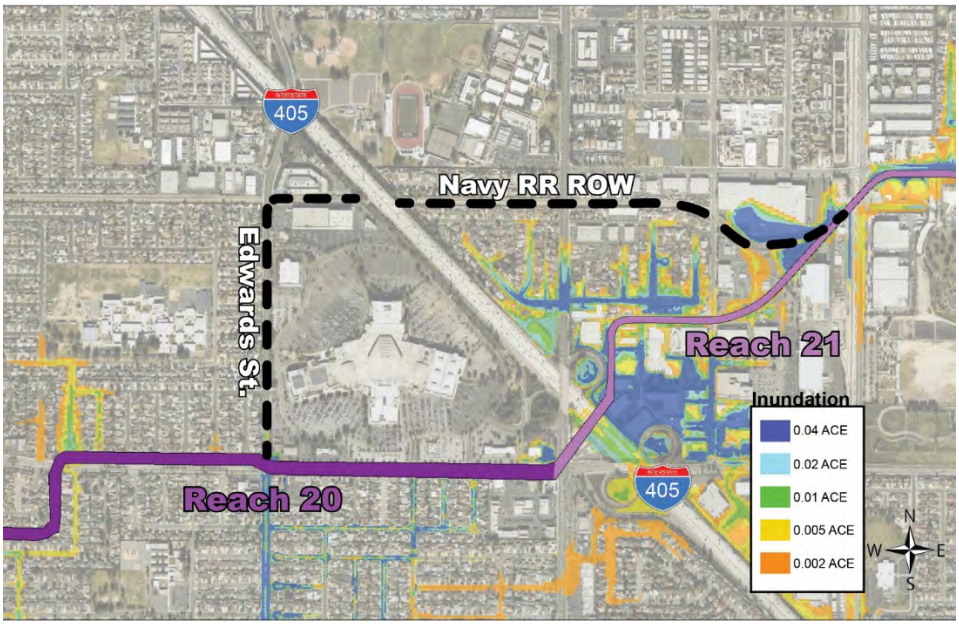


Figure 39: Proposed alignment of diversion channel at Westminster Mall (Black Dashed Line) would reduce flooding on C04 Reach 21 where it crosses I-405.

4.0 Comparison of the Final Array of Alternatives*

The plan formulation process utilized the best available information at this phase of the study to identify a Recommended Plan from the alternatives described in Chapter 3.0.

4.1 Channel Reaches and Impact Areas

Economic impact areas were identified in the study area to quantify and group the damages caused by flooding (Figure 40). The correlation between study channel reaches and economic impact areas are outlined in Table 28. The channel reaches (left column) are defined segments of the system which were used to develop designs, costs, and determine potential environmental impacts. The impact areas (right column) are defined consequence areas which are evaluated in the economic analyses. While the impact areas tend to line up with channel reach limits for the economic analysis, there is not a direct one-to-one comparison. For example, modifications along channel reaches 1 and 2 provide benefits to impact areas C05_5 (left descending bank) and C05_6 (right descending bank), while reach 4 falls completely within C05_4A.

Table 28: Channel reaches and their corresponding impact areas in the economic analysis.

Incremental Analyses	
Reaches (Costs)	**Impact Areas (Benefits)**
1 - 2	C05_5 and C05_6
3	C05_4B
4	C05_4A
5	C05_2D and C05_3D
6 - 7	C05_2C and C05_3C
8	C05_2B and C05_3B
9	C05_2A and C05_3A
10 - 12	C05_1A
13 - 15	C06_2
16 - 17	C06_1B
18 - 19	C06_1A
20	C04_4b and C04_4a
21	C04_3
22	C04_1 and C04_2
23	C02_1

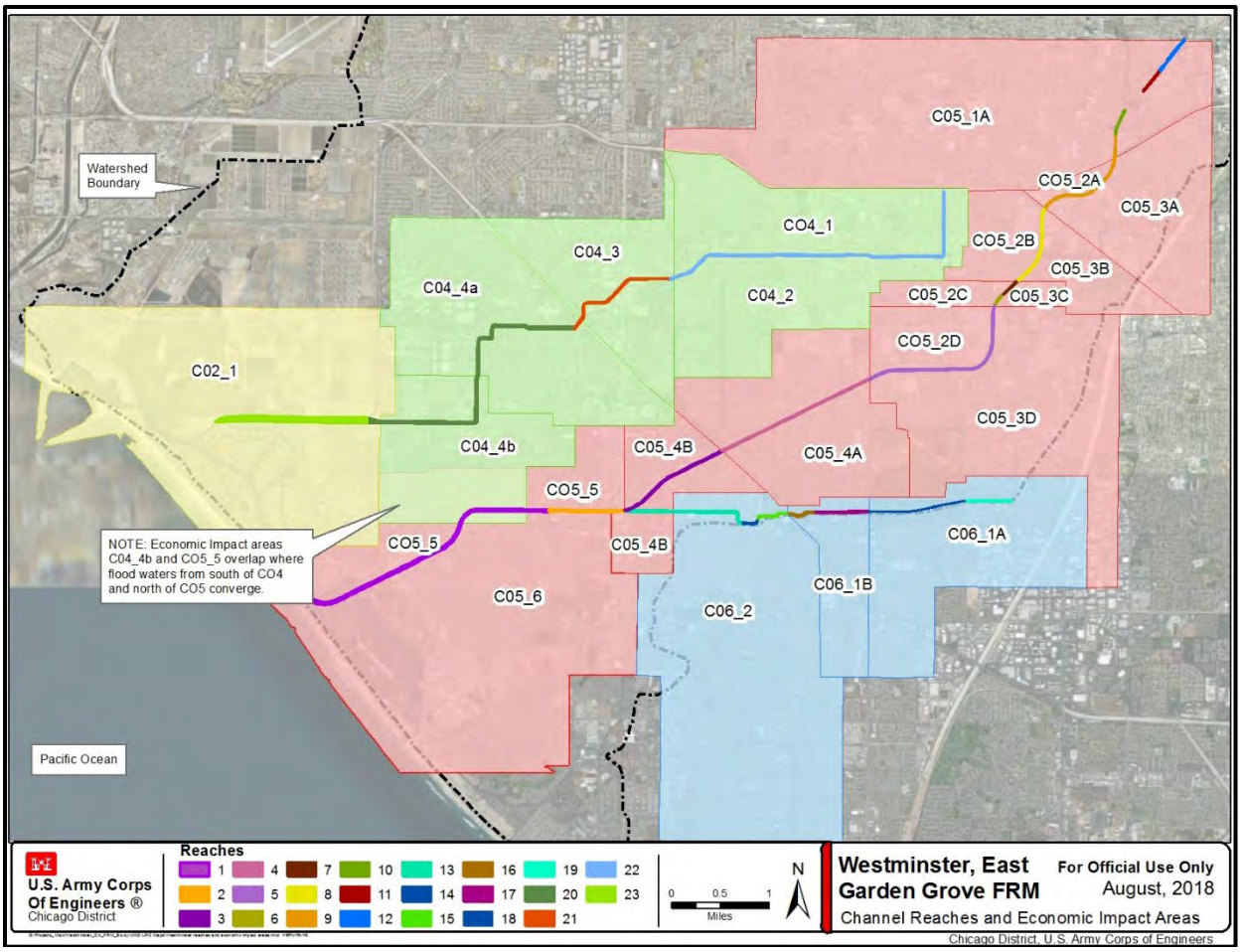


Figure 40: Economic impact areas are generally broken up to correspond with reach extents. Impact areas for the different channels are grouped by color for additional clarity.

4.2 Traffic Impact Analysis

In addition to causing physical damages, flood events also cause increased traffic delays when major roads and highways become inundated. These delays include the opportunity cost of time for motorists and increased vehicle operating costs, and count as a justifiable damage category.

Initial modeling of traffic delays has been conducted using the Dynamic Urban Systems for Transportation (DynusT) model provided by Metropia (contractor). This model utilizes route, capacity, and usage data from the Southern California Association of Governments (SCAG) Transportation Program. However, this modeling effort and subsequent reviews were not complete at the time of submittal of this Final Feasibility Report. Significant model review comments indicated further efforts to verify the model calculations and outputs would be required prior to the model's approval for use in Agency decision making. Therefore, the without project damages/costs and benefits of alternatives do not include traffic delay impacts. Should DynustT be approved for use prior to or during the pre-construction engineering and design phase for the project, it may be used to inform economic updates for the recommended plan.

Based upon the preliminary traffic analysis that has been completed, the traffic delay impacts would be substantial for major flood events, but given the low probability of such events, the impact to overall

estimates of without project damages and with project benefits is expected to be relatively minor (less than 10%). Regardless, in addition to the national economic development impacts associated with traffic delays, there are also other social effects impacts, including life and safety impacts associated with lack of access and delays for police, fire, and ambulance vehicles. Risks associated with these impacts, as well as the reduction in such risks that can be realized with proposed alternatives, are an important consideration in assessing overall project benefits and federal interest.

4.3 Cost Estimates for Minimum & Maximum Channel Modification Plans

Table 29: Project First Costs by Plan, FY 2020 Price Levels ($000)

Project Component	Plan		% of Construction Cost by Component - Min Plan	% of Construction Cost by Component - Max Plan
	Minimum Improvement	Maximum Improvement		
C02-C04	83,992	445,741	17%	36%
Reach C02	37,582	99,314	8%	8%
Reach C04	46,409	346,427	10%	28%
C05-C06	348,767	726,107	72%	59%
Reach C05	328,879	595,606	68%	49%
Reach C06	19,888	130,501	4%	11%
Non Reach-Specific	51,097	52,749	11%	4%
Widen Warner Ave	36,888	36,888	8%	3%
Remove Tide Gates	3,791	3,791	1%	0%
Mitigation	7,813	7,813	2%	1%
Real Estate	2,605	4,257	1%	0%
Total First Costs[1]	**483,856**	**1,224,598**	100%	100%

[1] *Construction costs include bridge replacement costs by reach; annual O&M costs not included*

4.4 Annualized Costs and Benefits for Minimum & Maximum Channel Modification Plans

A comparison of expected annual damages (EAD) for the without project condition for both the Minimum and Maximum Channel Modifications plans are shown in Table 30. EAD is different from average annual equivalent (AAE) estimates as each is provided with a different base year and timing considerations. The EAD estimates are in a 2020 base year, providing an approximate benefit that would occur if the measure was implemented today. The AAE estimates account for the full construction schedule and are presented in a base year of 2035, after the construction is assumed to be completed. The following tables include the impacts for the without project condition, the Minimum Channel Modifications Plan, and the Maximum Channel Modifications Plan.

Table 30: EAD for the without project condition, as well as the minimum and maximum alternatives are displayed by channel FY 2020 Price Level ($000's).

Reach	Structure and Structure Contents	Other Related Flood Damage Categories	Total Without Project Damages	EAD for Minimum Alternative	EAD for Maximum Alternative
Reaches C02-C04	**2,518**	**1,125**	**3,643**	**570**	**1**
Reach C02	1,615	907	2,522	569	1
All Reaches C04	902	218	1,120	1	0
Reaches C05-C06	**50,983**	**17,105**	**68,088**	**1,034**	**1**
All Reaches C05	50,858	17,077	67,935	921	1
All Reaches C06	125	28	153	113	1
Total Damages	**53,500**	**18,230**	**71,730**	**1,604**	**2**
Total Damages Reduced	**-**	**-**	**-**	**70,127**	**71,728**

Table 31: Annualized costs, benefits, and net benefits of the Final Array of Alternatives, FY 2020 Price Level.

Name	Total First Cost ($1,000)	Equivalent Average Annual Values ($1,000s)		
		Benefits	Costs	Net Benefits
No Action	-	-	-	-
Minimum Channel Modifications				
C02/C04	83,992	4,307	3,875	432
C05/C06	399,864	97,437	20,244	77,192
TOTAL	**483,856**	**101,743**	**24,119**	**77,624**
Maximum Channel Modifications				
C02/C04	445,741	8,974	20,786	-11,812
C05/C06	778,856	107,281	37,425	69,856
TOTAL	**1,224,598**	**116,255**	**58,211**	**58,044**

4.5 Selection of a Recommended Plan

Per USACE Guidance, the PDT identifies the alternative that maximizes net benefits for this Flood Risk Management Study; this is also called the NED Plan. In order to determine which alternative is the NED Plan, the costs and benefits for the Final Array of Alternatives were compared. Typically, the NED plan is the Recommended Plan for flood risk management studies. A Locally Preferred Plan (LPP) is the name frequently given to a plan that is preferred by the non-federal sponsor that is separate from the NED Plan (and consequently does not maximize net benefits).

Table 32 shows that the Minimum Channel Modifications Plan is the plan that maximizes net benefits and is, therefore, the NED plan that would typically be recommended by the PDT. However, the NFS has expressed an interest in pursuing an LPP in order to meet its goal of containing the 1% ACE event in the study channels. In order to become the Recommended Plan, an LPP must first be approved by HQUSACE and the Assistant Secretary of the Army for Civil Works (ASA(C)W)).

The Maximum Channel Modifications Plan has been identified by the NFS and the PDT as the LPP. LPPs may be selected as the Recommended Plan pending approval from HQUSACE and the ASA(CW), provided that they meet the study objectives and have a benefit to cost ratio (BCR) greater than 1. Approval of the LPP waiver was memorialized in a memo dated October 16, 2019: *Westminster, East Garden Grove, California, Flood Risk Management Study – Exception Request for Locally Preferred Plan (LPP)*. At that time, the LPP became identified as the Recommended Plan.

Table 32: Comparison of the Final Array of Alternatives, FY 2020 Price Level ($000's).

Name	Plan	Total First Cost ($1,000)	Equivalent Average Annual Values ($1,000s)		
			Benefits	Costs	Net Benefits
No Action	-	-	-	-	-
Minimum Channel Modifications (C02/C04 excluded)	**NED**	**483,856**	**101,743**	**24,119**	**77,624**
Maximum Channel Modifications (C02/C04 included)	**LPP**	**1,224,598**	**116,255**	**58,211**	**58,044**

5.0 Environmental Consequences*

The first part of this chapter is composed of resource-specific impact sections addressing direct and indirect effects of construction and operation and maintenance of the final array of alternatives, formatted as described below. The first part also includes the effects not found to be significant. Following this analysis, the remainder of the chapter addresses cumulative impacts and other sections required for inclusion under NEPA and, or CEQA, including growth-inducing impacts, identification of any unavoidable significant adverse impacts, the relationship between short-term uses of the environment and maintenance and enhancement of long-term productivity, and irreversible and irretrievable commitments of resources.

Environmental Resource Area: Identifies the environmental issue or resource type to be discussed (e.g., Geology Land Use, Biological Resources, etc.).

Regulatory Framework: Provides a short description of regulations relevant to the applicable resource area.

Impact Significance Criteria: Identifies one or more thresholds of significance for impacts to the applicable resource area. For this IFR, the impacts analysis typically adopts the CEQA thresholds of significance stated for each resource. However, for some resources, additional NEPA significance thresholds are identified. For certain resources such as air quality and GHGs, the NEPA analysis does not adopt the CEQA thresholds and therefore also applies separate significance criteria in accordance with relevant federal and state requirements.

Mitigation Measures: Includes project design features and Best Management Practices (BMPs) that have been incorporated into the project description of each alternative to avoid and/or reduce potential impacts.

Impact Analysis: Evaluates the environmental impacts of the No Action Alternative and the two Action Alternatives (i.e., NED Plan and LPP). Beneficial and adverse effects of these plans and measures are considered, including short-term direct and indirect effects resulting from construction and long-term operation and maintenance activities. Impacts of the measures within each alternative are evaluated.

Effects from the NED Plan described under each environmental resource area are described independently. Effects of the LPP are described in comparison to the NED Plan, and any differences are noted.

Cumulative effects are analyzed in *Section 5.18 – Cumulative Impacts Analysis*.

Level of Impact: The level of impact for each alternative and for each resources is based on the evaluation of identified significance criteria and incorporation of mitigation measures. A conclusion of either no impact, less than significant impact, or significant impact is reached. Impacts, whether they are significant or less than significant, are further defined as being either adverse or beneficial.

5.1 Alternatives Evaluated

Alternative: No Action Plan

Under NEPA (42 C.F.R., Part 1502.14), a No Federal Action Alternative must be considered, while under CEQA, a No Project Alternative must also be considered. The No Federal Action/No Project Alternative provides the basis for comparisons with other alternatives, as it represents a scenario under which nothing would be done to address the identified need for the Proposed Action. Under the No Federal Action/No

Project Alternative, the channels within the Westminster Watershed would remain as they are currently designed.

Alternative: NED Plan and LPP

As described in Chapter 3 and Table 33 below, some measures are identical for each Alternative. For example, the Warner Avenue Bridge modification in the NED Plan is the same as that in the LPP. As a result, and as described below, the impacts associated with construction of identical measures would be the same regardless of which alternative plan, NED Plan or LPP, (if any) is selected. Some measures, however, may be implemented at different locations or at a different scale depending on the alternative, or are only present within certain alternatives. In those cases, the discussion addresses the difference in impacts – beneficial or adverse – among the alternatives. As discussed in Chapter 3, the plan ultimately selected may be an alternative within the spectrum of the final array alternatives fully analyzed in this IFR.

Table 33: Measures Under Each Alternative

Measure	Alternative Plan	
	NED Plan	LPP
Warner Avenue Bridge	X	X
Tide Gates	X	X
C02/C04 Channels		
C02/R23 – Sheet pile with soft bottom	X	X
Concrete lined trapezoidal	X	
Concrete lined rectangular		X
Crossings Replaced		X
C05/C06 Channels		
C05/R1 – Sheet pile with soft bottom	X	X
Concrete lined trapezoidal	X	
Concrete lined rectangular		X
Crossings Replaced		X
Diversion Channel		X

5.2 Effects Not Found to be Significant

As stated in the CEQA Guidelines: "An EIR shall contain a statement briefly indicating the reason that various possible significant effects of a project were determined to not be significant and were therefore not discussed in detail in the EIR." The following sections include a discussion of those resource categories that were determined to not be impacted by the Proposed Project and are therefore not discussed in detail in the environmental consequences.

5.2.1 Mineral Resources

The only known mineral resource within the study area is ongoing oil production in an undeveloped area adjacent to the west end of C05 Reach 1 (BCER). The oil extraction is from the Huntington Beach Oil Field, a field underlying much of the City of Huntington Beach and extending offshore. The oil production is operated by CalResources LLP and includes numerous active oil wells and wells for water injection. No significant project impacts were identified that would result in the loss of availability of this

known mineral resource or the loss of a locally important mineral resource recovery site. Therefore, no impacts associated with mineral resources would occur under the No Action Alternative, the NED, or the LPP. Since the project is expected to have no significant impacts to mineral resources, a detailed alternatives analysis was not conducted.

5.2.2 Agriculture and Forestry

Land use within the project area is primarily residential, but also includes public, commercial, and industrial uses. There is no forested land within the vicinity of the Proposed Project. Approximately 10 acres of land within the vicinity of the Proposed Project are vacant lands. Approximately 49 acres are in agricultural use. Farmland is present along C02 Reach 23 within the vicinity of the Proposed Project. The land is owned by the NWSSB but is currently leased for farming. In 2014, approximately 2,000 acres of land were cultivated for fruits, vegetables, and grain on the Naval Weapons Station (Ablaza 2014). Modeling of flood events up to the 1% ACE does not show the farmland on the Naval Weapons Station being impacted. Since flooding does not cause inundation of the farmlands at the Naval Weapons Station currently (without project condition), there is no anticipated impact to agricultural lands for with project conditions. The Action Alternative further reduce flooding within the watershed and are not expected to increase flooding risk of the farmland on the Naval Weapons Station. Additionally, the Action Alternatives do not propose the conversion of farmland or the conversion of forest land to non-farmland or non-forest, respectively. Since the project is expected to have no significant impacts to agriculture or forest land, a detailed alternatives analysis was not conducted.

5.2.3 Population and Housing

It is expected that Proposed Project construction jobs would be filled from the local labor force and would not cause people to move to the local area seeking employment. Neither the NED nor the LPP would displace existing housing or a substantial number of people, necessitating the construction of replacement housing elsewhere because construction occurs within existing flood control channels and associated rights-of-way. Therefore, neither the NED nor the LPP would induce substantial population or employment growth resulting in a need to construct replacement housing elsewhere. None of the alternatives propose to construct housing or extend infrastructure, such as new roads or utilities that would support the future construction of housing. In addition, the area is considered built-out with only approximately 10 acres considered open/vacant land. Since no impacts are expected to population and housing, a detailed alternatives analysis was not conducted.

5.2.4 Public Services

Implementation of any of the proposed Action Alternatives would not provide new or physically altered governmental facilities, nor the need for new or physically altered governmental facilities in order to maintain acceptable service ratios and response times for fire protection, police protection, schools, parks, or other public facilities. Since no impacts are expected to public services, a detailed alternatives analysis was not conducted.

5.2.5 Wildfire

Neither the NED nor the LPP are located in an area designated as a fire hazard severity zone by the California Department of Forestry and Fire Protection (Figure 42). Therefore the implementation of either the NED or the LPP would not exacerbate wildfire risks. Since no impacts are expected due to the project not being located within a designated fire hazard severity zone, a detailed alternatives analysis was not conducted.

5.3 Earth Resources

5.3.1 Regulatory Framework

Numerous environmental laws and regulations govern the geologic and seismic resources in the study area. An overview of some of the more pertinent regulations and responsible agencies is presented below.

5.3.1.1 Federal

The United States Geologic Survey (USGS): The USGS provides reliable scientific information to describe and understand the earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect quality of life. The USGS does not have regulatory authority/jurisdiction, but rather it provides scientific information that can be used to help mitigate impacts from natural disasters such as floods, earthquakes, landslides, and volcanoes.

Federal Soil Protection Act: The purpose of the Federal Soil Protection Act is to protect and/or restore the functions of the soil on a permanent, sustainable basis. Protection and restoration activities include prevention of harmful soil changes, rehabilitation of the soil at contaminated sites and rehabilitation of water contaminated by contaminated soils. Additionally, the requirements of the Federal CWA through the National Pollution Discharge Elimination System provide guidance for protection of geologic and soil resources.

Section 402 Clean Water Act: Construction projects which disturb one or more acres of soil are required to obtain coverage under a General Construction Permit (GCP) by the State Water Resources Control Board (SWRCB). The GCP requires the filing of a Notice of Intent (NOI) with the SWRCB and the preparation of a Storm Water Pollution Prevention Plan (SWPPP).

Paleontological Resources Preservation Act (PRPA): The Paleontological Resources Preservation Act (PRPA) was signed in to law on March 30, 2009 (Public Law 111-11, Title VI, Subtitle D; 16 U.S.C. §§ 470aaa-470aaa-11). PRPA directs the Department of Agriculture (U.S. Forest Service) and the Department of the Interior (National Park Service, Bureau of Land Management, Bureau of Reclamation, and the USFWS) to implement comprehensive paleontological resources management programs. Section 6310 of the PRPA specifically states, “As soon as practical after the date of the enactment of this Act, the Secretary shall issue such regulations as are appropriate to carry out this subtitle, providing opportunities for the public notice and comment.” The U.S. Forest Service published the Department of Agriculture version of the PRPA regulations in the Federal Register in April 2015. The Corps is not required to comply with the PRPA.

5.3.1.2 State

California has promulgated several regulations regarding geology and soils. The International Building Code regulates construction practices including sections pertinent to design and construction to avoid geotechnical hazards. The codes include design standards and general design parameters for seismic design. The State Building Standards Commission is responsible for administering California’s building codes, including adopting, approving, publishing, and implementing codes and standards.

California Earthquake Fault Zoning Act (“Alquist-Priolo” Act): The Alquist-Priolo Earthquake Fault Zoning Act, enacted in 1972, regulates development near active faults to mitigate the hazards of surface fault-rupture. Under the act, the State Geologist is required to delineate special study zones along known active faults. The act also requires that prior to approval of a project within a mapped active fault zone, a geologic study is required to be prepared to define and delineate any hazards from surface fault rupture. A 50-foot setback for building structures from any known trace of an active fault is required. There is a

mapped "Alquist-Priolo" fault zone for the Newport-Inglewood Fault that passes through a portion of C05 Reach 1 (refer to Section 2.2.3).

The Proposed Project is in a seismically active region and could be subject to ground rupture, seismic shaking, and liquefaction from several active faults in the region. The Newport-Inglewood Fault extends in a northwest to southeast direction through the western end of the study area.

Seismic Hazards Zone Mapping Act: The Seismic Hazards Zone Mapping Act, enacted in 1990, was developed to protect the public from the effects of strong ground shaking, liquefaction, landslides, or other ground failure and hazards caused by earthquakes. The act requires the State Geologist to delineate various seismic hazard zones and requires cities, counties, and other local permitting agencies to regulate certain development projects within those mapped zones. The project area has been mapped by the California Geologic Survey and includes a liquefaction hazard zone. Landslide hazard zones are located to the southeast of the project, but not within the project area (refer to Section 2.2.3).

California Public Resources Code Related to Paleontological Resources: Several sections of the California Public Resources Code protect paleontological resources. Section 5097.5 prohibits "knowing and willful" excavation, removal, destruction, injury, and defacement of any paleontological feature on public lands (lands under state, county, city district or public authority jurisdiction, or the jurisdiction of a public corporation), except where the agency with jurisdiction has granted express permission. Section 30244 requires reasonable mitigation for impacts to paleontological resources that occur as a result of development on public lands. The California Administrative Code Sections 4307-4309, relating to the State Division of Beaches and Parks, afford protection to geological features and "paleontological materials," but grant the director of the state park system authority to issue permits for specific activities that may result in damage to such resources, if the activities are for state park purposes and in the interest of the state park system.

5.3.2 Impact Significance Criteria

The impact criteria below were taken from Appendix G of the CEQA guidelines, and are also being adopted for NEPA. For purposes of this analysis, the No Action Alternative, NED Plan, and LPP would have a significant impact related to Earth Resources if the alternative would:

IMPACT GEO-1: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving a) rupture of an earthquake fault as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault, b) strong seismic ground shaking, c) seismic-related ground failure including liquefaction, or d) landslides.

IMPACT GEO-2: Result in substantial soil erosion or the loss of topsoil.

IMPACT GEO-3: Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.

IMPACT GEO-4: Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property.

IMPACT GEO-5: Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

IMPACT GEO-6: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

5.3.3 Mitigation Measures

The following mitigation measures would be implemented for both the NED Plan and LPP, before, during, and after construction as applicable. These include:

MM-GEO-1 Consistent with the requirements of the California Construction General Permit Order (currently 2009-0009-DWQ; subject to update), each individual construction project shall have a Stormwater Pollution Prevention Plan (SWPPP) prepared by certified Qualified SWPPP Developer. SWPPP requirements will be integrated into the Environmental Protection Plan, which will be maintained on site and updated throughout the construction project.

MM-GEO-2 Areas temporarily disturbed by construction would be returned to preconstruction conditions by grading and re-vegetating.

MM-PR-1 A qualified paleontologist would be notified and retained when earth-moving activities are anticipated to impact undisturbed deposits in the project site. The designated Paleontologist should be present during the pre-grade meeting to discuss paleontological sensitivity and to assess whether scientifically important fossils have the potential to be encountered. The extent of monitoring activities would be determined at the meeting in consultation with the OCPW. If any scientifically important large fossil remains are uncovered during earth-moving activities, the Paleontological Monitor would divert heavy equipment away from the fossil site until s/he has had an opportunity to examine the remains. Any identified paleontological artifacts will be preserved in accordance with applicable laws before construction resumes.

5.3.4 Earth Resource Impacts

5.3.4.1 IMPACT GEO-1: Directly or indirectly cause substantial adverse effects, including the risk of loss, injury, or death involving a) rupture of an earthquake fault as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault, b) strong seismic ground shaking, c) seismic-related ground failure including liquefaction, or d) landslides.

ALTERNATIVE: NO ACTION PLAN

As described in *Section 2.2.3 Faults and Seismic Activity*, the study area is within the Newport-Inglewood Alquist-Priolo Earthquake Fault Zone and the Liquefaction Zones of Required Investigation. The Newport-Inglewood Fault Zone is capable of producing surface rupturing earthquakes with average lateral displacements on the order of 6.5 feet and local maximum displacements of up to 13 feet (Leonard 2010, 2012; Wells and Coppersmith 1994). Stepovers across multiple fault splays or strands and changes in fault strike or orientation can create localized transpression and transtension, resulting in local vertical displacements of a couple of feet. Lateral surface displacements can reduce the cross-sectional area of the existing channels and vertical surface displacement can disrupt existing channel gradients, thereby causing potential flood hazards. Considering the study area could experience at least one or more earthquakes within the period of analysis, people or structures within the study area could be exposed to potential substantial adverse impacts if an earthquake were to occur that causes displacement of the channels, as they currently exist, thereby resulting in a flood breach. In regards to liquefaction, it can occur when relatively loose, saturated, non-cohesive soils undergo a temporary loss of stiffness and strength during strong ground shaking. As a consequence, a permanent ground and surface deformation could occur that could impact the channels, as they currently exist, thereby resulting in a flood breach. Under the No Action Alternative, no federal project would be implemented, therefore, no construction

activities would occur. There would be no change to the study area condition described above due to the implementation of a project.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

According to the California Geologic Survey Seismic Hazard Zone Map for the Seal Beach, Newport Beach, and Anaheim Quadrangles, the Newport-Inglewood Fault Zone extends in a northwest to southeast direction at the western end of the project area, running nearly parallel to the coast line. The Newport-Inglewood Fault is an active fault capable of producing an earthquake of 6.9 on the Richter scale (SCEDC 2004; OCSD 2005). This magnitude earthquake would be large enough to result in ground surface rupture impacts in the Westminster watershed. The Warner Avenue Bridge is not located within the Newport-Inglewood Fault Trace nor the Newport-Inglewood Fault Zone (Figure 13); however, it is located within the vicinity. The Alquist-Priolo Act prohibits the construction of habitable structures across active faults and within 50 feet of an active fault (Bryant and Hart 2007). The Warner Avenue Bridge is located approximately 1,800 feet west of the Newport-Inglewood Fault Zone (Figure 1). Additionally, since the Warner Avenue Bridge is not habitable it is not subject to compliance with the Alquist-Priolo Act.

The modification of the Warner Avenue Bridge includes construction of a permanent infrastructure structure as described in Chapter 3.0, Plan Formulation. Considering the study area could experience at least one or more earthquakes within the life of the project, people within the study area could be exposed to potential substantial adverse effects if an earthquake were to occur that caused displacement of the bridge, thereby resulting in its failure. However, the modification of the Warner Avenue Bridge will not directly increase the risk of the structures failure during a seismic event over the existing condition described under the No Action Plan. In addition, the modified bridge will be in compliance with seismic design requirements. Therefore, since the modification will not substantially increase the risk of structure failure over the existing condition, and the design of the modification will be in compliance with current seismic design requirements, there would be a less than significant impact.

Indirect Impacts

The Warner Avenue Bridge is located approximately 1,800 feet west of an active fault and could be subject to seismic shaking impacts and liquefaction impacts if an earthquake occurs in the regional area. The modification of the Warner Avenue Bridge does not involve the construction of any habitable structure; however, it does involve the modification of a permanent infrastructure structure that is already in place. This permanent infrastructure structure would be subject to seismic shaking impacts or liquefaction impacts, but the modification of the Warner Avenue Bridge does not indirectly increase or decrease the risk of structure failure over the existing condition, therefore, there is a less than significant impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete,

damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. All of these activities would be temporary in duration and are not expected to have any impacts to earth resources. Operation and maintenance of the new Warner Avenue Bridge would be consistent with current activities by Caltrans for the existing Warner Avenue Bridge. For the reasons above, there is a less than significant long-term impact.

Tide Gates

Direct Impacts

According to the California Geologic Survey Seismic Hazard Zone Map for the Seal Beach, Newport Beach, and Anaheim Quadrangles, the Newport-Inglewood Fault Zone extends in a northwest to southeast direction at the western end of the project area, running nearly parallel to the coast line. The Newport-Inglewood Fault is an active fault capable of producing an earthquake of 6.9 on the Richter scale (SCEDC 2004; OCSD 2005). This magnitude earthquake would be large enough to result in ground surface rupture impacts in the Westminster Watershed. The downstream reaches of C02 and C05 are within the Newport-Inglewood Alquist-Priolo Earthquake Fault Zone (CDMG 1986a,b; CGS 2002). The Alquist-Priolo Act prohibits the construction of habitable structures across active faults and within 50 feet of an active fault (Bryant and Hart 2007). The tide gates are located approximately 2,200 feet west of the Newport-Inglewood Fault Zone (Figure 13). As part of the NED Plan, the tide gates are being permanently removed and replaced with a new access bridge that will continue to allow recreation, maintenance, and emergency vehicle access. The Alquist-Priolo Act prohibits the construction of habitable structures across active faults and within 50 feet of an active fault (Bryant and Hart 2007); however, the new small bridge built to replace the access provided by the tide gates is not habitable and is therefore not subject to compliance with the Alquist-Priolo Act.

The bridge constructed to replace the access lost by the permanent removal of the tide gates is a permanent infrastructure structure. Considering the study area could experience at least one or more earthquakes within the life of the project, people utilizing the trail system within the BCER as well as any emergency response or maintenance vehicles could be exposed to potential substantial adverse effects if an earthquake were to occur that caused displacement of the bridge, thereby resulting in its failure. However, the new bridge would be in compliance with seismic design requirements. Since the new bridge would be in compliance with current seismic design requirements, the exposure of people to substantial adverse effects would not increase or decrease substantially with the removal of the tide gates and replacement with a new bridge structure over the conditions described under the No Action Plan. Therefore, the impact would be less than significant.

Indirect Impacts

Under the NED Plan, the tide gates would be permanently removed and replaced with a small bridge that would continue to provide access to recreational users as well as emergency response vehicles and maintenance vehicles. Where the new bridge would be constructed is located approximately 2,200 feet west of an active fault and could be subject to seismic shaking impacts and liquefaction impacts if an earthquake occurs in the regional area. The removal of the tide gates and construction of a new access bridge does not involve the construction of any habitable structure; however, it does involve the construction of a permanent infrastructure structure. This permanent infrastructure structure would be subject to seismic shaking impacts or liquefaction impacts, however, since the bridge would be in compliance with current seismic design requirements the new infrastructure does not indirectly increase

or decrease the risk of structure failure over the existing condition, therefore, there is a less than significant impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new bridge replacing the tide gates would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. All of these activities would be temporary in duration and are not expected to have any impacts to earth resources. For the reasons above, there is a less than significant long-term impact.

C02/C04 Channels

Direct Impacts

According to the California Geologic Survey Seismic Hazard Zone Map for the Seal Beach, Newport Beach, and Anaheim Quadrangles, the Newport-Inglewood Fault Zone extends in a northwest to southeast direction at the western end of the project area, running nearly parallel to the coast line. The Newport-Inglewood Fault is an active fault capable of producing an earthquake of 6.9 on the Richter scale (SCEDC 2004; OCSD 2005). This magnitude earthquake would be large enough to result in ground surface rupture impacts in the Westminster Watershed. The downstream reach of C02 is within the Newport-Inglewood Alquist-Priolo Earthquake Fault Zone (CDMG 1986a,b; CGS 2002). The Alquist-Priolo Act prohibits the construction of habitable structures across active faults and within 50 feet of an active fault (Bryant and Hart 2007). An approximately 490 foot section of C02 Reach 23 is within and/or within 50 feet of the Newport-Inglewood Fault Zone (Figure 13). However, since the C02/C04 channels are not habitable structures, they are not subject to compliance with the Alquist-Priolo Act.

Construction activities within the C02/C04 channels would include: a single sheet pile wall along the south levee and no modification of the north levee for C02 Reach 23, and replacement of earthen/riprap/concrete trapezoidal channels with open rectangular concrete channels. For a detailed description of activities on a reach by reach basis refer to Section 3.6. Under the NED Plan, the conveyance efficiency of the channels would be improved. Construction activities associated with the C02/C04 channel system would not occur in areas where landslides have been mapped (see Figure 13, Section 2.2.3); however, failure of channel slopes prior to pouring of concrete could occur. Shoring of the side slopes of the channels would be employed during construction to ensure that slope failure is avoided. Overall, the modification of the drainage channels will not directly increase the risk of the structures failure during a seismic event over the existing condition described under the No Action Plan. In addition, design and construction of the channels would meet or exceed applicable design standards for liquefaction, subsidence, and seepage. Therefore, since the modification of the channels will not substantially increase the risk of structure failure over the existing condition, and the design of the channels will meet or exceed applicable design standards, there will be a less than significant impact.

Indirect Impacts

An approximately 490 foot section of C02 Reach 23 is within 50 feet of the Newport-Inglewood Fault Zone and could be subject to seismic shaking impacts and liquefaction impacts if an earthquake occurs in the regional area. The modification of the channels does not involve the construction of any habitable structure; however, it does involve the modification of permanent infrastructure structures that are already

in place. This permanent infrastructure would be subject to seismic shaking impacts or liquefaction impacts, however, since the design of the channels will meet or exceed applicable design standards the new infrastructure does not indirectly increase or decrease the risk of structure failure over the existing condition. Therefore, there is a less than significant indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the channels would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would have a less than significant impact on earth resources since these maintenance activities are already undertaken for the current channels under the existing condition.

C05/C06 Channels

Direct Impacts

According to the California Geologic Survey Seismic Hazard Zone Map for the Seal Beach, Newport Beach, and Anaheim Quadrangles, the Newport-Inglewood Fault Zone extends in a northwest to southeast direction at the western end of the project area, running nearly parallel to the coast line. The Newport-Inglewood Fault is an active fault capable of producing an earthquake of 6.9 on the Richter scale (SCEDC 2004; OCSD 2005). This magnitude earthquake would be large enough to result in ground surface rupture impacts in the Westminster Watershed. The downstream reach of C05 is within the Newport-Inglewood Alquist-Priolo Earthquake Fault Zone (CDMG 1986a,b; CGS 2002). The Alquist-Priolo Act prohibits the construction of habitable structures across active faults and within 50 feet of an active fault (Bryant and Hart 2007). An approximately 1,200 foot section of C05 Reach 1 is within 50 feet of the Newport-Inglewood Fault Zone (Figure 13). However, since the C05/C06 channels are not habitable structures, they are not subject to compliance with the Alquist-Priolo Act.

Construction activities within the C05/C06 channels would include: double sheet pile walls along the north and south sides of C05 Reach 1 and replacement of earthen/riprap trapezoidal channels with concrete lined trapezoidal channels. For a detailed description of activities on a reach by reach basis, refer to Section 3.6. Under the NED Plan, only the conveyance efficiency of the channels would be improved. Construction activities associated with the C05/C06 channel system would not occur in areas where landslides have been mapped (see Figure 13, Section 2.2.3); however, failure of channel slopes prior to pouring of concrete could occur. Shoring of the side slopes of the channels would be employed during construction to ensure that slope failure is avoided. Overall, the modification of the drainage channels will not directly increase the risk of the structures failure during a seismic event over the existing condition described under the No Action Plan. In addition, design and construction of the channels would meet or exceed applicable design standards for liquefaction, subsidence, and seepage. Therefore, since the modification of the channels will not substantially increase the risk of structure failure over the existing condition, and the design of the channels will meet or exceed applicable design standards, there will be a less than significant impact.

Indirect Impacts

An approximately 1,200 foot section of C05 Reach 1 is within 50 feet of the Newport-Inglewood Fault Zone and could be subject to seismic shaking impacts and liquefaction impacts if an earthquake occurs in the regional area. The modification of the channels does not involve the construction of any habitable structure; however, it does involve the modification of permanent infrastructure structures that are already in place. This permanent infrastructure would be subject to seismic shaking impacts or liquefaction

impacts, but the modification of the channels does not increase or decrease the exposure of these permanent infrastructure structures to impacts, however, since the design of the channels will meet or exceed applicable design standards the new infrastructure does not indirectly increase or decrease the risk of structure failure over the existing condition. Therefore, there is a less than significant indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the channels would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would have a less than significant impact on earth resources since these maintenance activities are already undertaken for the current channels under the existing conditions.

Level of Impact for the NED Plan

Less than significant impact. Short-term direct and indirect and long-term operation and maintenance activities would not increase the risk or exposure of people to significant adverse seismic ground rupture, seismic shaking impacts, or liquefaction impacts over the current condition.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

According to the California Geologic Survey Seismic Hazard Zone Map for the Seal Beach, Newport Beach, and Anaheim Quadrangles, the Newport-Inglewood Fault Zone extends in a northwest to southeast direction at the western end of the project area, running nearly parallel to the coast line. The Newport-Inglewood Fault is an active fault capable of producing an earthquake of 6.9 on the Richter scale (SCEDC 2004; OCSD 2005). This magnitude earthquake would be large enough to result in ground surface rupture impacts in the Westminster Watershed. The downstream reach of C02 is within the Newport-Inglewood Alquist-Priolo Earthquake Fault Zone (CDMG 1986a,b; CGS 2002). The Alquist-Priolo Act prohibits the construction of habitable structures across active faults and within 50 feet of an active fault (Bryant and Hart 2007). An approximately 490 foot section of C02 Reach 23 is within and/or within 50 feet of the Newport-Inglewood Fault Zone (Figure 13). However, since the C02/C04 channels are not habitable structures, they are not subject to compliance with the Alquist-Priolo Act.

Construction activities within the C02/C04 channels would include: a single sheet pile wall along the south levee and regarding and vegetated cellular confinement system along the north levee for C02 Reach

23, and replacement of earthen/riprap/concrete trapezoidal channels with open rectangular concrete channels. For a detailed description of activities on a reach by reach basis refer to Section 3.6. Under the LPP, both the conveyance efficiency and capacity of the channels would be improved. Construction activities associated with the C02/C04 channel system would not occur in areas where landslides have been mapped (see Figure 13, Section 2.2.3); however, failure of channel slopes prior to pouring of concrete could occur. Shoring of the side slopes of the channels would be employed during construction to ensure that slope failure is avoided. Overall, the modification of the drainage channels and crossings will not directly increase the risk of the structures failure during a seismic event over the existing condition described under the No Action Plan. Design and construction of the channels and crossings will meet or exceed applicable design standards for liquefaction, subsidence, and seepage. Therefore, since the modification of the channels and crossings will not substantially increase the risk of structure failure over the existing condition, and the design of the channels and crossings will meet or exceed applicable design standards, there will be a less than significant impact.

Indirect Impacts

An approximately 490 foot section of C02 Reach 23 is within 50 feet of the Newport-Inglewood Fault Zone and could be subject to seismic shaking impacts and liquefaction impacts if an earthquake occurs in the regional area. The modification of the channels does not involve the construction of any habitable structure; however, it does involve the modification of permanent infrastructure structures that are already in place. This permanent infrastructure would be subject to seismic shaking impacts or liquefaction impacts, but the modification of the channels does not increase or decrease the exposure of these permanent infrastructure structures to impacts, however, since the design of the channels will meet or exceed applicable design standards the new infrastructure does not indirectly increase or decrease the risk of structure failure over the existing condition. Therefore, there is a less than significant indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the channels would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would have a less than significant impact on earth resources since these maintenance activities are already undertaken for the current channels under the existing conditions.

C05/C06 Channels

Direct Impacts

According to the California Geologic Survey Seismic Hazard Zone Map for the Seal Beach, Newport Beach, and Anaheim Quadrangles, the Newport-Inglewood Fault Zone extends in a northwest to southeast direction at the western end of the project area, running nearly parallel to the coast line. The Newport-Inglewood Fault is an active fault capable of producing an earthquake of 6.9 on the Richter scale (SCEDC 2004; OCSD 2005). This magnitude earthquake would be large enough to result in ground surface rupture impacts in the Westminster Watershed. The downstream reach of C05 is within the Newport-Inglewood Alquist-Priolo Earthquake Fault Zone (CDMG 1986a,b; CGS 2002). The Alquist-Priolo Act prohibits the construction of habitable structures across active faults and within 50 feet of an active fault (Bryant and Hart 2007). An approximately 1,200 foot section of C05 Reach 1 is within 50 feet of the Newport-Inglewood Fault Zone (Figure 13). However, since the C05/C06 channels are not habitable structures, they are not subject to compliance with the Alquist-Priolo Act.

Construction activities within the C05/C06 channels would include: double sheet pile walls for the north and south sides of C05 Reach 1 and replacement of earthen/riprap/concrete trapezoidal channels with open rectangular concrete channels. For a detailed description of activities on a reach by reach basis refer to Section 3.6. Under the LPP, both the conveyance efficiency and capacity of the channels would be improved. Construction activities associated with the C05/C06 channel system would not occur in areas where landslides have been mapped (see Figure 13, Section 2.2.3); however, failure of channel slopes prior to pouring of concrete could occur. Shoring of the side slopes of the channels would be employed during construction to ensure that slope failure is avoided. Overall, the modification of the drainage channels and crossings will not directly increase the risk of the structures failure during a seismic event over the existing condition described under the No Action Plan. Design and construction of the channels and crossings will meet or exceed applicable design standards for liquefaction, subsidence, and seepage. Therefore, since the modification of the channels and crossings will not substantially increase the risk of structure failure over the existing condition, and the design of the channels and crossings will meet or exceed applicable design standards, there will be a less than significant impact.

Indirect Impacts

An approximately 1,200 foot section of C05 Reach 1 is within 50 feet of the Newport-Inglewood Fault Zone and could be subject to seismic shaking impacts and liquefaction impacts if an earthquake occurs in the regional area. The modification of the channels does not involve the construction of any habitable structure; however, it does involve the modification of permanent infrastructure structures that are already in place. This permanent infrastructure would be subject to seismic shaking impacts or liquefaction impacts, but the modification of the channels does not increase or decrease the exposure of these permanent infrastructure structures to impacts, however, since the design of the channels will meet or exceed applicable design standards the new infrastructure does not indirectly increase or decrease the risk of structure failure over the existing condition. Therefore, there is a less than significant indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the channels would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would have a less than significant impact on earth resources since these maintenance activities are already undertaken for the current channels under the existing conditions.

Diversion Channel

Direct Impacts

According to the California Geologic Survey Seismic Hazard Zone Map for the Seal Beach, Newport Beach, and Anaheim Quadrangles, the Newport-Inglewood Fault Zone extends in a northwest to southeast direction at the western end of the project area, running nearly parallel to the coast line. The Newport-Inglewood Fault is an active fault capable of producing an earthquake of 6.9 on the Richter scale (SCEDC 2004; OCSD 2005). This magnitude earthquake would be large enough to result in ground surface rupture impacts in the Westminster Watershed. The Alquist-Priolo Act prohibits the construction of habitable structures across active faults and within 50 feet of an active fault (Bryant and Hart 2007). The downstream end of the diversion channel is located approximately 3.3 miles northeast of the Newport-Inglewood Fault Zone (Figure 13). However, since the diversion channel is not a habitable structure, it is not subject to compliance with the Alquist-Priolo Act. The diversion channel would span two reaches in C04 (Reach 20 and Reach 21) and would be a combination of open channel and reinforced concrete box (RCB). Construction activities associated with the diversion channel would not occur in

areas where landslides have been mapped (see Figure 13, Section 2.2.3); however, failure of the channel slopes prior to pouring of concrete and placement of the RCB could occur. Shoring of the side slopes of the constructed channel would be employed during construction to ensure that slope failure is avoided. Design and construction of the diversion channel would meet or exceed applicable design standards for liquefaction, subsidence, and seepage. Since the design of the diversion channel will meet or exceed applicable design standards, there will be a less than significant impact.

Indirect Impacts

The diversion channel is located more than 50 feet away from the Newport-Inglewood Fault Zone. The construction of the diversion channel does not involve the construction of any habitable structure; however, it does involve the construction of a permanent infrastructure structure. This permanent infrastructure would be subject to seismic shaking impacts or liquefaction impacts, but the construction of the diversion channel does not increase or decrease the exposure of this permanent infrastructure structure to impacts, however, since the design of the channels will meet or exceed applicable design standards the new infrastructure does not indirectly increase or decrease the risk of structure failure over the existing condition. Therefore, there is a less than significant indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the diversion channel would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channel if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would have a less than significant impact on earth resources since similar maintenance activities are already undertaken for the other channel reaches within C04 where the diversion channel would be located.

Level of Impact for the LPP

Less than significant impact. Short-term direct and indirect and long-term operation and maintenance activities would not increase the risk or exposure of people to significant adverse seismic ground rupture, seismic shaking impacts, or liquefaction impacts over the current condition.

5.3.4.2 IMPACT GEO-2: Result in substantial soil erosion or the loss of topsoil.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative, no federal project would be implemented, therefore, no construction activities would occur. There would be no change to the study area condition due to the implementation of a project. Currently, portions of the study area, including both Huntington Harbour and within the vicinity of Warner Avenue Bridge, experience scouring and soil erosion. The Draft Huntington Harbour Bulkhead Repair Mitigated Negative Declaration (2008) states that Huntington Harbour is experiencing erosion due to localized tidal currents, recreational boat use, and periodic maintenance dredging activities in the area which have undermined the bulkheads, damaged support piles, and threatened their structural integrity. Properties located on the main channel of Huntington Harbour, show the greatest erosion levels. Within the vicinity of Warner Avenue Bridge upstream there is erosion which has caused the bluffs near the bridge to be closed to the public due to their instability. In addition, the leveed areas of the drainage channels (i.e., C02 Reach 23 and C05 Reach 1) as well as the channels that are earthen experience scouring and erosion during storm events. All of the above would be expected to continue if no project is implemented.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

The modification of the Warner Avenue Bridge would require excavation of soil including the excavation of the upstream constriction. Approximately 48,800 cubic yards of construction debris would be removed and disposed of at the nearest landfill and/or recycling center that accepts construction debris. If any landfill and/or recycling center reaches capacity for the day, excavated material would be temporarily stockpiled. This measure would disturb about 0.6 acre by excavation activities and would be required to comply with Section 402 of the CWA. Prior to the start of excavation activities mitigation measure MM-GEO-1 would be implemented. MM-GEO-1 would include obtaining a General Construction Permit, filing a NOI with SWRCB, and preparing and implementing a SWPPP, which would include a list of BMPs to minimize potential soil erosion impacts. Mitigation measure MM-GEO-2 would be implemented after excavation activities are complete to ensure that any disturbed soils are properly stabilized to minimize potential soil erosion impacts post construction. With the implementation of mitigation measures MM-GEO-1 and MM-GEO-2 potential direct adverse erosion impacts would be less than significant.

Indirect Impacts

The modification of the Warner Avenue Bridge could have an adverse indirect impact by increasing flow velocities within the area which in turn could result in increased soil erosion. Currently, the flow velocities moving through the Warner Avenue Bridge range from approximately 5.5 cfs during MHHW to 7.8 cfs during MLW for the 100-year storm event. During construction, the flow velocities would not be expected to change significantly from the current condition, until the constriction point is removed. Once the constriction point is removed and construction of the upstream channel reaches are complete, flow velocities moving through Warner Avenue Bridge would be expected to range from approximately 4.2 cfs during MHHW to 6.0 cfs during MLW for the 100-year storm event. Therefore, flow velocities under the NED Plan are expected to be less than they are for the existing condition for the 100-year storm event. Even though velocities are expected to decrease under the NED Plan, stone would be placed in areas near Warner Avenue Bridge and Huntington Harbour to proactively prevent any potential scouring. It is important to note that both Huntington Harbour and Warner Avenue Bridge already experience scouring and erosion under the existing condition. According to the Draft Huntington Harbour Bulkhead Repair Mitigated Negative Declaration (City of Huntington Beach 2008), Huntington Harbour is experiencing erosion due to localized tidal currents, recreational boat use, and periodic maintenance dredging activities in the area which have undermined the bulkheads, damaged support piles, and threatened their structural integrity. Properties located on the main channel, which would also experience the higher velocities as a result of this project being implemented, show the greatest erosion levels. In addition, Warner Avenue Bridge itself is also currently experiencing erosion which has caused the bluffs near the bridge to be closed to the public due to their instability. Riprap has been placed around the toe of the bridge to address ongoing erosion and prevent further scouring.

Implementation of the proposed project would decrease flow velocities within the vicinity of Warner Avenue Bridge from existing condition, therefore, the NED Plan is not expected to increase scouring or erosion beyond the current condition described under the No Action Plan and in Chapter 2. In addition, mitigation measure MM-GEO-1 would be implemented which is the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP), which would include a list of BMPs to minimize potential soil erosion impacts. Mitigation measures MM-GEO-2 would also be implemented, but after

excavation activities are complete, to ensure that any disturbed soils are properly stabilized to minimize potential soil erosion impacts post construction. With the implementation of mitigation measures MM-GEO-1 and MM-GEO-2 potential indirect adverse impacts would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. All of these activities would be temporary in duration and are not expected to result in substantial soil erosion or the loss of topsoil, therefore, long-term impacts are less than significant.

Tide Gates

Direct Impacts

The permanent removal of the tide gates and replacement with a new access bridge would require the excavation of approximately 4,500 cubic yards of construction debris, which would be removed and disposed of at the nearest landfill and/or recycling center that accepts construction debris. If any landfill and/or recycling center reaches capacity for the day, excavated material would be temporarily stockpiled. This measure would disturb at least one acre by excavation activities and would be required to comply with Section 402 of the CWA. Prior to the start of excavation activities mitigation measures MM-GEO-1 would be implemented. MM-GEO-1 would include obtaining a General Construction Permit, filing a NOI with SWRCB, and preparing and implementing a SWPPP, which would include a list of BMPs to minimize potential soil erosion impacts. Mitigation measure MM-GEO-2 would be implemented after excavation activities are complete to ensure that any disturbed soils are properly stabilized to minimize potential soil erosion impacts post construction. With the implementation of mitigation measures MM-GEO-1 and MM-GEO-2 potential direct adverse erosion impacts would be less than significant.

Indirect Impacts

Indirect impacts could occur if BMPs are not implemented during construction and/or if materials are loosened during construction and are not properly stabilized. Therefore, mitigation measure MM-GEO-1 will be implemented which is the preparation and implementation of a SWPPP, which would include a list of BMPs to minimize potential soil erosion impacts. Mitigation measure MM-GEO-2 would also be implemented, but after excavation activities are complete, to ensure that any disturbed soils are properly stabilized to minimize potential soil erosion impacts post construction. With the implementation of mitigation measures MM-GEO-1 and MM-GEO-2, potential indirect adverse impacts would be less than significant.

Long-Term Operation and Maintenance Impacts

Under the NED Plan, the tide gates located at the downstream end of C05 Reach 1 would be removed permanently and replaced with a new small bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. All of these activities would be temporary in duration and are not expected to result in substantial soil erosion or the loss of topsoil, therefore, long-term impacts are less than significant.

C02/C04 Channels

Direct Impacts

Construction related to the channel modifications would require excavation of soil from the sides and bottom of the channels to ensure the invert grade elevation remains the same as what currently exists once the channels are lined with concrete. Approximately 82,000 cubic yards of construction debris would be excavated from the channels and disposed of at the nearest landfill and/or recycling center that accepts construction debris. If any landfill and/or recycling center reaches capacity for the day, excavated material would be temporarily stockpiled on the adjacent channel maintenance roads. Minor erosion of the channel sides and bottom from wind or rain events could occur prior to pouring of concrete. There would also be incidental wind erosion due to the proximity of the proposed project to the ocean and onshore breezes that could cause minor erosion when excavated soil is stockpiled prior to removal off site. In general, construction activities would cause no change to the physical or chemical quality of sediments or soils, and the project would not trigger or accelerate geologic processes such as erosion of sediment brought about by disturbance of landforms. Most of the existing reaches of the channel systems are currently constructed of natural inverts and natural or riprapped side slopes. Therefore, surficial sloughing or erosion is possible considering the existing channel conditions. The conversion of the natural or riprap channels to concrete lined would reduce erosion potential of the channel sides and bottom. Prior to the start of excavation activities, mitigation measure MM-GEO-1 would be implemented. MM-GEO-1 would include obtaining a General Construction Permit, filing a NOI with SWRCB, and preparing and implementing a SWPPP, which would include a list of BMPs to minimize potential soil erosion impacts. Mitigation measure MM-GEO-2 would be implemented after excavation activities are complete to ensure that any disturbed soils are properly stabilized to minimize potential soil erosion impacts post construction. In addition, since this measure would disturb at least one acre by excavation activities required in order to modify the drainage channels, the project would be required to comply with Section 402 of the CWA. With the implementation of mitigation measures MM-GEO-1, MM-GEO-2, and compliance with Section 402 of the CWA potential direct adverse erosion impacts would be less than significant.

Indirect Impacts

Indirect impacts could occur if BMPs are not implemented during construction and/or if materials are loosened during construction and are not properly stabilized. Therefore, mitigation measure MM-GEO-1 will be implemented which is the preparation and implementation of a SWPPP, which would include a list of BMPs to minimize potential soil erosion impacts. Mitigation measure MM-GEO-2 would also be implemented, but after excavation activities are complete, to ensure that any disturbed soils are properly stabilized to minimize potential soil erosion impacts post construction. With the implementation of mitigation measure MM-GEO-1 and MM-GEO-2, potential indirect adverse impacts would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the channels would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would not result in substantial soil erosion or the loss of topsoil since these maintenance activities are already undertaken for the current channels, therefore, long-term impacts are less than significant.

C05/C06 Channels

Direct Impacts

Construction related to the channel modifications would require excavation of soil from the sides and bottom of the channels to ensure the invert grade elevation remains the same as what currently exists once the channels are lined with concrete. Approximately 128,200 cubic yards of construction debris would be excavated from the channels and disposed of at the nearest landfill and/or recycling center that accepts construction debris. If any landfill and/or recycling center reaches capacity for the day, excavated material would be temporarily stockpiled on the adjacent channel maintenance roads. Minor erosion of the channel sides and bottom from wind or rain events could occur prior to pouring of concrete. There would also be incidental wind erosion due to the proximity of the proposed project to the ocean and onshore breezes that could cause minor erosion when excavated soil is stockpiled prior to removal off site. In general, construction activities would cause no change to the physical or chemical quality of sediments or soils, and the project would not trigger or accelerate geologic processes such as erosion of sediment brought about by disturbance of landforms. Most of the existing reaches of the channel systems are currently constructed of natural inverts and natural or riprapped side slopes. Therefore, surficial sloughing or erosion is possible considering the existing channel conditions. The conversion of the natural or riprap channels to concrete lined would reduce erosion potential of the channel sides and bottom. Prior to the start of excavation activities, mitigation measure MM-GEO-1 would be implemented. MM-GEO-1 would include obtaining a General Construction Permit, filing a NOI with SWRCB, and preparing and implementing a SWPPP, which would include a list of BMPs to minimize potential soil erosion impacts. Mitigation measure MM-GEO-2 would be implemented after excavation activities are complete to ensure that any disturbed soils are properly stabilized to minimize potential soil erosion impacts post construction. In addition, since this measure would disturb at least one acre by excavation activities required in order to modify the drainage channels, the project would be required to comply with Section 402 of the CWA. With the implementation of mitigation measures MM-GEO-1, MM-GEO-2, and compliance with Section 402 of the CWA potential direct adverse erosion impacts would be less than significant.

Indirect Impacts

Indirect impacts could occur if BMPs are not implemented during construction and/or if materials are loosened during construction and are not properly stabilized. Therefore, mitigation measure MM-GEO-1 will be implemented which is the preparation and implementation of a SWPPP, which would include a list of BMPs to minimize potential soil erosion impacts. Mitigation measure MM-GEO-2 would also be implemented, but after excavation activities are complete, to ensure that any disturbed soils are properly stabilized to minimize potential soil erosion impacts post construction. With the implementation of mitigation measures MM-GEO-1 and MM-GEO-2, potential indirect adverse impacts would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the channels would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would not result in substantial soil erosion or the loss of topsoil since these maintenance activities are already undertaken for the current channels, therefore, long-term impacts are less than significant.

Level of Impact for the NED Plan

Less than significant impact with mitigation incorporated. The NED Plan includes the modification of Warner Avenue Bridge, replacement of the tide gates at the downstream end of C05 Reach 1, and conversion of earthen/riprap trapezoidal lined drainage channels to trapezoidal concrete lined drainage channels. All of the above modifications would require excavation activities, detailed above, that could instigate soil erosion and/or loss of topsoil thereby potentially causing a significant impact. This significant impact would be reduced to less than significant with the incorporation of mitigation measures MM-GEO-1 and MM-GEO-2. These mitigation measures include the obtaining of a General Construction Permit, filing a NOI with SWRCB, and preparing and implementing a SWPPP, which would include a list of BMPs to minimize potential soil erosion impacts. In addition, any disturbed soils would be properly stabilized once construction is complete to minimize potential soil erosion post-construction.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

Construction related to the channel modifications would require excavation of soil from the sides and bottom of the channels to ensure the invert grade elevation remains the same as what currently exists once the channels are lined with concrete. Approximately 600,300 cubic yards of construction debris would be excavated from the channels and disposed of at the nearest landfill and/or recycling center that accepts construction debris. If any landfill and/or recycling center reaches capacity for the day, excavated material would be temporarily stockpiled on the adjacent channel maintenance roads. Minor erosion of the channel sides and bottom from wind or rain events could occur prior to pouring of concrete. There would also be incidental wind erosion due to the proximity of the proposed project to the ocean and onshore breezes that could cause minor erosion when excavated soil is stockpiled prior to removal off site. In general, construction activities would cause no change to the physical or chemical quality of sediments or soils, and the project would not trigger or accelerate geologic processes such as erosion of sediment brought about by disturbance of landforms. Most of the existing reaches of the channel systems are currently constructed of natural inverts and natural or riprapped side slopes. Therefore, surficial sloughing or erosion is possible considering the existing channel conditions. The replacement of earthen or riprap channels with concrete lined channels would reduce erosion potential of the channel sides and bottom. Prior to the start of excavation activities, mitigation measure MM-GEO-1 would be implemented. MM-GEO-1 would include obtaining a General Construction Permit, filing a NOI with SWRCB, and preparing and implementing a SWPPP, which would include a list of BMPs to minimize potential soil erosion impacts. Mitigation measure MM-GEO-2 would be implemented after excavation activities are complete to ensure that any disturbed soils are properly stabilized to minimize potential soil erosion impacts post

construction. In addition, since this measure would disturb at least one acre by excavation activities required in order to modify the drainage channels, the project would be required to comply with Section 402 of the CWA. With the implementation of mitigation measures MM-GEO-1, MM-GEO-2, and compliance with Section 402 of the CWA potential direct adverse erosion impacts would be less than significant.

Indirect Impacts

Indirect impacts could occur if BMPs are not implemented during construction and/or if materials are loosened during construction and are not properly stabilized. Therefore, mitigation measure MM-GEO-1 will be implemented which is the preparation and implementation of a SWPPP, which would include a list of BMPs to minimize potential soil erosion impacts. Mitigation measure MM-GEO-2 would also be implemented, but after excavation activities are complete, to ensure that any disturbed soils are properly stabilized to minimize potential soil erosion impacts post construction. With the implementation of mitigation measures MM-GEO-1 and MM-GEO-2, potential indirect adverse impacts would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the channels would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would not result in substantial soil erosion or the loss of topsoil since these maintenance activities are already undertaken for the current channels, therefore, long-term impacts are less than significant.

C05/C06 Channels

Direct Impacts

Construction related to the channel modifications would require excavation of soil from the sides and bottom of the channels to ensure the invert grade elevation remains the same as what currently exists once the channels are lined with concrete. Approximately 1,054,400 cubic yards of construction debris would be excavated from the channels and disposed of at the nearest landfill and/or recycling center that accepts construction debris. If any landfill and/or recycling center reaches capacity for the day, excavated material would be temporarily stockpiled on the adjacent channel maintenance roads. Minor erosion of the channel sides and bottom from wind or rain events could occur prior to pouring of concrete. There would also be incidental wind erosion due to the proximity of the proposed project to the ocean and onshore breezes that could cause minor erosion when excavated soil is stockpiled prior to removal off site. In general, construction activities would cause no change to the physical or chemical quality of sediments or soils, and the project would not trigger or accelerate geologic processes such as erosion of sediment brought about by disturbance of landforms. Most of the existing reaches of the channel systems are currently constructed of natural inverts and natural or riprapped side slopes. Therefore, surficial sloughing or erosion is possible considering the existing channel conditions. The replacement of earthen or riprap channels with concrete lined channels would reduce erosion potential of the channel sides and bottom. Prior to the start of excavation activities, mitigation measure MM-GEO-1 would be implemented. MM-GEO-1 would include obtaining a General Construction Permit, filing a NOI with SWRCB, and preparing and implementing a SWPPP, which would include a list of BMPs to minimize potential soil erosion impacts. Mitigation measure MM-GEO-2 would be implemented after excavation activities are complete to ensure that any disturbed soils are properly stabilized to minimize potential soil erosion impacts post construction. In addition, since this measure would disturb at least one acre by excavation activities required in order to modify the drainage channels, the project would be required to comply with Section

402 of the CWA. With the implementation of mitigation measures MM-GEO-1, MM-GEO-2, and compliance with Section 402 of the CWA potential direct adverse erosion impacts would be less than significant.

Indirect Impacts

Indirect impacts could occur if BMPs are not implemented during construction and/or if materials are loosened during construction and are not properly stabilized. Therefore, mitigation measure MM-GEO-1 will be implemented which is the preparation and implementation of a SWPPP, which would include a list of BMPs to minimize potential soil erosion impacts. Mitigation measure MM-GEO-2 would also be implemented, but after excavation activities are complete, to ensure that any disturbed soils are properly stabilized to minimize potential soil erosion impacts post construction. With the implementation of mitigation measures MM-GEO-1 and MM-GEO-2, potential indirect adverse impacts would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the channels would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would not result in substantial soil erosion or the loss of topsoil since these maintenance activities are already undertaken for the current channels, therefore, long-term impacts are less than significant.

Diversion Channel

Direct Impacts

Construction of the diversion channel would require excavation of approximately 106,500 cubic yards of construction debris would be excavated from the channel and disposed of at the nearest landfill and/or recycling center that accepts construction debris. If any landfill and/or recycling center reaches capacity for the day, excavated material would be temporarily stockpiled. Minor erosion of the channel sides and bottom from wind or rain events could occur prior to pouring of concrete. In general, construction activities would cause no change to the physical or chemical quality of sediments or soils, and the project would not trigger or accelerate geologic processes such as erosion of sediment brought about by disturbance of landforms. Prior to the start of excavation activities, mitigation measure MM-GEO-1 would be implemented. MM-GEO-1 would include obtaining a General Construction Permit, filing a NOI with SWRCB, and preparing and implementing a SWPPP, which would include a list of BMPs to minimize potential soil erosion impacts. Mitigation measure MM-GEO-2 would be implemented after excavation activities are complete to ensure that any disturbed soils are properly stabilized to minimize potential soil erosion impacts post construction. In addition, since this measure would disturb at least one acre by excavation activities required in order to modify the drainage channels, the project would be required to comply with Section 402 of the CWA. With the implementation of mitigation measures MM-GEO-1, MM-GEO-2, and compliance with Section 402 of the CWA potential direct adverse erosion impacts would be less than significant.

Indirect Impacts

Indirect impacts could occur if BMPs are not implemented during construction and/or if materials are loosened during construction and are not properly stabilized. Therefore, mitigation measure MM-GEO-1 will be implemented which is the preparation and implementation of a SWPPP, which would include a list of BMPs to minimize potential soil erosion impacts. Mitigation measure MM-GEO-2 would also be implemented, but after excavation activities are complete, to ensure that any disturbed soils are properly

stabilized to minimize potential soil erosion impacts post construction. With the implementation of mitigation measures MM-GEO-1 and MM-GEO-2, potential indirect adverse impacts would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the diversion channel would be the same as the other channels and would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channel if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would not result in substantial soil erosion or the loss of topsoil since these maintenance activities are already undertaken for the current channels, therefore, long-term impacts are less than significant.

Level of Impact for the LPP

Less than significant impact with mitigation incorporated. The LPP includes the modification of Warner Avenue Bridge, replacement of the tide gates at the downstream end of C05 Reach 1 with a new access bridge, and conversion of earthen/riprap/concrete lined trapezoidal drainage channels to open rectangular concrete lined drainage channels. All of the above modifications would require excavation activities, detailed above, that could instigate soil erosion and/or loss of topsoil thereby potentially causing a significant impact. This significant impact would be reduced to less than significant with the incorporation of mitigation measures MM-GEO-1 and MM-GEO-2. These mitigation measures include the obtaining of a General Construction Permit, filing a NOI with SWRCB, and preparing and implementing a SWPPP, which would include a list of BMPs to minimize potential soil erosion impacts. In addition, any disturbed soils would be properly stabilized once construction is complete to minimize potential soil erosion post-construction.

5.3.4.3 IMPACT GEO-3: Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative, no federal project would be implemented, therefore, no construction activities would occur. There would be no change to the study area condition due to the implementation of a project. As described in Section *2.2.4*, the majority of the study area is located within a Zone of Required Investigation for Liquefaction. Since the study are is subject to liquefaction it is also subject to lateral spreading and to seismically-induced settlement. Therefore, under current conditions and without the implementation of a project, the study area and structures within the study area are already located on potentially unstable soils. Conversely, the study area is not located within an area that is typically subject to landslides. Mapped landslide features that are closest to the study area are located approximately 1.6 miles southeast of C05, near Huntington Central Park West.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

Under the NED Plan, the span of Warner Avenue Bridge would be increased by adding three extra bents to the existing structure. According to the Mitigated Negative Declaration for the Warner Avenue Bridge Preventive Maintenance Project (over Bolsa Chica Channel) (City of Huntington Beach 2012), the Warner Avenue Bridge has been on the site for over 30 years, and has had no problems related to off-site landslides, lateral spreading, subsidence, liquefaction, expansive soils, or collapse. According to the State of California Seismic Hazards Zonation Program, the Warner Avenue Bridge is located in a Zone of Required Investigation for Liquefaction. Since the bridge is located within an area subject to liquefaction it can be assumed that it may also be subject to lateral spreading and to seismically-induced settlement. Although the bridge is located within an area of potential liquefaction and therefore may be subject to lateral spreading and seismically-induced settlement, the proposed project would only add on to the existing bridge structure and would ensure stability of the bridge would not be negatively affected.

Modification of the Warner Avenue Bridge would also include the removal of an approximately 0.6 acre constriction point upstream of the bridge on the left descending bank of OBB. Approximately 48,800 cubic yards of construction debris would be excavated from the area and disposed of at an appropriate landfill and/or recycling center. Once the constriction point is removed, the area would be stabilized with riprap to prevent scouring and erosion and ensure the stability of the bridge structure. Therefore, the modification of the bridge will have a less than significant impact on the structure's geologic stability.

Indirect Impacts

Modification of the Warner Avenue Bridge would have a less than significant indirect impact on the bridge's geologic stability.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modification of the Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. The typical maintenance activities are intended to maintain the bridge in a structurally safe and serviceable condition, correct minor structural defects, and extend the service life. Overall, maintenance activities would maintain or improve the stability of the bridge, therefore, the modification of Warner Avenue Bridge would have a less than significant impact on its geologic stability.

Tide Gates

Direct Impacts

Under the NED Plan the tide gates located at the downstream end of C05 Reach 1 would be permanently removed and replaced with a new access bridge. According to the State of California Seismic Hazards Zonation Program, the replacement bridge would be located in a Zone of Required Investigation for Liquefaction. Since the new bridge would be located within an area subject to liquefaction it can be assumed that it may also be subject to lateral spreading and to seismically-induced settlement. Although the new bridge would be located within an area of potential liquefaction and therefore may be subject to lateral spreading and seismically-induced settlement, the new bridge would adhere to seismic design

requirements ensuring the stability of the bridge would not be negatively affected. Therefore, the removal of the tide gates and replacement with an access bridge will have a less than significant impact on the new structure's geologic stability.

Indirect Impacts

The design of the new bridge would adhere to seismic design requirements, therefore, construction would have a less than significant indirect impact on the new bridge's geologic stability.

Long-Term Operation and Maintenance Impacts

Under the NED Plan, the tide gates would be permanently removed and replaced with a new access bridge. Maintenance activities associated with the new bridge would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. The typical maintenance activities are intended to maintain the new bridge in a structurally safe and serviceable condition, correct minor structural defects, and extend the service life. Overall, maintenance activities would maintain or improve the stability of the new bridge, therefore, the long-term operation and maintenance of the new bridge would have a less than significant impact on its geologic stability.

C02/C04 Channels

Direct Impacts

Under the NED Plan the conveyance efficiency of the C02/C04 drainage channels would be modified. For a detailed description of activities on a reach by reach basis refer to Section 3.6. All of the C02/C04 drainage channels are located in a Zone of Required Investigation for Liquefaction according to the State of California Seismic Hazards Zonation Program. Since the drainage channels are located within an area subject to liquefaction it can be assumed that they may also be subject to lateral spreading (perhaps on the order of a few feet) and to seismically-induced settlement (perhaps on the order of several inches to one foot). Although the drainage channels are located within an area of potential liquefaction and therefore may be subject to lateral spreading and seismically-induced settlement, the NED Plan would only modify the existing drainage channels and would ensure stability of the drainage channels would not be negatively affected. Therefore, the modification of the drainage channels would have a less than significant impact on the geologic stability of the drainage channels.

Indirect Impacts

Modification of the drainage channels would have a less than significant impact on the geologic stability of the channels.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would have a less than significant impact to the geologic stability of the channels as the routine maintenance activities are carried out in an effort to maintain the stability of the channels and extend their life span.

C05/C06 Channels

Direct Impacts

Under the NED Plan the conveyance efficiency of the C05/C06 drainage channels would be improved. For a detailed description of activities on a reach by reach basis refer to Section 3.6. The majority of the C05/C06 drainage channels, except C05 Reach 12, are located in a Zone of Required Investigation for Liquefaction according to the State of California Seismic Hazards Zonation Program. Since the drainage channels are located within an area subject to liquefaction it can be assumed that they may also be subject to lateral spreading (perhaps on the order of a few feet) and to seismically-induced settlement (perhaps on the order of several inches to one foot). Although the drainage channels are located within an area of potential liquefaction and therefore may be subject to lateral spreading and seismically-induced settlement, the NED Plan would only modify the existing drainage channels and would ensure stability of the drainage channels would not be negatively affected. Therefore, the modification of the drainage channels would have a less than significant impact on the geologic stability of the drainage channels.

Indirect Impacts

Modification of the drainage channels would have a less than significant impact on the geologic stability of the channels.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would have a less than significant impact to the geologic stability of the channels as the routine maintenance activities are carried out in an effort to maintain the stability of the channels and extend their life span.

Level of Impact for the NED Plan

Less than Significant. Short-term direct and indirect impacts due to construction activities and long-term operation and maintenance activities would have a less than significant impact to the geologic stability of the Warner Avenue Bridge, the new access bridge at the downstream end of C05 Reach 1, the C02/C04 drainage channels, and the C05/C06 drainage channels.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

Under the LPP the conveyance efficiency and capacity of the C02/C04 drainage channels would be modified. For a detailed description of activities on a reach by reach basis refer to Section 3.6. All of the C02/C04 drainage channels are located in a Zone of Required Investigation for Liquefaction according to the State of California Seismic Hazards Zonation Program. Since the drainage channels are located within an area subject to liquefaction it can be assumed that they may also be subject to lateral spreading (perhaps on the order of a few feet) and to seismically-induced settlement (perhaps on the order of several inches to one foot). Although the drainage channels are located within an area of potential liquefaction and therefore may be subject to lateral spreading and seismically-induced settlement, the LPP would only modify the existing drainage channels not the surrounding terrain, and would ensure stability of the drainage channels would not be negatively affected. Therefore, the modification of the drainage channels would have a less than significant impact on the geologic stability of the drainage channels.

Under the LPP, modifications to crossings on C04 would occur to accommodate the change in channel geometry from trapezoidal to rectangular. According to the State of California Seismic Hazards Zonation Program, the bridges are all located in a Zone of Required Investigation for Liquefaction. Since the bridges are located within an area subject to liquefaction it can be assumed that they may also be subject to lateral spreading and to seismically-induced settlement. Although the bridges are located within an area of potential liquefaction and therefore may be subject to lateral spreading and seismically-induced settlement, the LPP would ensure the stability of the newly constructed bridges would not be negatively affected. Therefore, the modification of the drainage channels and associated bridges would have a less than significant impact on the geologic stability of these structures.

Indirect Impacts

Modification of the drainage channels and associated bridges would have a less than significant indirect impact on the geologic stability of the channels.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the drainage channels would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would have a less than significant impact to the geologic stability of the channels as the routine maintenance activities are carried out in an effort to maintain the stability of the channels and extend their life span. Maintenance activities associated with the bridge modifications would be no different than maintenance activities that are undertaken for the current bridge crossings. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Similar to the channel maintenance activities, the bridge maintenance activities are intended to maintain the bridges in a structurally sage and serviceable condition, correct minor structural defects, and extend the service life. Bridge maintenance activity would maintain or improve the stability of the bridge crossings, therefore, these long-term activities would have a less than significant impact on the structures geologic stability.

C05/C06 Channels

Direct Impacts

Under the LPP the conveyance efficiency and capacity of the C05/C06 drainage channels would be modified. For a detailed description of activities on a reach by reach basis refer to Section 3.6. The majority of the C05/C06 drainage channels, except C05 Reach 12, are located in a Zone of Required Investigation for Liquefaction according to the State of California Seismic Hazards Zonation Program. Since the drainage channels are located within an area subject to liquefaction it can be assumed that they may also be subject to lateral spreading (perhaps on the order of a few feet) and to seismically-induced settlement (perhaps on the order of several inches to one foot). Although the drainage channels are located within an area of potential liquefaction and therefore may be subject to lateral spreading and seismically-induced settlement, the LPP would only modify the existing drainage channels not any of the surrounding terrain, and would ensure stability of the drainage channels would not be negatively affected.

Under the LPP, modifications to 27 crossings on C05 and three crossings on C06 would occur to accommodate the change in channel geometry from trapezoidal to rectangular. According to the State of California Seismic Hazards Zonation Program, the bridges are all located in a Zone of Required Investigation for Liquefaction. Since the bridges are located within an area subject to liquefaction it can be assumed that they may also be subject to lateral spreading and to seismically-induced settlement. Although the bridges are located within an area of potential liquefaction and therefore may be subject to lateral spreading and seismically-induced settlement, the LPP would ensure the stability of the newly constructed bridges would not be negatively affected. Therefore, the modification of the drainage channels and associated bridges would have a less than significant impact on the geologic stability of these structures.

Indirect Impacts

Modification of the drainage channels would have a less than significant indirect impact on the geologic stability of the channels.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would have a less than significant impact on the geologic stability of the channels as the routine maintenance activities are carried out in an effort to maintain the stability of the channels and extend their life span. Maintenance activities associated with the bridge modifications would be no different than maintenance activities that are undertaken for the current bridge crossings. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Similar to the channel maintenance activities, the bridge maintenance activities are intended to maintain the bridges in a structurally sage and serviceable condition, correct minor structural defects, and extend the service life. Bridge maintenance activity would maintain or improve the stability of the bridge crossings, therefore, these long-term activities would have a less than significant impact on the structures geologic stability.

Diversion Channel

Direct Impacts

Under the LPP, a bypass channel would be constructed to direct flows around a long reach of covered conduit that runs under I-405 and the Westminster Mall and causes a bottleneck. This diversion would span two reaches in C04 (Reaches 20 and 21) and would be a combination of open channel and reinforced concrete box. It would split off of C04 Reach 21 at the intersection of Hoover and Hazard streets, run west along an abandoned Navy railroad line to the north of Westminster Mall, and then turn south underneath Edwards Street until it reconnects with Reach 20 (where Reach 20 goes underground) near the intersection of Edwards Street and Bolsa Avenue. According to the State of California Seismic Hazards Zonation Program, the diversion channel is located in a Zone of Required Investigation for Liquefaction. Since the diversion channel would be located within an area subject to liquefaction it can be assumed that it may also be subject to lateral spreading and to seismically-induced settlement. Although the diversion channel is located within an area of potential liquefaction and therefore may be subject to lateral spreading and seismically-induced settlement, the construction of the diversion channel would not increase the risk that underlying soils would become unstable. Therefore, the construction of the diversion channel would have a less than significant impact on the geologic stability of the site.

Indirect Impacts

Construction of the diversion channel would have a less than significant indirect impact on the geologic stability of the site.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the diversion channel would be the same as those currently undertaken for the drainage channels that are already present. Maintenance would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would have a less than significant impact to the geologic stability of the diversion channel as the routine maintenance activities are carried out in an effort to maintain the stability of the channels and extend their life span.

Level of Impact for the LPP

Less than Significant. Construction and long-term operation and maintenance activities would have a less than significant impact on the geologic stability of Warner Avenue Bridge, the new access bridge at the downstream end of C05 Reach 1, C02/C04 drainage channels, and the C05/C06 drainage channels.

5.3.4.4 IMPACT GEO-4: Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative, no federal project would be implemented, therefore, no construction activities would occur. There would be no change to the study area condition due to the implementation of a project. The existing drainage channels in their current configuration would not be modified. Portions of the existing drainage channels are located on expansive soils (i.e., portion of C05 Reach 1). Expansive soils shrink or swell as the moisture content decreases or increases; the shrinking or swelling can shift, crack, or break structures built on such soils. Therefore, portions of the existing drainage channels that are

located on expansive soils would continue to be at risk of potential breaking, even without the implementation of a project, which could result in a direct or indirect risk to life or property.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

According to the geotechnical investigation (refer to *Appendix G – Geotechnical Engineering*), no potentially expansive soils were identified within the vicinity of the Warner Avenue Bridge. Therefore, the proposed modification of the Warner Avenue Bridge would not increase risks to people or structures from expansive soils hazards and the impact would be less than significant.

Indirect Impacts

According to the geotechnical investigation (refer to *Appendix G – Geotechnical Engineering*), no potentially expansive soils were identified within the vicinity of the Warner Avenue Bridge. Therefore, the proposed modification of the bridge would not indirectly increase risks to people or structures from expansive soils hazards and the indirect impact would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modification of the Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. According to the geotechnical investigation (refer to *Appendix G – Geotechnical Engineering*) no potentially expansive soils were identified within the vicinity of the Warner Avenue Bridge. Therefore, the typical maintenance activities would not be expected to increase risks to people or structures from expansive soils hazards. The impact would be less than significant.

Tide Gates

Direct Impacts

According to the geotechnical investigation (refer to *Appendix G – Geotechnical Engineering*), potentially expansive soils were identified from roughly 0.7 miles north of PCH at Oil Road Bridge upstream for an approximate length of 1,400 linear feet within the C05 drainage channel. The location of the expansive soils are approximately 3,000 feet upstream of the tide gates on C05. Expansive soils shrink or swell as the moisture content decreases or increases; the shrinking or swelling can shift, crack, or break structures built on such soils. While expansive soils can potentially lead to damage of structures, the design of the new bridge to replace the tide gates on C05 Reach 1 would comply with seismic design standards. Therefore, the construction of the new bridge would not increase risks to people or structures from expansive soils hazards and the impact would be less than significant.

Indirect Impacts

According to the geotechnical investigation (refer to *Appendix G – Geotechnical Engineering*), potentially expansive soils were identified from roughly 0.7 miles north of PCH at Oil Road Bridge

upstream for an approximate length of 1,400 linear feet within the C05 drainage channel. While expansive soils can potentially lead to damage of structures, the design of the new bridge to replace the tide gates on C05 Reach 1 would comply with seismic design standards. Therefore, the construction of the new bridge would not indirectly increase risks to people or structures from expansive soils hazards and the impact would be less than significant.

Long-Term Operation and Maintenance Impacts

Under the NED Plan the tide gates would be permanently removed and replaced with a new access bridge. Maintenance activities associated with the new bridge would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. According to the geotechnical investigation (refer to *Appendix G – Geotechnical Engineering*), potentially expansive soils were identified from roughly 0.7 miles north of PCH at Oil Road Bridge upstream for an approximate length of 1,400 linear feet within the C05 drainage channel. While expansive soils can potentially lead to damage of structures, the design of the new bridge to replace the tide gates on C05 Reach 1 would comply with seismic design standards. Therefore, the typical maintenance activities and long-term operation of the bridge would not be expected to increase risks to people or structures from expansive soils hazards. The impact would be less than significant.

C02/C04 Channels

Direct Impacts

According to the geotechnical investigation (refer to *Appendix G – Geotechnical Engineering*), no potentially expansive soils were identified within the C02/C04 drainage channels. Therefore, the proposed modifications to the channels and crossings within C02/C04 would not increase risks to people or structures from expansive soils hazards and the impact would be less than significant.

Indirect Impacts

According to the geotechnical investigation (refer to *Appendix G – Geotechnical Engineering*), no potentially expansive soils were identified within the C02/C04 drainage channels. Therefore, the proposed modifications to the channels and crossings within C02/C04 system would not increase risks to nearby structures from expansive soils hazards and the indirect impact would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would not be expected to create substantial hazards that would increase risks to people or structures from expansive soils since these routine maintenance activities are already occurring under the future without project condition. Therefore, the impact would be less than significant.

C05/C06 Channels

Direct Impacts

According to the geotechnical investigation (refer to *Appendix G – Geotechnical Engineering*), potentially expansive soils were identified from roughly 0.7 miles north of PCH at Oil Road Bridge

upstream for an approximately length of 1,400 linear feet within the C05 drainage channel. The location of the expansive soils are within the proposed project's action area. No expansive soils were identified for the C06 drainage channel. Expansive soils shrink or swell as the moisture content decreases or increases; the shrinking or swelling can shift, crack, or break structures built on such soils. While expansive soils can potentially lead to damage of structures, the proposed modifications to the channels would only alter existing structures that are not for human occupancy and are closed to the public. In addition, the proposed project is modifying existing drainage channels and would not increase risks to people or structures beyond what is currently probable under the future without project condition. Therefore, the proposed project would not create substantial hazards that would increase risks to people or structures from expansive soils. The impact would be less than significant.

Indirect Impacts

The potential indirect impact of modifying the drainage channels would be the risk of damage from expansive soils hazards to nearby structures that are not part of the proposed project. The proposed project is only modifying existing drainage channels and would not substantially increase risks to nearby structures beyond what is currently probable under the future without project condition. Therefore, the impact would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would not be expected to create substantial hazards that would increase risks to people or structures from expansive soils since these routine maintenance activities are already occurring under the future without project condition. Therefore, the impact would be less than significant.

Level of Impact for the NED Plan

Less than Significant. Construction and long-term operation and maintenance activities associated with the NED Plan would not substantially increase risks to people or structures beyond what is currently probable under the future without project condition.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

According to the geotechnical investigation (refer to *Appendix G – Geotechnical Engineering*), no potentially expansive soils were identified within the C02/C04 channels. Therefore, the proposed modifications to the channels and crossings within C02/C04 would not increase risks to people or structures from expansive soils hazards and the impact would be less than significant.

Indirect Impacts

According to the geotechnical investigation (refer to *Appendix G – Geotechnical Engineering*), no potentially expansive soils were identified within the C02/C04 channels. Therefore, the proposed modifications to the channels and crossings within C02/C04 would not increase risks to nearby structures from expansive soils hazards and the indirect impact would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would not be expected to create substantial hazards that would increase risks to people or structures from expansive soils since these routine maintenance activities are already occurring under the future without project condition. Therefore, the impact would be less than significant.

C05/C06 Channels

Direct Impacts

According to the geotechnical investigation (refer to *Appendix G – Geotechnical Engineering*), potentially expansive soils were identified from roughly 0.7 miles north of PCH at Oil Road Bridge upstream for an approximately length of 1,400 linear feet within the C05 drainage channel. The location of the expansive soils are within the proposed project's action area. No expansive soils were identified for the C06 drainage channel. Expansive soils shrink or swell as the moisture content decreases or increases; the shrinking or swelling can shift, crack, or break structures built on such soils. While expansive soils can potentially lead to damage of structures, the proposed modifications to the channels would only alter existing structures that are not for human occupancy and are closed to the public. In addition, the proposed project is modifying existing drainage channels and would not increase risks to people or structures beyond what is currently probable under the future without project condition. Therefore, the proposed project would not create substantial hazards that would increase risks to people or structures from expansive soils. The impact would be less than significant.

Indirect Impacts

The potential indirect impact of modifying the drainage channels would be the risk of damage from expansive soils hazards to nearby structures that are not part of the proposed project. The proposed project is only modifying existing drainage channels and would not substantially increase risks to nearby structures beyond what is currently probably under the future without project condition. Therefore, the impact would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would not be expected to create substantial hazards that would increase risks to people or structures from expansive soils since these routine maintenance activities are already occurring under the future without project condition. Therefore, the impact would be less than significant.

Diversion Channel

Direct Impacts

According to the geotechnical investigation (refer to *Appendix G – Geotechnical Engineering*), no potentially expansive soils were identified within the area where the diversion channel would be constructed. Therefore, the construction of the diversion channel would not increase risks to people or structures from expansive soils hazards and the impact would be less than significant.

Indirect Impacts

According to the geotechnical investigation (refer to *Appendix G – Geotechnical Engineering*), no potentially expansive soils were identified within the area where the diversion channel would be constructed. Therefore, the construction of the diversion channel would not indirectly increase risks to people or structures from expansive soils hazards and the impact would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the diversion channel would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., channel repairs and sediment removal) would not be expected to create substantial hazards that would increase risks to people or structures from expansive soils. Therefore, the impact would be less than significant.

Level of Impact for the LPP

Less than Significant. Construction and long-term operation and maintenance activities associated with the LPP would not substantially increase risks to people or structures beyond what is currently probable under the future without project condition.

5.3.4.5 IMPACT GEO-5: Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative, no federal project would be implemented, therefore, no construction activities would occur. There would be no change to the study area condition due to the implementation

of a project. The No Action Plan is the continued operation of the existing drainage channels in their existing configurations which does not involve septic tanks or waste water disposal systems.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

Due to the nature of this measure, the lengthening of the Warner Avenue Bridge, septic tanks are not necessary for project implementation. No impacts related to wastewater disposal systems would occur due to implementation of this measure.

Indirect Impacts

Due to the nature of this measure, septic tanks are not necessary for project implementation. Therefore, no indirect impacts related to wastewater disposal systems would occur with implementation of this measure.

Long-term Operation and Maintenance Impacts

Maintenance activities associated with the modification of the Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Due to the nature of this measure, septic tanks are not necessary for long-term operation or maintenance activities. No impacts related to wastewater disposal systems would occur due to long-term operation and maintenance associated with the lengthening of Warner Avenue Bridge.

Tide Gates

Direct Impacts

Due to the nature of this measure, the permanent removal of the tide gates on C05 Reach 1 and replacement with a new access bridge, septic tanks are not necessary for project implementation. No impacts related to wastewater disposal systems would occur due to implementation of this measure.

Indirect Impacts

Due to the nature of this measure, septic tanks are not necessary for project implementation. Therefore, no indirect impacts related to wastewater disposal systems would occur with implementation of this measure.

Long-term Operation and Maintenance Impacts

Maintenance activities associated with the new access bridge to replace the tide gates would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Due to the nature of this measure, septic tanks are not necessary for long-term operation or maintenance activities. No impacts related to wastewater disposal systems would occur due to long-term operation and maintenance associated with the new bridge to replace the tide gates on C05 Reach 1.

C02/C04 Channels

Direct Impacts

Due to the nature of this measure, septic tanks are not necessary for project implementation. Additionally, the project would not generate wastewater and would not use alternative wastewater disposal systems. No impacts related to wastewater disposal systems would occur due to implementation of this measure.

Indirect Impacts

Due to the nature of this measure, septic tanks are not necessary for project implementation. Additionally, the project would not generate wastewater and would not use alternative wastewater disposal systems. Therefore, no indirect impacts related to wastewater disposal systems would occur with implementation of this measure.

Long-term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. None of these small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) nor long-term operation of the channels would generate wastewater or use alternative wastewater disposal systems. Therefore, no long-term operation or maintenance impacts related to wastewater disposal systems would occur due to the implementation of this measure.

C05/C06 Channels

Direct Impacts

Due to the nature of this measure, septic tanks are not necessary for project implementation. Additionally, the project would not generate wastewater and would not use alternative wastewater disposal systems. No impacts related to wastewater disposal systems would occur due to implementation of this measure.

Indirect Impacts

Due to the nature of this measure, septic tanks are not necessary for project implementation. Additionally, the project would not generate wastewater and would not use alternative wastewater disposal systems. Therefore, no indirect impacts related to wastewater disposal systems would occur with implementation of this measure.

Long-term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. None of these small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) nor long-term operation of the channels would generate wastewater or use alternative wastewater disposal systems. Therefore, no long-term operation or maintenance impacts related to wastewater disposal systems would occur due to the implementation of this measure.

Level of Impact for the NED Plan

No impact. Due to the nature of the project, the NED Plan would not generate wastewater and would not use alternative wastewater disposal systems.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

Due to the nature of this measure, septic tanks are not necessary for project implementation. Additionally, the project would not generate wastewater and would not use alternative wastewater disposal systems. No impacts related to wastewater disposal systems would occur due to implementation of this measure.

Indirect Impacts

Due to the nature of this measure, septic tanks are not necessary for project implementation. Additionally, the project would not generate wastewater and would not use alternative wastewater disposal systems. Therefore, no indirect impacts related to wastewater disposal systems would occur with implementation of this measure.

Long-term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. None of these small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) nor long-term operation of the channels would generate wastewater or use alternative wastewater disposal systems. Therefore, no long-term operation or maintenance impacts related to wastewater disposal systems would occur due to the implementation of this measure.

C05/C06 Channels

Direct Impacts

Due to the nature of this measure, septic tanks are not necessary for project implementation. Additionally, the project would not generate wastewater and would not use alternative wastewater disposal systems. No impacts related to wastewater disposal systems would occur due to implementation of this measure.

Indirect Impacts

Due to the nature of this measure, septic tanks are not necessary for project implementation. Additionally, the project would not generate wastewater and would not use alternative wastewater disposal systems. Therefore, no indirect impacts related to wastewater disposal systems would occur with implementation of this measure.

Long-term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. None of these small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) nor long-term operation of the channels would generate wastewater or use alternative wastewater disposal systems. Therefore, no long-term operation or maintenance impacts related to wastewater disposal systems would occur due to the implementation of this measure.

Diversion Channel

Direct Impacts

Due to the nature of this measure, septic tanks are not necessary for project implementation. Additionally, the project would not generate wastewater and would not use alternative wastewater disposal systems. No impacts related to wastewater disposal systems would occur due to implementation of this measure.

Indirect Impacts

Due to the nature of this measure, septic tanks are not necessary for project implementation. Additionally, the project would not generate wastewater and would not use alternative wastewater disposal systems. Therefore, no indirect impacts related to wastewater disposal systems would occur with implementation of this measure.

Long-term Operation and Maintenance Impacts

Maintenance activities for the newly constructed diversion channel would be the same type of activities that currently occur within the existing drainage channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. None of these small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) nor long-term operation of the channels would generate wastewater or use alternative wastewater disposal systems. Therefore, no long-term operation or maintenance impacts related to wastewater disposal systems would occur due to the implementation of this measure.

Level of Impact for the LPP

No impact. Due to the nature of the project, the LPP would not generate wastewater and would not use alternative wastewater disposal systems.

5.3.4.6 IMPACT GEO-6: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative, no federal project would be implemented, therefore, no construction activities would occur. There would be no change to the study area condition due to the implementation of a project. The study area is underlain by Quaternary Alluvium and marine deposits of the Pleistocene to Holocene geologic age (USGS 2019). Quaternary Alluvium is younger alluvium, therefore, these

deposits typically do not contain significant vertebrate fossils, at least in the uppermost layers. Under the No Action Plan it is unlikely that there would be any direct or indirect impacts to unidentified paleontological resources or sites due to the existing drainage channels and their continued operation.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

The study area, including the Warner Avenue Bridge area, is underlain by Quaternary Alluvium and marine deposits of the Pleistocene to Holocene geologic age (USGS 2019). Quaternary Alluvium is younger alluvium and therefore these deposits typically do not contain significant vertebrate fossils, at least in the uppermost layers.

This measure would involve removal of approximately 48,800 cubic yards of material upstream of the bridge on the west side of OBB which currently acts as a constriction point for water exiting OBB into Huntington Harbour. A paleontological resource assessment has not been conducted of the area where the sediment would be removed due to the unlikely presence of paleontological resources. The study area is underlain by Quaternary Alluvium and marine deposits of the Pleistocene to Holocene geologic age (USGS 2019). Quaternary Alluvium is younger alluvium and therefore these deposits typically do not contain significant vertebrate fossils, at least in the uppermost layers. Although it may be unlikely that paleontological resources would be encountered during construction of Warner Avenue Bridge measure, it is ultimately possible that excavation activities could uncover previously undiscovered paleontological resources. Paleontological artifacts destroyed by excavation would be a significant impact. Mitigation measure MM-PR-1 would be implemented during earth-moving activities to ensure impacts to any unidentified fossils that may be uncovered are minimized. With the implementation of MM-PR-1 the impact would be reduced to less than significant under CEQA.

Indirect Impacts

The modification of the Warner Avenue Bridge and removal of the upstream constriction is expected to decrease flow velocities from what they are currently, therefore, a substantial increase in erosion and scouring over the existing condition is not anticipated. Scouring and erosion would be of concern since previously undiscovered paleontological resources that may be present within the vicinity of Warner Avenue Bridge could be exposed and damaged. Even though flow velocities are not expected to increase over the existing condition with the proposed project, areas where scour and/or erosion could be possible would be fortified with stone. Therefore, indirect impacts associated with this measure would be less than significant under CEQA.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. None of these maintenance activities include groundbreaking activities that could potentially expose previously undiscovered paleontological resources. Therefore, long-term operation and maintenance impacts associated with this measure would be less than significant under CEQA.

Tide Gates

Direct Impacts

Similar to the Warner Avenue Bridge area, the tide gates are located in an area that is underlain by Quaternary Alluvium and marine deposits of the Pleistocene and Holocene geologic age (USGS 2019). C05 Reach 1, where the tide gates are currently located, was surveyed for paleontological resources (Govean 1996), and based on the survey of the area it was determined that there was a low to no sensitivity for paleontological resources. Although this area has not been designated as sensitive for paleontological resources, the excavation into native undisturbed soils that would be necessary in order to permanently remove the tide gates and construction of the new small bridge may result in the finding of previously undiscovered paleontological resources. Paleontological resources destroyed by excavation would be a significant impact. Mitigation measure MM-PR-1 would be implemented during earth-moving activities to ensure impacts to any unidentified fossils that may be uncovered are minimized. With the implementation of MM-PR-1 the impact would be reduced to less than significant under CEQA.

Indirect Impacts

The removal of the tide gates and replacement with a new access bridge is not expected to increase erosion at the downstream end of C05 Reach 1 which could expose and impact any previously undiscovered paleontological resources. In addition, a survey of the area for paleontological resources (Govean 1996) determined that the area had low to no sensitivity for paleontological resources. Therefore, the indirect impact would be less than significant to paleontological resources under CEQA.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new bridge would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. None of these maintenance activities include groundbreaking activities that could potentially expose previously undiscovered paleontological resources. Therefore, long-term operation and maintenance impacts associated with this measure would be less than significant. Under CEQA.

C02/C04 Channels

Direct Impacts

A paleontological resource assessment has not been conducted for proposed channel modifications in the C02/C04 system due to the unlikely presence of paleontological resources. The study area, including the C02/C04 drainage channels are underlain by Quaternary Alluvium and marine deposits of the Pleistocene to Holocene geologic age (USGS 2019). Quaternary Alluvium is younger alluvium and therefore these deposits typically do not contain significant vertebrate fossils, at least in the uppermost layers. Under the NED Plan, the conveyance efficiency of the channels within the C02/C04 system would be increased. Although the shape of the channels would not change, excavation of the channel bottoms would occur prior to lining with concrete in order to maintain the existing channel invert. The only exception is C02 Reach 23 which would have a single sheet pile wall driven along the crest of the south side levee. Although the majority of onsite soils were previously disturbed by construction of the existing drainage channels, the proposed project would require excavation into possibly undisturbed native soils in order to maintain the existing channel inverts.

All of the aforementioned excavation activities would potentially remove native undisturbed soils that could have previously undiscovered paleontological resources. Therefore, fossil artifacts may be encountered during excavation activities. Paleontological artifacts destroyed by excavation would be a significant impact. Mitigation measure MM-PR-1 would be implemented during earth-moving activities to ensure impacts to any unidentified fossils that may be uncovered are minimized. With the implementation of MM-PR-1 the impact would be reduced to less than significant under CEQA.

Indirect Impacts

Under the NED Plan, the conveyance efficiency of the channels within the C02/C04 system would be increased. This means that velocities within the channels could be greater than what they are now and increased erosion/scouring could be experienced which in turn could expose any previously undiscovered paleontological resources. However, the proposed project would line the channels with concrete which would eliminate the erosion/scouring potential within these channels. Therefore, there would be no indirect impact to paleontological resources under CEQA.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the drainage channels within the C02/C04 system would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. None of these maintenance activities would include groundbreaking activities that would have the potential for impacting previously undiscovered paleontological resources that may be present. Therefore, there would be no long-term operation or maintenance impacts to paleontological resources under CEQA.

C05/C06 Channels

Direct Impacts

Under the NED Plan, the conveyance efficiency of the channels within the C05/C06 system would be increased. Construction activities would involve the conversion of existing earthen/riprap lined trapezoidal channels to concrete lined trapezoidal channels. Although the majority of onsite soils were previously disturbed by construction of the existing drainage channels, the proposed project would require excavation into possibly undisturbed native soils in order to maintain the existing channel inverts once the channels are lined with concrete. As discussed in Section 2.9, a paleontological resource assessment was conducted of the C05/C06 system (Govean 1996). Within C05, Reach 2 and Reach 3 (from the C05/C06 confluence upstream to Beach Boulevard) were found to have high sensitivity for paleontological resources. Within C06, Reach 13 (from the C05/C06 confluence) was found to have high sensitivity for paleontological resources. All other reaches within the C05/C06 system that would be modified as part of the NED Plan were found to have low to no sensitivity for paleontological resources.

In reaches that have high sensitivity for paleontological resources is it likely that fossil artifacts may be encountered during excavation activities. In addition, even in the channels that have not been designated as sensitive for paleontological resources, the excavation into native undisturbed souls may result in the finding of previously undiscovered paleontological resources. Paleontological resources destroyed by excavation would be a significant impact. Mitigation measure MM-PR-1 would be implemented during earth-moving activities to ensure impacts to any unidentified fossils that may be uncovered are minimized. With the implementation of MM-PR-1 the impact would be reduced to less than significant under CEQA.

Indirect Impacts

Under the NED Plan, the conveyance efficiency of the channels within the C05/C06 system would be increased. By increasing the efficiency storm water moves through the system, water velocities within the channels, especially downstream, would be expected to increase. The increased velocities could lead to scouring of channels reaches downstream which in turn could expose previously undiscovered paleontological resources. However, the proposed project lines the existing channels with concrete which would eliminate the erosion/scouring potential. Therefore, there would be no indirect impact to paleontological resources under CEQA.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the drainage channels within the C05/C06 system would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. None of these maintenance activities would include groundbreaking activities that would have the potential for exposing undiscovered paleontological resources that may be present within native undisturbed soils. Therefore, there would be no long-term operation or maintenance impacts to paleontological resources under CEQA.

Level of Impact for the NED Plan

Less than Significant with Mitigation Incorporated. Excavation activities that are part of the modification of the Warner Avenue Bridge, removal of the tide gates at the downstream end of C05 Reach 1 and replacement with a new access bridge, and modification of the drainage channels could encounter previously unidentified fossil remains. Paleontological resources destroyed by excavation activities would be a significant impact. Mitigation measure MM-PR-1 would be implemented during earth-moving activities to ensure impacts to any unidentified fossils that may be uncovered are minimized.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

A paleontological resource assessment has not been conducted for proposed channel modifications in the C02/C04 system due to the unlikely presence of paleontological resources. The study area, including the C02/C04 drainage channels are underlain by Quaternary Alluvium and marine deposits of the Pleistocene to Holocene geologic age (USGS 2019). Quaternary Alluvium is younger alluvium and therefore these deposits typically do not contain significant vertebrate fossils, at least in the uppermost layers. Under the

LPP, the conveyance efficiency and capacity of the channels within the C02/C04 system would be increased. Construction activities would involve replacing existing earthen/riprap/concrete lined trapezoidal channels with an open rectangular concrete lined channel. The only exception is C02 Reach 23 which would have a single sheet pile wall driven along the crest of the south levee. Sediment would then be excavated once the sheet pile is driven so as to increase the width of the existing channel. Although the majority of onsite soils were previously disturbed by construction of the existing drainage channels, the proposed project would require excavation into possibly undisturbed native soils in order to increase the bottom width of the channels and maintain the existing channel inverts. Therefore, the excavation activities would increase the bottom width and depth of the channels, prior to lining with concrete.

All of the aforementioned excavation activities would potentially remove native undisturbed soils that could have previously undiscovered paleontological resources. Therefore, fossil artifacts may be encountered during excavation activities. Paleontological artifacts destroyed by excavation would be a significant impact. Mitigation measure MM-PR-1 would be implemented during earth-moving activities to ensure impacts to any unidentified fossils that may be uncovered are minimized. With the implementation of MM-PR-1 the impact would be reduced to less than significant under CEQA.

Indirect Impacts

Under the LPP, the conveyance efficiency and capacity of the channels within the C02/C04 system would be increased. This means that velocities within the channels could be greater than what they are now and increased erosion/scouring could be experienced which in turn could expose any existing previously undiscovered paleontological resources. However, the proposed project would line the channels with concrete which would eliminate the erosion/scouring potential within these channels. Therefore, there would be no indirect impact to paleontological resources under CEQA.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the drainage channels within the C02/C04 system would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. None of these maintenance activities would include groundbreaking activities that would have the potential for exposing previously undiscovered paleontological resources. Therefore, there would be no long-term operation or maintenance impacts to paleontological resources under CEQA.

C05/C06 Channels

Direct Impacts

Under the LPP, the conveyance efficiency and capacity of the channels within the C05/C06 system would be increased. Construction activities would involve replacing existing earthen/riprap/concrete lined trapezoidal channels with an open rectangular concrete lined channel. Although the majority of onsite soils were previously disturbed by construction of the existing drainage channels, the proposed project would require excavation into possibly undisturbed native soils in order to increase the bottom width of the channels and maintain the existing channel inverts once they are lined with concrete. As discussed in Section 2.9, a paleontological resource assessment was conducted of the C05/C06 system (Govean 1996). Within C05, Reach 2 and Reach 3 (from the C05/C06 confluence upstream to Beach Boulevard) were found to have high sensitivity for paleontological resources. Within C06, Reach 13 (from the C05/C06 confluence) was found to have high sensitivity for paleontological resources. All other reaches within the C05/C06 system that would be modified as part of the LPP were found to have low to no sensitivity for paleontological resources.

In reaches that have high sensitivity for paleontological resources it is likely that fossil artifacts may be encountered during excavation activities. In addition, even in the channels that have not been designated as sensitive for paleontological resources, the excavation into potentially native undisturbed souls may result in the finding of previously undiscovered paleontological resources. Paleontological resources destroyed by excavation would be a significant impact. Mitigation measure MM-PR-1 would be implemented during earth-moving activities to ensure impacts to any unidentified fossils that may be uncovered are minimized. With the implementation of MM-PR-1 the impact would be reduced to less than significant under CEQA.

Indirect Impacts

Under the LPP, the conveyance efficiency and capacity of the channels within the C05/C06 system would be increased. This means that velocities within the channels could be greater than what they are now and increased erosion/scouring could be experienced which in turn could expose any existing previously undiscovered paleontological resources. However, the proposed project would line the channels with concrete which would eliminate the erosion/scouring potential within these channels. Therefore, there would be no indirect impact to paleontological resources under CEQA.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the drainage channels within the C05/C06 system would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. None of these maintenance activities would include groundbreaking activities that would have the potential for exposing previously undisturbed paleontological resources. Therefore, there would be no long-term operation or maintenance impacts to paleontological resources under CEQA.

Diversion Channel

Direct Impacts

A paleontological resource assessment has not been conducted for where the diversion channel would be constructed within the C02/C04 system due to the unlikely presence of paleontological resources. The study area is underlain by Quaternary Alluvium and marine deposits of the Pleistocene to Holocene geologic age (USGS 2019). Quaternary Alluvium is younger alluvium and therefore these deposits typically do not contain significant vertebrate fossils, at least in the uppermost layers. The construction of the diversion channel does require the excavation of approximately 106,500 cubic yards of construction debris. Excavation activities would remove native undisturbed soils that could have previously undiscovered paleontological resources. Therefore, fossil artifacts may be encountered during excavation activities. Paleontological artifacts destroyed by excavation would be a significant impact. Mitigation measure MM-PR-1 would be implemented during earth-moving activities to ensure impacts to any unidentified fossils that may be uncovered are minimized. With the implementation of MM-PR-1 the impact would be reduced to less than significant under CEQA.

Indirect Impacts

The construction of the diversion channel would increase the capacity and conveyance efficiency within the C02/C04 drainage system. This means that velocities within the channels downstream of the diversion channel could be greater than what they are under the existing condition and increased erosion/scouring could be experienced, which in turn could expose any existing previously undiscovered paleontological resources. However, the proposed project would line the channels within the system with concrete, including the diversion channel, which would eliminate the erosion/scouring potential within these channels. Therefore, there would be no indirect impact to paleontological resources under CEQA.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the diversion channel would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. None of these maintenance activities would include groundbreaking activities that would have the potential for exposing previously undiscovered paleontological resources. Therefore, there would be no long-term operation or maintenance impacts to paleontological resources under CEQA.

Level of Impact for the LPP

Less than Significant with Mitigation Incorporated. Excavation activities that are part of the modification of the Warner Avenue Bridge, removal of the tide gates at the downstream end of C05 Reach 1 and replacement with a new access bridge, and modification of the drainage channels could encounter previously unidentified fossil remains. Paleontological resources destroyed by excavation activities would be a significant impact. Mitigation measure MM-PR-1 would be implemented during earth-moving activities to ensure impacts to any unidentified fossils that may be uncovered are minimized.

5.4 Water Resources

5.4.1 Regulatory Framework

5.4.1.1 Federal

Clean Water Act: The objectives of the CWA are to restore and maintain the chemical, physical, and biological integrity of Waters of the United States. The CWA establishes basic guidelines for regulating discharges of pollutants into the Waters of the United States and requires states to adopt water quality standards to protect health, enhance the quality of water resources, and to develop plans and programs to implement the CWA. Below is a discussion of sections of the CWA that are relevant to the proposed project.

Section 401: Section 401 of the CWA requires federal agencies and applicants for a federal permit proposing work that involves a discharge into Waters of the United States to obtain certification that the discharges would not result in adverse water quality impacts. This process is known as the Water Quality Certification. For activities in Orange County, the Santa Ana RWQCB issues Section 401 Water Quality Certifications. The recommended plan, once selected, will require 401 Certification prior to construction as each action alternative includes measures that would result in discharges to Waters of the U.S.

Section 402: Section 402 of the CWA established the National Pollution Discharge Elimination System (NPDES) to control water pollution by regulating point sources that discharge pollutants into Waters of the United States. In the State of California, the Environmental Protection Agency (USEPA) has authorized the SWRCB the permitting authority to implement the NPDES program. The SWRCB requires storm water discharges from construction sites with a disturbed area of one or more acres to either obtain individual NPDES permits for storm water discharges or be covered by the Construction General Permit. Coverage under the Construction General Permit is accomplished by completing and filing a NOI with the SWRCB and preparing and implementing a SWPPP prior to grading and during construction. The primary objective of the SWPPP is to identify, construct, implement, and maintain BMPs to reduce or eliminate pollutants in storm water discharges and authorized non-storm water discharges from the construction site during construction. BMPs include programs, technologies, processes, practices, and devices that control, prevent, remove, or reduce pollution.

Section 404: Section 404 of the CWA established a permitting program to regulate the discharge of dredged or filled material into Waters of the United States. The permitting program is administered by the

Corps of Engineers. The Corps does not issue itself permits for Corps Civil Works projects but must comply with the 404(b)(1) guidelines. A draft Section 404(b)(1) evaluation has been prepared and is found in *Appendix L – Environmental Considerations.*

5.4.1.2 State

Porter-Cologne Water Quality Control Act: The Porter-Cologne Water Quality Control Act established the SWRCB, which has the ultimate authority over state water rights and water quality policy. It also established nine regional boards to oversee water quality on a day-to-day basis at the local or regional level. The regional boards develop and update their respective basin plans, which are used to address beneficial uses, water quality standards for both surface water and groundwater, and measures necessary to control point and nonpoint sources.

5.4.2 Impact Significance Criteria

The impact criteria below were taken from Appendix G of the CEQA guidelines and are also being adopted for NEPA. For purposes of this analysis the No Action Plan, NED Plan, and LPP would have a significant impact related to Water Resources if it would:

IMPACT WR-1: Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.

IMPACT WR-2: Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.

IMPACT WR-3: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surface, in a manner which would a) result in substantial erosion or siltation on- or off-site, b) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site, c) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff, or d) impede or redirect flood flows.

IMPACT WR-4: In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.

IMPACT WR-5: Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

5.4.3 Mitigation Measures

The following mitigation measures would be implemented for both the NED Plan and LPP, before, during, and after construction as applicable. These include:

MM-WR-1 A SWPPP shall be prepared to reduce the potential for accidental release of fuels and other toxic materials. The SWPPP would be reviewed and approved by appropriate Corps team members. Consistent with federal and state regulations, BMPs shall be implemented to control the erosion of sediments into water courses, prevent or contain spills from storage locations or equipment used. This plan shall include the designation of refueling locations, emergency response procedures, and definitions of reporting requirements for any spill that occurs. Equipment for immediate cleanup will be kept at the staging area for immediate use. Measures identified within the SWPPP will be complied with during construction activities. The SWPPP and necessary containment and clean-up materials shall be kept within the construction area during all construction activities. Workers shall

be educated on measures included in the SWPPP at the preconstruction meeting or prior to beginning work in the Proposed Action Area.

MM-WR-2 All construction contracts will require the Contractor to prepare, update, and maintain on site two documents related to spill prevention and contaminant control: a Spill Control Plan that includes the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by 40 C.F.R. 68, 40 C.F.R. 302, 40 C.F.R. 355, and/or regulated under State or Local laws and regulations; and a Contaminant Prevention Plan that identifies potentially hazardous substances to be used on the job site, identifies the intended actions to prevent introduction of such materials into the air, water, or ground, and details provisions for compliance with federal, State, and local laws and regulations for transportation, storage, and handling of these materials. These plans will include best practices to prevent the release of contaminants to the environment and to respond to any unforeseen releases. BMPs include such actions as having hazardous waste clean-up equipment and spill kits staged on-site, using the appropriate size and gauge drip pans and absorbent diapers, continual monitoring of refueling operations, good maintenance of equipment to prevent leaks or spills, and prompt and appropriate disposal of all waste materials.

MM-WR-3 Stockpile sites, parking areas, and staging areas shall be located to avoid erosion into open water and locations shall be approved by appropriate USACE team members.

MM-WR-4 A Water Quality Mitigation and Monitoring Plan will be developed as needed for CWA 404/401 compliance. The plan shall meet the requirements of the SAWQCB. Monitoring and reporting will be proposed based on the estimated construction duration and extent associated for work in the ocean receiving waters.

MM-WR-5 Turbidity curtains shall be used in instances when construction activities are adjacent to open water and during high flow periods when construction activities must continue. Turbidity curtains may consist of a floating line of buoys with a subsurface material curtain that can contain areas of in water disturbance or turbid run-off.

MM-WR-6 Additional actions would be considered to provide practicable mitigation if plans or design modifications cause detrimental impacts on water quality conditions.

MM-WR-7 Contract documents will include specifications about how a contractor shall respond to forecasted extreme weather events.

5.4.4 Water Resource Impacts

5.4.4.1 IMPACT-WR-1: Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no federal project would be implemented. There would be no construction activities occurring in the study area and there would be no additional potential that water quality standards in the Westminster Watershed could be violated. The watershed would continue to be subject to the water quality standards that have been established.

Local flooding issues would continue in the manner as they currently occur. Under existing conditions, the 10%, 4%, 2%, 1%, and 0.2% ACE events cause flooding in both overbanks including comingling flooding between the channel systems. Flooding begins at approximately the 10% ACE flood event throughout the study area and is cause by overtopping of the channels as well as failure of the levees in the downstream reaches of the C05 channel system. Overtopping and failure of the levees in the

downstream reach of C04 occurs at approximately the 2% ACE flood event. Widespread overtopping of the channels as well as levee failure would still occur between the 10% and 4% ACE events within the two channel systems, thereby leaving homes that are within the 100 year flood plain at risk to impacts from flooding.

Current water quality issues associated with storm water and with flood events would remain unchanged under the No Action Plan. No new water quality issues would be introduced, and no water quality issues would be addressed.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

The project site is subject to the water quality regulations of the RWQCB (Santa Ana Region) and the USEPA under the authority of the CWA. Under Section 303(d) of the 1972 CWA, states, territories, and authorized tribes are required to develop a list of water quality-limited segments. Waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for water on the lists and develop action plans, called TMDLs, to improve water quality. The Warner Avenue Bridge spans where the waters of OBB meet Huntington Harbour. Both OBB (identified as Bolsa Chica Marsh on the 303(d) list) and Huntington Harbour are listed on the 2016 Santa Ana Region 303(d) List of Water Quality Limited Segments. Identified impairments for OBB include sediment toxicity and water toxicity from unknown sources. Identified impairments for Huntington Harbour include chlordane, copper, lead, PCBs, and sediment toxicity from unknown sources, and indicator bacteria from urban runoff/storm sewers (refer to Section 2.3 Water Resources and Water Quality).

Modification of the Warner Avenue Bridge would require ground-disturbing work, including sediment disturbance, and the use of construction equipment at the bridge. There would be possible temporary impacts to water quality during construction, although these could be mitigated by the implementation of BMPs, erosion control measures, and the implementation of turbidity curtains, if needed. Sediment and soil that is excavated during construction would be disposed of upland to prevent water quality impacts. There would be no long-term or substantial impairments of water quality and no violation of any water quality standard or waste discharge requirement. A 404(b)(1) analysis has been completed (*Appendix L - Environmental Considerations*) and a 401 Water Quality Certification will be obtained prior to construction of the project as needed, thereby reducing the projects potential for significant impacts. Along with a 401 Water Quality Certification, mitigation measures MM-WR-1 through MM-WR-7 would be implemented. The mitigation measures include the preparation of a SWPPP, a Spill Control Plan, a Contaminant Prevention Plan, and BMPs for reducing turbidity and avoiding/minimizing erosion into open water in order to minimize impacts to water quality during construction activities. With the implementation of these mitigation measures and a 401 Water Quality Certification, the direct impact to water quality would be less than significant.

Indirect Impacts

There would be less than significant indirect impacts to water quality. Required construction BMPs implemented as part of the NPDES Construction General Permit have been designated to isolate disturbed areas such that there would be less than significant impacts.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Typical bank related maintenance activities would be related to erosion control on upland areas near the bridge. Maintenance activities are expected to have less than significant impacts to water quality.

Tide Gates

Direct Impacts

The project site is subject to the water quality regulations of the RWQCB (Santa Ana Region) and the USEPA under the authority of the CWA. Under Section 303(d) of the 1972 CWA, states, territories, and authorized tribes are required to develop a list of water quality-limited segments. Waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for water on the lists and develop action plans, called TMDLs, to improve water quality. The tide gates are located on C05 Reach 1 which is listed on the 2016 Santa Ana Region 303(d) List of Water Quality Limited Segments. In addition, the receiving waters for the C05 drainage channels, OBB (identified as Bolsa Chica Marsh on the 303(d) list) is also listed. The identified impairment for C05 is ammonia (unionized) from unknown sources. The identified impairments for OBB include sediment toxicity and water toxicity from unknown sources (refer to Section 2.3 Water Resources and Water Quality).

The permanent removal of the tide gates on C05 Reach 1 and replacement with a new access bridge would require ground-disturbing work and the use of construction equipment. There would be possible temporary impacts to water quality during construction, although these could be mitigated by the implementation of BMPs, erosion control measures, and the implementation of turbidity curtains, if needed. Sediment and soil would be disposed of upland to prevent water quality impacts. There would be no long-term or substantial impairments of water quality and no violation of any water quality standard or waste discharge requirement. The Westminster watershed drainage channels are regulated under Orange County NPDES permit number CAS618030 issued and approved by the RWQCB (Santa Ana Region) Order number R8-2009-0030. The NPDES permit is incorporated as part of the countywide DAMP for compliance with the NPDES. Regular water quality monitoring and construction requirements are part of the DAMP that include criteria for the County and City water quality ordinances as well as construction building and grading ordinances for new and redevelopment projects. A 404(b)(1) analysis has been completed (*Appendix L- Environmental Considerations*) and a 401 Water Quality Certification will be obtained prior to construction of the project as needed, thereby reducing the projects potential for significant impacts. Along with a 401 Water Quality Certification, mitigation measures MM-WR-1 through MM-WR-7 would be implemented. The mitigation measures include the preparation of a SWPPP, a Spill Control Plan, a Contaminant Prevention Plan, and BMPs for reducing turbidity and avoiding/minimizing erosion into open water in order to minimize impacts to water quality during construction activities. With the implementation of these mitigation measures and a 401 Water Quality Certification, the direct impact to water quality would be less than significant.

Indirect Impacts

There would be less than significant indirect impacts to water quality. Required construction BMPs implemented as part of the NPDES Construction General Permit have been designated to isolate disturbed areas such that there would be less than significant impacts.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new bridge would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Maintenance activities are expected to have less than significant impacts to water quality.

C02/C04 Channels

Direct Impacts

The project site is subject to the water quality regulations of the RWQCB (Santa Ana Region) and the USEPA under the authority of the CWA. Under Section 303(d) of the 1972 CWA, states, territories, and authorized tribes are required to develop a list of water quality-limited segments. Waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for water on the lists and develop action plans, called TMDLs, to improve water quality. The C02/C04 drainage channel reaches that are part of the proposed project are not listed on the 2016 Santa Ana Region 303(d) List of Water Quality Limited Segments; however, upstream reaches of C02 that are not included in the proposed project as well as the receiving waters of Huntington Harbour are listed. The identified impairments for C02 reaches that are not part of the proposed project include ammonia (unionized) from urban runoff, storm sewers, and non-point sources; and indicator bacteria and pH from unknown sources. The identified impairments for Huntington Harbour include chlordane, copper, lead, PCBs, and sediment toxicity from unknown sources, and indicator bacteria from urban runoff/storm sewers (refer to Section 2.3 Water Resources and Water Quality).

Modification of the C02/C04 channels would require ground-disturbing work and the use of construction equipment. There would be possible temporary impacts to water quality during construction, although these could be mitigated by the implementation of BMPs, erosion control measures, and the implementation of turbidity curtains, if needed. Sediment and soil would be disposed of upland to prevent water quality impacts. There would be no long-term or substantial impairments of water quality and no violation of any water quality standard or waste discharge requirement. The Westminster watershed drainage channels are regulated under Orange County NPDES permit number CAS618030 issued and approved by the RWQCB (Santa Ana Region) Order number R8-2009-0030. The NPDES permit is incorporated as part of the countywide DAMP for compliance with the NPDES. Regular water quality monitoring and construction requirements are part of the DAMP that include criteria for the County and City water quality ordinances as well as construction building and grading ordinances for new and redevelopment projects. A 404(b)(1) analysis has been completed (*Appendix L- Environmental Considerations*) and a 401 Water Quality Certification will be obtained prior to construction of the project as needed, thereby reducing the projects potential for significant impacts. Along with a 401 Water Quality Certification, mitigation measures MM-WR-1 through MM-WR-7 would be implemented. The mitigation measures include the preparation of a SWPPP, a Spill Control Plan, a Contaminant Prevention Plan, and BMPs for reducing turbidity and avoiding/minimizing erosion into open water in order to minimize impacts to water quality during construction activities. With the implementation of these mitigation measures and a 401 Water Quality Certification, the direct impact to water quality would be less than significant.

Indirect Impacts

There would be less than significant indirect impacts to water quality. Required construction BMPs implemented as part of the NPDES Construction General Permit have been designated to isolate disturbed areas such that there would be less than significant impacts.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts. Therefore, the long-term impact to water quality would be less than significant.

C05/C06 Channels

Direct Impacts

The project site is subject to the water quality regulations of the RWQCB (Santa Ana Region) and the USEPA under the authority of the CWA. Under Section 303(d) of the 1972 CWA, states, territories, and authorized tribes are required to develop a list of water quality-limited segments. Waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for water on the lists and develop action plans, called TMDLs, to improve water quality. The C06 drainage channels are not listed on the 2016 Santa Ana Region 303(d) List of Water Quality Limited Segments, however, certain reaches of the C05 drainage channels are. In addition, the receiving waters for the C05/C06 drainage channels, OBB (identified as Bolsa Chica Marsh on the 303(d) list) is also listed. The identified impairment for C05 is ammonia (unionized) from unknown sources. The identified impairments for OBB include sediment toxicity and water toxicity from unknown sources (refer to Section 2.3 Water Resources and Water Quality).

Modification of the C05/C06 channels would require ground-disturbing work and the use of construction equipment. There would be possible temporary impacts to water quality during construction, although these could be mitigated by the implementation of BMPs, erosion control measures, and the implementation of turbidity curtains, if needed. Sediment and soil would be disposed of upland to prevent water quality impacts. There would be no long-term or substantial impairments of water quality and no violation of any water quality standard or waste discharge requirement. The Westminster watershed drainage channels are regulated under Orange County NPDES permit number CAS618030 issued and approved by the RWQCB (Santa Ana Region) Order number R8-2009-0030. The NPDES permit is incorporated as part of the countywide DAMP for compliance with the NPDES. Regular water quality monitoring and construction requirements are part of the DAMP that include criteria for the County and City water quality ordinances as well as construction building and grading ordinances for new and redevelopment projects. A 404(b)(1) analysis has been completed (*Appendix L- Environmental Considerations*) and a 401 Water Quality Certification will be obtained prior to construction of the project as needed, thereby reducing the projects potential for significant impacts. Along with a 401 Water Quality Certification, mitigation measures MM-WR-1 through MM-WR-7 would be implemented. The mitigation measures include the preparation of a SWPPP, a Spill Control Plan, a Contaminant Prevention Plan, and BMPs for reducing turbidity and avoiding/minimizing erosion into open water in order to minimize impacts to water quality during construction activities. With the implementation of these mitigation

measures and a 401 Water Quality Certification, the direct impact to water quality would be less than significant.

Indirect Impacts

There would be less than significant indirect impacts to water quality. Required construction BMPs implemented as part of the NPDES Construction General Permit have been designated to isolate disturbed areas such that there would be less than significant impacts.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts. Therefore, the long-term impact to water quality would be less than significant.

Level of Impact for the NED Plan

Less than Significant Impact with Mitigation Incorporated. Modification of the Warner Avenue Bridge, removal of the tide gates on C05 Reach 1 and replacement with an access bridge, and modification of the drainage channels would require ground-disturbing work and the use of construction equipment. There would be the possibility of temporary significant impacts to water quality during construction activities, therefore, mitigation measures MM-WR-1 through MM-WR-7 would be implemented along with obtaining a 401 Water Quality Certification to reduce these potential temporary significant impacts to less than significant.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

As discussed under the NED Plan, the C02/C04 drainage channel reaches that are part of the proposed project are not listed on the 2016 Santa Ana Region 303(d) List of Water Quality Limited Segments; however, upstream reaches of C02 that are not included in the proposed project as well as the receiving waters of Huntington Harbour are listed. The identified impairments for C02 reaches that are not part of the proposed project include ammonia (unionized) from urban runoff, storm sewers, and non-point

sources; and indicator bacteria and pH from unknown sources. The identified impairments for Huntington Harbour include chlordane, copper, lead, PCBs, and sediment toxicity from unknown sources, and indicator bacteria from urban runoff/storm sewers (refer to Section 2.3 Water Resources and Water Quality).

Modification of the C02/C04 channels would require ground-disturbing work and the use of construction equipment. There would be possible temporary impacts to water quality during construction, although these could be mitigated by the implementation of BMPs, erosion control measures, and the implementation of turbidity curtains, if needed. Sediment and soil would be disposed of upland to prevent water quality impacts. There would be no long-term or substantial impairments of water quality and no violation of any water quality standard or waste discharge requirement. The Westminster watershed drainage channels are regulated under Orange County NPDES permit number CAS618030 issued and approved by the RWQCB (Santa Ana Region) Order number R8-2009-0030. The NPDES permit is incorporated as part of the countywide DAMP for compliance with the NPDES. Regular water quality monitoring and construction requirements are part of the DAMP that include criteria for the County and City water quality ordinances as well as construction building and grading ordinances for new and redevelopment projects. A 404(b)(1) analysis has been completed (*Appendix L- Environmental Considerations*) and a 401 Water Quality Certification will be obtained prior to construction of the project as needed, thereby reducing the projects potential for significant impacts. Along with a 401 Water Quality Certification, mitigation measures MM-WR-1 through MM-WR-7 would be implemented. The mitigation measures include the preparation of a SWPPP, a Spill Control Plan, a Contaminant Prevention Plan, and BMPs for reducing turbidity and avoiding/minimizing erosion into open water in order to minimize impacts to water quality during construction activities. With the implementation of these mitigation measures and a 401 Water Quality Certification, the direct impact to water quality would be less than significant.

Indirect Impacts

There would be no indirect adverse impacts to water quality. Required construction BMPs implemented as part of the NPDES Construction General Permit have been designated to isolate disturbed areas such that there would be no indirect impacts.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) could potentially cause temporary adverse impacts to water quality, although these could be mitigated for by the implementation of BMPs, erosion control measures, and the implementation of turbidity curtain, if needed.

C05/C06 Channels

Direct Impacts

As discussed under the NED Plan, the C06 drainage channels are not listed on the 2016 Santa Ana Region 303(d) List of Water Quality Limited Segments, however, certain reaches of the C05 drainage channels are. In addition, the receiving waters for the C05/C06 drainage channels, OBB (identified as Bolsa Chica Marsh on the 303(d) list) is also listed. The identified impairment for C05 is ammonia (unionized) from unknown sources. The identified impairments for OBB include sediment toxicity and water toxicity from unknown sources (refer to Section 2.3 Water Resources and Water Quality).

Modification of the C05/C06 channels would require ground-disturbing work and the use of construction equipment. There would be possible temporary impacts to water quality during construction, although these could be mitigated by the implementation of BMPs, erosion control measures, and the implementation of turbidity curtains, if needed. Sediment and soil would be disposed of upland to prevent water quality impacts. There would be no long-term or substantial impairments of water quality and no violation of any water quality standard or waste discharge requirement. The Westminster watershed drainage channels are regulated under Orange County NPDES permit number CAS618030 issued and approved by the RWQCB (Santa Ana Region) Order number R8-2009-0030. The NPDES permit is incorporated as part of the countywide DAMP for compliance with the NPDES. Regular water quality monitoring and construction requirements are part of the DAMP that include criteria for the County and City water quality ordinances as well as construction building and grading ordinances for new and redevelopment projects. A 404(b)(1) analysis has been completed (*Appendix L- Environmental Considerations*) and a 401 Water Quality Certification will be obtained prior to construction of the project as needed, thereby reducing the projects potential for significant impacts. Along with a 401 Water Quality Certification, mitigation measures MM-WR-1 through MM-WR-7 would be implemented. The mitigation measures include the preparation of a SWPPP, a Spill Control Plan, a Contaminant Prevention Plan, and BMPs for reducing turbidity and avoiding/minimizing erosion into open water in order to minimize impacts to water quality during construction activities. With the implementation of these mitigation measures and a 401 Water Quality Certification, the direct impact to water quality would be less than significant.

Indirect Impacts

There would be no indirect adverse impacts to water quality. Required construction BMPs implemented as part of the NPDES Construction General Permit have been designated to isolate disturbed areas such that there would be no indirect impacts.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) could potentially cause temporary adverse impacts to water quality, although these could be mitigated for by the implementation of BMPs, erosion control measures, and the implementation of turbidity curtain, if needed.

Diversion Channel

Direct Impacts

The Westminster Mall Diversion Channel would be constructed as part of the proposed project. This area is currently part of an abandoned railway; therefore, it is not listed on the 2016 Santa Ana Region 303(d) List of Water Quality Limited Segments. In addition, the receiving waters of the diversion channel, which would be C04, are also not listed on the 2016 Santa Ana Region 303(d) List of Water Quality Limited Segments (refer to Section 2.3 Water Resources and Water Quality).

Construction of the Westminster Mall Diversion Channel which would require ground-disturbing work, however, all the work would be constructed in the dry. Soil would be disposed of upland to prevent water quality impacts. There would be no long-term or substantial impairments of water quality and no violation of any water quality standard or waste discharge requirement. A 404(b)(1) analysis has been completed (*Appendix L- Environmental Considerations*) and a 401 Water Quality Certification will be obtained prior to construction of the project as needed, thereby reducing the projects potential for

significant impacts. Along with a 401 Water Quality Certification, mitigation measures MM-WR-1 through MM-WR-7 would be implemented. The mitigation measures include the preparation of a SWPPP, a Spill Control Plan, a Contaminant Prevention Plan, and BMPs for reducing turbidity and avoiding/minimizing erosion into open water in order to minimize impacts to water quality during construction activities. With the implementation of these mitigation measures and a 401 Water Quality Certification, the direct impact to water quality would be less than significant.

Indirect Impacts

There would be no indirect adverse impacts to water quality. Required construction BMPs implemented as part of the NPDES Construction General Permit have been designated to isolate disturbed areas such that there would be no indirect impacts.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the diversion channel would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channel if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would have no impact on earth resources since similar maintenance activities are already undertaken for the other channel reaches within C04.

Level of Impact for the LPP

Less than Significant Impact with Mitigation Incorporated. Modification of the Warner Avenue Bridge, removal of the tide gates on C05 Reach 1 and replacement with an access bridge, and modification of the drainage channels would require ground-disturbing work and the use of construction equipment. There would be the possibility of temporary significant impacts to water quality during construction activities, therefore, mitigation measures MM-WR-1 through MM-WR-7 would be implemented along with obtaining a 401 Water Quality Certification to reduce these potential temporary significant impacts to less than significant.

5.4.4.2 IMPACT WR-2: Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no federal project would be implemented. There would be no construction activities occurring in the study area that would substantially decrease groundwater supplies or interfere substantially with groundwater recharge. Under current conditions approximately 75 percent of the length of the existing drainage channels are lined with concrete or riprap, therefore, it is unlikely that under existing conditions the C02/C04 and C05/C06 drainage channels provide substantial infiltration of water into soil or groundwater recharge. Without the implementation of the project, the amount of groundwater recharge through the channels is not expected to increase or decrease substantially in the future.

ALTERNATIVE: NED PLAN
Warner Avenue Bridge

Direct Impacts

The modification of Warner Avenue Bridge would not use or deplete groundwater supply, nor involve the creation of new impermeable surfaces where no impermeable surfaces existed before, which would interfere with groundwater recharge. Temporary construction may disturb the recharge area, however, the intent is to complete construction within the dry period to the extent possible, and any impacts to the recharge area would be temporary. Upon completion of the bridge widening, water would be available for recharge within the project area. No impact on groundwater or groundwater recharge would occur as a result of the proposed project.

Indirect Impacts

The modification of Warner Avenue Bridge would not indirectly use or deplete groundwater supply or interfere with groundwater recharge. No impact on groundwater or groundwater recharge would occur as a result of the proposed project.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Maintenance activities nor long-term operation of the bridge would use or deplete groundwater supply or interfere with groundwater recharge. Therefore, no groundwater or groundwater recharge would occur as a result of long-term operation or maintenance activities of the proposed project.

Tide Gates

Direct Impacts

The permanent removal of the tide gates located on C05 Reach 1 and replacement with a new access bridge would not use or deplete groundwater supply, nor involve the creation of new impermeable surfaces where no impermeable surfaces existed before, which would interfere with groundwater recharge. Although surface water temporarily would be diverted around the active construction area, downstream flows would be maintained. Thus, water would be available for recharge both upstream and downstream of the activity. No impact on groundwater or groundwater recharge would occur as a result of the proposed project.

Indirect Impacts

The permanent removal of the tide gates and replacement with a new bridge would not indirectly use or deplete groundwater supply or interfere with groundwater recharge. No impact on groundwater or groundwater recharge would occur as a result of the proposed project.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new bridge would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Neither maintenance activities nor

long-term operation of the new bridge would use or deplete groundwater supply or interfere with groundwater recharge. Therefore, no groundwater or groundwater recharge would occur as a result of long-term operation or maintenance activities of the proposed project.

C02/C04 Channels

Direct Impacts

The proposed project would not substantially deplete groundwater supplies. Within C02 Reach 23, currently 100 percent of the length of the existing channel reach is soft-bottom and would remain soft-bottom with the implementation of this measure. Within C04 Reaches 20 through 22, currently about 42 percent of the length of the existing channel reaches are lined with concrete whereas about 33 percent lined with riprap and about 25 percent are earthen. In reaches where channel modifications would occur and where the channel is currently riprap lined invert, replacement of existing riprap with concrete lined invert would have a minor impact during construction on groundwater. Where there is currently an earthen channel invert that would be replaced with a concrete lined invert, there would be less surface area absorbing seasonal flows for minor groundwater recharge. Since about 75 percent of the length of the existing C04 channel is lined with concrete or riprap, the actual amount of recharge that occurs through the approximately 25 percent earthen bottom is unknown since water does not stay in the channel for a long time. Given the majority of the existing C04 channel is lined with concrete or riprap, it is likely the existing channel does not provide substantial infiltration of water into soil or groundwater recharge. However, lining the bottom surface of the existing earthen channel reaches would directly block infiltration. Although lining the channel would block infiltration, since the majority of the channel is already lined and infiltration is not likely substantial, there would be a less than significant impact to groundwater supplies and groundwater recharge.

Indirect Impacts

Lining the existing earthen and riprap trapezoidal channels with concrete would indirectly increase the flowrate within the channels which in turn would lead to a shorter timeframe for water retention in the channels. However, water retention within the channels under existing conditions is minimal since a majority of the channels (about 75 percent) have already been lined with riprap or concrete. Since lining the channels would not substantially reduce infiltration beyond existing conditions, there would be a less than significant indirect impact to groundwater supplies and groundwater recharge.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts. Therefore, a less than significant impact to groundwater supplies and groundwater recharge is expected due to maintenance and long-term operation of the channels.

C05/C06 Channels

Direct Impacts

The proposed project would not substantially deplete groundwater supplies. Within C05, currently about 49 percent of the length of the existing channel reaches are lined with concrete whereas about 30 percent are lined with riprap and about 21 percent are earthen. Within C06, currently about 46 percent of the

length of the existing channel reaches are lined with concrete whereas about 39 percent are lined with riprap and about 15 percent are earthen. In reaches where channel modifications would occur and where the channel is currently riprap lined invert, replacement of existing riprap with concrete lined invert would have a minor impact during construction on groundwater. Where there is currently an earthen channel invert that would be replaced with a concrete lined invert, there would be less surface area absorbing seasonal flows for minor groundwater recharge. Since about 79 percent of the length of the existing C05 channel and about 85 percent of the length of the existing C06 channel is lined with concrete or riprap, the actual amount of recharge that occurs through the approximately 21 percent and 15 percent earthen bottom, respectively, is unknown since water does not stay in the channel for a long time. Given the majority of both the existing C05 and C06 channels are lined with concrete or riprap, it is likely the existing channels do not provide substantial infiltration of water into soil or groundwater recharge. However, lining the bottom surface of the existing earthen channel reaches would directly block infiltration. Although lining the channels would block infiltration, since the majority of the channels are already lined and infiltration is not likely substantial, there would be a less than significant impact to groundwater supplies and groundwater recharge.

Indirect Impacts

Lining the existing earthen and riprap trapezoidal channels with concrete would indirectly increase the flowrate within the channels which in turn would lead to a shorter timeframe for water retention in the channels. However, water retention within the channels under existing conditions is minimal since a majority of the channels (about 79 percent for C05 and about 85 percent for C06) have already been lined with riprap or concrete. Since lining the channels would not substantially reduce infiltration beyond existing conditions, there would be a less than significant indirect impact to groundwater supplies and groundwater recharge.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts. Therefore, a less than significant impact to groundwater supplies and groundwater recharge is expected due to maintenance and long-term operation of the channels.

Level of Impact for the NED Plan

Less than Significant Impact. Short-term construction activities would not directly or indirectly substantially impact groundwater supplies or groundwater recharge. In addition, long-term operation and maintenance activities would not directly or indirectly substantially impact groundwater supplies or groundwater recharge.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

The proposed project would not substantially deplete groundwater supplies. Within C02 Reach 23, currently 100 percent of the length of the existing channel reach is soft-bottom and would remain soft-bottom with the implementation of this measure. Within C04 currently about 42 percent of the length of the existing channel reaches are lined with concrete whereas about 33 percent are lined with riprap and about 25 percent are earthen. Under the LPP, C04 Reach 20 would remain primarily earthen bottom with concrete channel walls. Therefore, of the approximately 58 percent of the length of the existing channel reach that are riprap and earthen, about 28 percent would remain earthen bottomed. In reaches where channel modifications would occur and where the channel is currently riprap and concrete lined invert, replacement with open rectangular concrete channel would have a minor impact during construction on groundwater. Where there is currently an earthen channel invert that would be replaced with an open rectangular concrete channel, there would be less surface area absorbing seasonal flows for minor groundwater recharge. Since about 75 percent of the length of the existing C04 channel is lined with concrete or riprap, the actual amount of recharge that occurs through the approximately 25 percent earthen bottom is unknown since water does not stay in the channel for a long time. Given the majority of the existing C04 channel is lined with concrete or riprap, it is likely the existing channel does not provide substantial infiltration of water into soil or groundwater recharge. However, replacing the existing earthen channels with open rectangular concrete channels would directly block infiltration. Although replacing with open rectangular concrete channels would block infiltration, since the majority of the channel is already lined and infiltration is not likely substantial, there would be a less than significant impact to groundwater supplies and groundwater recharge.

Indirect Impacts

Replacing the existing earthen and riprap trapezoidal channels with open rectangular concrete channels would indirectly increase the flowrate within the channels which in turn would lead to a shorter timeframe for water retention in the channels. However, water retention within the channels under existing conditions is minimal since a majority of the channels (about 75 percent) have already been lined with riprap or concrete. Since replacing the channels with open rectangular concrete channels would not substantially reduce infiltration beyond existing conditions, there would be a less than significant indirect impact to groundwater supplies and groundwater recharge.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts. Therefore, a less than significant impact to groundwater supplies and groundwater recharge is expected due to maintenance and long-term operation of the channels.

C05/C06 Channels

Direct Impacts

The proposed project would not substantially deplete groundwater supplies. Within C05, currently about 49 percent of the length of the existing channel reaches are lined with concrete whereas about 30 percent are lined with riprap and about 21 percent are earthen. Within C06, currently about 46 percent of the length of the existing channel reaches are lined with concrete whereas about 39 percent are lined with riprap and about 15 percent are earthen. In reaches where channel modifications would occur and where the channel is currently riprap or concrete lined invert, replacement with open rectangular concrete channels would have a minor impact during construction on groundwater. Where there is currently an earthen channel invert that would be replaced with an open rectangular concrete channel, there would be less surface area absorbing seasonal flows for minor groundwater recharge. Since about 79 percent of the length of the existing C05 channel and about 85 percent of the length of the existing C06 channel is lined with concrete or riprap, the actual amount of recharge that occurs through the approximately 21 percent and 15 percent earthen bottom, respectively, is unknown since water does not stay in the channel for a long time. Given the majority of both the existing C05 and C06 channels are lined with concrete or riprap, it is likely the existing channels do not provide substantial infiltration of water into soil or groundwater recharge. However, replacing the existing earthen channels with open rectangular concrete lined channels would directly block infiltration. Although replacing with open rectangular concrete channels would block infiltration, since the majority of the channel is already lined and infiltration is not likely substantial, there would be a less than significant impact to groundwater supplies and groundwater recharge.

Indirect Impacts

Replacing the existing earthen/riprap/concrete trapezoidal channels with open rectangular concrete channels would indirectly increase the flowrate within the channels which in turn would lead to a shorter timeframe for water retention in the channels. However, water retention within the channels under existing conditions is minimal since a majority of the channels (about 79 percent for C05 and about 85 percent for C06) have already been lined with riprap or concrete. Since replacing the existing channels with open rectangular concrete channels would not substantially reduce infiltration beyond existing conditions, there would be a less than significant indirect impact to groundwater supplies and groundwater recharge.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts. Therefore, a less than significant impact to groundwater supplies and groundwater recharge is expected due to maintenance and long-term operation of the channels.

Diversion Channel

Direct Impacts

The construction of the Westminster Mall Diversion Channel would not use or deplete groundwater supply. The implementation of this measure would involve the creation of new impermeable surfaces where no impermeable surfaces existed before. modification of Warner Avenue Bridge would not use or

deplete groundwater supply, nor involve the creation of new impermeable surfaces where no impermeable surfaces existed before, which would interfere with groundwater recharge. Approximately 5,200 linear feet of the diversion channel would be constructed on an abandoned railway while the remaining approximately 2,200 linear feet of the diversion channel would be constructed adjacent to Edwards Street. Given the existing condition of the area where the diversion channel would be constructed is a mixture of compacted gravel/soil, mowed lawn, and asphalt it is likely the existing area does not provide substantial infiltration of water into soil or groundwater recharge. However, constructing an open rectangular concrete lined channel where permeable surface is currently would directly block infiltration. Although replacing with open rectangular concrete channels would block infiltration, since the majority of the area where the diversion channel would be constructed is already hardened due to compacted gravel and asphalt infiltration is not likely substantial. Therefore, there would be a less than significant impact to groundwater supplies and groundwater recharge due to implementation of this measure.

Indirect Impacts

Construction of the diversion channel would indirectly increase the flowrate within the C04 drainage channel system which in turn would lead to a shorter timeframe for water retention in the system. However, water retention within the C04 drainage channel system under existing conditions is minimal since a majority of the channels (about 75 percent) have already been lined with riprap or concrete. Since adding the diversion channel would not substantially reduce infiltration beyond existing conditions, there would be a less than significant indirect impact to groundwater supplies and groundwater recharge.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance for the diversion channel would be similar to the drainage channels that already exist within the C02/C04 system. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts. Therefore, a less than significant impact to groundwater supplies and groundwater recharge is expected due to maintenance and long-term operation of the diversion channel.

Level of Impact for the LPP

Less than Significant Impact. Short-term construction activities would not directly or indirectly substantially impact groundwater supplies or groundwater recharge. In addition, long-term operation and maintenance activities would not directly or indirectly substantially impact groundwater supplies or groundwater recharge.

5.4.4.3 IMPACT WR-3: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surface, in a manner which would a) result in substantial erosion or siltation on- or off-site, b) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site, c) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff, or d) impede or redirect flood flows.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no federal project would be implemented. There would be no construction activities occurring that would substantially alter the existing drainage pattern within the Westminster watershed.

Local flooding issues would continue in the manner as they currently occur. Under existing conditions, the 10%, 4%, 2%, 1%, and 0.2% ACE events cause flooding in both overbanks including comingling flooding between the channel systems. Flooding begins at approximately the 10% ACE flood event throughout the study area and is cause by overtopping of the channels as well as failure of the levees in the downstream reaches of the C05 channel system. Overtopping and failure of the levees in the downstream reach of C04 occurs at approximately the 2% ACE flood event. Widespread overtopping of the channels as well as levee failure would still occur between the 10% and 4% ACE events within the two channel systems, thereby leaving homes that are within the 100 year flood plain at risk to impacts from flooding.

Current water quality issues associated with storm water and with flood events would remain unchanged under the No Action Plan. No new water quality issues would be introduced, and no water quality issues would be addressed.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

The modification of the Warner Avenue Bridge would not substantially alter an existing drainage pattern in a manner which would result in substantial erosion or siltation on- or off-site. Currently, water from the C05/C06 drainage channels and OBB flows through Warner Avenue Bridge out to Huntington Harbour. This drainage pattern would still occur with the implementation of this measure. Flows would not be redirected during construction when the bridge is being lengthened, nor when the constriction point upstream of the bridge is being removed. Modification of the bridge would include temporary erosion control during the construction, and permanent erosion control features (such as riprap and permanent vegetation) to prevent erosion. Any potential erosive areas will be designed to proactively stabilize the banks upstream and adjacent to the Warner Avenue Bridge in the vicinity of OBB.

The modification of the bridge would not change the drainage pattern of the area or increase the risk of flooding. The purpose of the proposed project is to reduce the risk of flooding within the drainage area. The existing bridge would be lengthened and the upstream constriction point removed to allow sufficient drainage capacity due to upstream channel modifications.

The modification of the bridge would not create or contribute runoff that would exceed the capacity of existing storm water drainage systems. The lengthening of the bridge and removal of the upstream constriction would allow greater drainage capacity.

A 404(b)(1) analysis has been completed (*Appendix L - Environmental Considerations*) and a 401 Water Quality Certification will be obtained prior to construction of the project as needed, thereby reducing the projects potential for significant impacts. Along with a 401 Water Quality Certification, mitigation

measures MM-WR-1 through MM-WR-7 would be implemented. The mitigation measures include the preparation of a SWPPP, a Spill Control Plan, a Contaminant Prevention Plan, and BMPs for reducing turbidity and avoiding/minimizing erosion into open water during construction activities. With the implementation of these mitigation measures and a 401 Water Quality Certification, the project would have a less than significant direct impact.

Indirect Impacts

Required construction BMPs implemented as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be less than significant indirect impacts.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. In addition, activities would include inspection and maintenance of any erosion control features necessary to address any localized failures. The long-term impact is expected to be less than significant.

Tide Gates

Direct Impacts

The permanent removal of the tide gates on C05 Reach 1 and replacement with a new access bridge would not substantially alter an existing drainage pattern in a manner which would result in substantial erosion or siltation on- or off-site. Currently, water from the C05/C06 drainage channels flows through the tide gates and out into OBB. This drainage pattern would still occur with implementation of this measure. The new bridge that would replace the tide gates is expected to have three pile bents which is less than the four pile bents on the Oil Field Bridge located directly upstream on C05, therefore, the new bridge is not expected to constrict flow. During removal of the tide gates, flows would not be redirected. Removal of the gates and construction of the new bridge would include temporary erosion control during construction activities, and potentially permanent erosion control features (such as riprap) to prevent erosion around the new bridge. Any potential erosive areas will be designed to proactively stabilize the banks upstream and downstream of the new bridge.

The permanent removal of the tide gates and replacement with a small bridge would not change the drainage pattern of the area or increase the risk of flooding. The purpose of the proposed project is to reduce the risk of flooding within the drainage area. The removal of the tide gates would allow sufficient drainage capacity due to upstream channel modifications.

The removal of the tide gates and replacement with a small bridge would not create or contribute runoff that would exceed the capacity of existing storm water drainage systems. The permanent removal of the tide gates would allow greater drainage capacity and the new bridge is not expected to interfere with drainage capacity.

A 404(b)(1) analysis has been completed (*Appendix L - Environmental Considerations*) and a 401 Water Quality Certification will be obtained prior to construction of the project as needed, thereby reducing the projects potential for significant impacts. Along with a 401 Water Quality Certification, mitigation measures MM-WR-1 through MM-WR-7 would be implemented. The mitigation measures include the preparation of a SWPPP, a Spill Control Plan, a Contaminant Prevention Plan, and BMPs for reducing

turbidity and avoiding/minimizing erosion into open water during construction activities. With the implementation of these mitigation measures and a 401 Water Quality Certification, the project would have a less than significant direct impact.

Indirect Impacts

Required construction BMPs implemented as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be less than significant indirect impacts.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new bridge to replace the access previously provided by the tide gates would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. In addition, activities would include inspection and maintenance of any erosion control features necessary to address any localized failures. The long-term impact is expected to be less than significant.

C02/C04 Channels

Direct Impacts

The modification of the drainage channels to allow increased conveyance efficiency would not substantially alter an existing drainage pattern in a manner which would result in substantial erosion or siltation on- or off-site. During construction, flows would not be redirected during construction when earthen/riprap trapezoidal channels are being lined with concrete. Modification of the channels would include temporary erosion control during construction to prevent erosion.

The modification of the drainage channels would not change the drainage pattern of the area or increase the risk of flooding. The purpose of the proposed project is to reduce the risk of flooding within the drainage area. Currently, flooding begins at approximately the 25% ACE flood event throughout the area. Overtopping and failure of the levees in the downstream reaches of C04 occur at approximately the 2% ACE flood event. The existing channels provide drainage capacity for a 25-year storm; the proposed modifications would allow for a 50-year storm. Anticipated peak stormwater flows in the channel during a 100-year storm are shown in Table 34. The modified channels would expand flood control capacity, and implementation of this measure would reduce flood risks in and downstream of the drainage area.

Table 34 – Peak Storm Flow Channel Capacity

Location (from south to north)	Existing 100-year Peak Discharge Flow*	Project Completion 100-year Peak Discharge Flow*
Ward	950	1230
Magnolia	1120	1340
Hazard	2470	2690
405 Freeway	2670	3110
Bolsa Ave	2610	3200
Graham St	2680	3740

*Numbers shown are in cubic feet per second

The modification of the drainage channels would not create or contribute additional runoff that would exceed the capacity of existing storm water drainage systems. Implementation of this measure would

expand the stormwater drainage capacity of the C05/C06 system and would have no adverse impact on storm drainage capacity. The project would reduce the risk of flooding and would construct debris booms to reduce the amount of polluted runoff.

A 404(b)(1) analysis has been completed (*Appendix L - Environmental Considerations*) and a 401 Water Quality Certification will be obtained prior to construction of the project as needed, thereby reducing the projects potential for significant impacts. Along with a 401 Water Quality Certification, mitigation measures MM-WR-1 through MM-WR-7 would be implemented. The mitigation measures include the preparation of a SWPPP, a Spill Control Plan, a Contaminant Prevention Plan, and BMPs for reducing turbidity and avoiding/minimizing erosion into open water during construction activities. With the implementation of these mitigation measures and a 401 Water Quality Certification, the project would have a less than significant direct impact.

Indirect Impacts

Required construction BMPs implemented as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no indirect impacts.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts.

C05/C06 Channels

Direct Impacts

The modification of the drainage channels to allow increased conveyance efficiency would not substantially alter an existing drainage pattern in a manner which would result in substantial erosion or siltation on- or off-site. During construction, flows would not be redirected during construction when earthen/riprap trapezoidal channels are being lined with concrete. Modification of the channels would include temporary erosion control during construction to prevent erosion.

The modification of the drainage channels would not change the drainage pattern of the area or increase the risk of flooding. The purpose of the proposed project is to reduce the risk of flooding within the drainage area. Currently, flooding begins at approximately the 10% ACE flood event throughout the area and is caused by overtopping of the channels as well as failure of the levees in the downstream reaches of the C05 drainage channels. The existing channels provide drainage capacity for a 10-year storm; the proposed modifications would allow for a 25-year storm. Anticipated peak stormwater flows in the channel during a 100-year storm are shown in Table 35. The modified channels would expand flood control capacity, and implementation of this measure would reduce flood risks in and downstream of the drainage area.

Table 35 – Peak Storm Flow Channel Capacity

Location (from south to north)	Existing 100-year Peak Discharge Flow*	Project Completion 100-year Peak Discharge Flow*
Fifth St.	1810	1970
Ward St	2010	2550
Magnolia	1950	2950
405 Freeway	2040	3010
Newland St	1210	1380
Golden West	4580	5560

*Numbers shown are in cubic feet per second

The modification of the drainage channels would not create or contribute additional runoff that would exceed the capacity of existing storm water drainage systems. Implementation of this measure would expand the stormwater drainage capacity of the C05/C06 system and would have no adverse impact on storm drainage capacity. The project would reduce the risk of flooding and would construct debris booms to reduce the amount of polluted runoff.

A 404(b)(1) analysis has been completed (*Appendix L - Environmental Considerations*) and a 401 Water Quality Certification will be obtained prior to construction of the project as needed, thereby reducing the projects potential for significant impacts. Along with a 401 Water Quality Certification, mitigation measures MM-WR-1 through MM-WR-7 would be implemented. The mitigation measures include the preparation of a SWPPP, a Spill Control Plan, a Contaminant Prevention Plan, and BMPs for reducing turbidity and avoiding/minimizing erosion into open water during construction activities. With the implementation of these mitigation measures and a 401 Water Quality Certification, the project would have a less than significant direct impact.

Indirect Impacts

Required construction BMPs implemented as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no indirect impacts.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts.

Level of Impact for the NED Plan

Less than Significant with Mitigation Incorporated. The purpose of the proposed project is to expand drainage capacity and reduce flooding, therefore, the project is not expected to substantially alter an existing drainage pattern. During construction activities, there could be short-term impacts to water quality and erosion. To offset these potential short-term impacts mitigation measures MM-WR-1 through MM-WR-7 would be implemented. The mitigation measures include the preparation of a SWPPP, a Spill Control Plan, a Contaminant Prevention Plan, and BMPs for reducing turbidity and avoiding/minimizing erosion into open water during construction activities. With the implementation of the above mitigation measures during construction activities, significant short-term impacts would be reduced to less than significant.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

The modification of the drainage channels to allow increased conveyance efficiency and capacity would not substantially alter an existing drainage pattern in a manner which would result in substantial erosion or siltation on- or off-site. During construction, flows would not be redirected during construction when earthen/riprap trapezoidal channels are being lined with concrete. Modification of the channels would include temporary erosion control during construction to prevent erosion.

The modification of the drainage channels would not change the drainage pattern of the area or increase the risk of flooding. The purpose of the proposed project is to reduce the risk of flooding within the drainage area. Currently, flooding begins at approximately the 25% ACE flood event throughout the area. Overtopping and failure of the levees in the downstream reaches of C04 occur at approximately the 2% ACE flood event. The existing channels provide drainage capacity for a 25-year storm; the proposed modifications would allow for a 100-year storm. Anticipated peak stormwater flows in the channel during a 100-year storm are shown in Table 36. The modified channels would expand flood control capacity, and implementation of this measure would reduce flood risks in and downstream of the drainage area.

Table 36 – Peak Storm Flow Channel Capacity

Location (from south to north)	Existing 100-year Peak Discharge Flow*	Project Completion 100-year Peak Discharge Flow*
Ward	950	1690
Magnolia	1120	1930
Hazard	2470	3550
405 Freeway	2670	2770
Bolsa Ave	2610	4880
Graham St	2680	4980

*Numbers shown are in cubic feet per second

The modification of the drainage channels would not create or contribute additional runoff that would exceed the capacity of existing storm water drainage systems. Implementation of this measure would expand the stormwater drainage capacity of the C05/C06 system and would have no adverse impact on storm drainage capacity. The project would reduce the risk of flooding and would construct debris booms to reduce the amount of polluted runoff.

A 404(b)(1) analysis has been completed (*Appendix L - Environmental Considerations*) and a 401 Water Quality Certification will be obtained prior to construction of the project as needed, thereby reducing the

projects potential for significant impacts. Along with a 401 Water Quality Certification, mitigation measures MM-WR-1 through MM-WR-7 would be implemented. The mitigation measures include the preparation of a SWPPP, a Spill Control Plan, a Contaminant Prevention Plan, and BMPs for reducing turbidity and avoiding/minimizing erosion into open water during construction activities. With the implementation of these mitigation measures and a 401 Water Quality Certification, the project would have a less than significant direct impact.

Indirect Impacts

Required construction BMPs implemented as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no indirect impacts.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts.

C05/C06 Channels

Direct Impacts

The modification of the drainage channels to allow increased conveyance efficiency and capacity would not substantially alter an existing drainage pattern in a manner which would result in substantial erosion or siltation on- or off-site. During construction, flows would not be redirected during construction when earthen/riprap trapezoidal channels are being lined with concrete. Modification of the channels would include temporary erosion control during construction to prevent erosion.

The modification of the drainage channels would not change the drainage pattern of the area or increase the risk of flooding. The purpose of the proposed project is to reduce the risk of flooding within the drainage area. Currently, flooding begins at approximately the 10% ACE flood event throughout the area and is caused by overtopping of the channels as well as failure of the levees in the downstream reaches of the C05 drainage channels. The existing channels provide drainage capacity for a 10-year storm; the proposed modifications would allow for a 100-year storm. Anticipated peak stormwater flows in the channel during a 100-year storm are shown in Table 37. The modified channels would expand flood control capacity, and implementation of this measure would reduce flood risks in and downstream of the drainage area.

Table 37 – Peak Storm Flow Channel Capacity

Location (from south to north)	Existing 25-year Peak Discharge Flow*	Project Completion 100-year Peak Discharge Flow*
Fifth St.	1810	3470
Ward St	2010	4710
Magnolia	1950	5460
405 Freeway	2040	5320
Newland St	1210	1855
Golden West	4580	8386

*Numbers shown are in cubic feet per second

The modification of the drainage channels would not create or contribute additional runoff that would exceed the capacity of existing storm water drainage systems. Implementation of this measure would expand the stormwater drainage capacity of the C05/C06 system and would have no adverse impact on storm drainage capacity. The project would reduce the risk of flooding and would construct debris booms to reduce the amount of polluted runoff.

A 404(b)(1) analysis has been completed (*Appendix L - Environmental Considerations*) and a 401 Water Quality Certification will be obtained prior to construction of the project as needed, thereby reducing the projects potential for significant impacts. Along with a 401 Water Quality Certification, mitigation measures MM-WR-1 through MM-WR-7 would be implemented. The mitigation measures include the preparation of a SWPPP, a Spill Control Plan, a Contaminant Prevention Plan, and BMPs for reducing turbidity and avoiding/minimizing erosion into open water during construction activities. With the implementation of these mitigation measures and a 401 Water Quality Certification, the project would have a less than significant direct impact.

Indirect Impacts

Required construction BMPs implemented as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no indirect impacts.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts.

Diversion Channel

Direct Impacts

The construction of the Westminster Mall Diversion channel would allow increased conveyance efficiency and capacity. The construction of this channel would not substantially alter an existing drainage pattern in a manner which would result in substantial erosion or siltation on- or off-site. During construction temporary erosion controls would be implemented to prevent erosion.

The construction of the diversion channel would not change the drainage pattern of the area or increase the risk of flooding. The purpose of the proposed project is to reduce the risk of flooding within the drainage area. Currently, flooding begins at approximately the 25% ACE flood event throughout the area. Overtopping and failure of the levees in the downstream reaches of C04 occur at approximately the 2% ACE flood event. The proposed diversion channel would allow drainage capacity for a 100-year storm.

The construction of the diversion channel would not create or contribute additional runoff that would exceed the capacity of existing storm water drainage systems. Implementation of this measure would expand the stormwater drainage capacity of the C04 channel system and would have no adverse impact on storm drainage capacity. The project would reduce the risk of flooding and would construct debris booms to reduce the amount of polluted runoff.

A 404(b)(1) analysis has been completed (*Appendix L - Environmental Considerations*) and a 401 Water Quality Certification will be obtained prior to construction of the project as needed, thereby reducing the

projects potential for significant impacts. Along with a 401 Water Quality Certification, mitigation measures MM-WR-1 through MM-WR-7 would be implemented. The mitigation measures include the preparation of a SWPPP, a Spill Control Plan, a Contaminant Prevention Plan, and BMPs for reducing turbidity and avoiding/minimizing erosion into open water during construction activities. With the implementation of these mitigation measures and a 401 Water Quality Certification, the project would have a less than significant direct impact.

Indirect Impacts

Required construction BMPs implemented as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no indirect impacts.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar to the existing channels. Current channel maintenance that would be expected to occur within the diversion channel would include repairing channel linings, removing vegetation, and removing garbage or debris. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts.

Level of Impact for the LPP

Less than Significant with Mitigation Incorporated. The purpose of the proposed project is to expand drainage capacity and reduce flooding, therefore, the project is not expected to substantially alter an existing drainage pattern. During construction activities, there could be short-term impacts to water quality and erosion. To offset these potential short-term impacts mitigation measures MM-WR-1 through MM-WR-7 would be implemented. The mitigation measures include the preparation of a SWPPP, a Spill Control Plan, a Contaminant Prevention Plan, and BMPs for reducing turbidity and avoiding/minimizing erosion into open water during construction activities. With the implementation of the above mitigation measures during construction activities, significant short-term impacts would be reduced to less than significant.

5.4.4.4 IMPACT WR-4: In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no federal project would be implemented. Local flooding issues would continue in the manner as they currently occur. Under existing conditions, the 10%, 4%, 2%, 1%, and 0.2% ACE events cause flooding in both overbanks including comingling flooding between the channel systems. Flooding begins at approximately the 10% ACE flood event throughout the study area and is cause by overtopping of the channels as well as failure of the levees in the downstream reaches of the C05 channel system. Overtopping and failure of the levees in the downstream reach of C04 occurs at approximately the 2% ACE flood event. Widespread overtopping of the channels as well as levee failure would still occur between the 10% and 4% ACE events within the two channel systems, thereby leaving homes that are within the 100 year flood plain at risk to impacts from flooding.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

Warner Avenue Bridge is located less than 0.5 mile from the Pacific Ocean. According to the Tsunami Inundation Map for Emergency Planning Los Alamitos Quadrangle/Seal Beach Quadrangle (California Emergency Management et al. 2009), C05 Reach 1 where the tide gates are located is susceptible to inundation and is within the tsunami hazard zone. The most recent tsunami for the Orange County area was March 11, 2011 and was triggered by the magnitude 9.0 earthquake in the Tohoku region of Japan. Strong tsunami currents from the event damaged harbors along the coast of California. The most devastating tsunami on record was March 28, 1964 and was triggered by a 9.2 magnitude earthquake off Alaska. The event caused powerful waves and an approximately 20-feet high water surge. Although tsunamis have occurred they are for the most part uncommon in California and have caused little or no damage when they have occurred. Although the construction area for the Warner Avenue Bridge is located within a tsunami inundation and hazard area, the modification of the bridge is expected to have no impact on water quality due to increasing the risk of pollutants being released during inundation from flooding, tsunami, or seiche.

Indirect Impacts

The Warner Avenue Bridge is being lengthened and the upstream constriction point removed so as to increase conveyance efficiency and capacity through the bridge. The implementation of this measure would have no indirect impact to water quality due to pollutants being released during inundation from flooding, tsunami, or seiche.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Neither the maintenance activities nor long-term operation of the bridge would have an adverse impact to water quality due to pollutants being released during inundation from flooding, tsunami, or seiche.

Tide Gates

Direct Impacts

The tide gates on C05 Reach 1 are located less than 0.25 mile from the Pacific Ocean. According to the Tsunami Inundation Map for Emergency Planning Los Alamitos Quadrangle/Seal Beach Quadrangle (California Emergency Management et al. 2009), C05 Reach 1 where the tide gates are located is susceptible to inundation and is within the tsunami hazard zone. The most recent tsunami for the Orange County area was March 11, 2011 and was triggered by the magnitude 9.0 earthquake in the Tohoku region of Japan. Strong tsunami currents from the event damaged harbors along the coast of California. The most devastating tsunami on record was March 28, 1964 and was triggered by a 9.2 magnitude earthquake off Alaska. The event caused powerful waves and an approximately 20-feet high water surge. Although tsunamis have occurred they are for the most part uncommon in California and have caused little or no damage when they have occurred. Although the construction area for the tide gates is located within a tsunami inundation and hazard area, the removal of the tide gates and replacement with a new

small bridge is expected to have no impact on water quality due to increasing the risk of pollutants being released during inundation from flooding, tsunami, or seiche.

Indirect Impacts

The tide gates on C05 are being permanently removed so as to increase conveyance efficiency and capacity at the downstream end of Reach 1. Construction of the new bridge, to replace access provided by the tide gates, would not impact conveyance efficiency. The implementation of this measure would have no indirect impact to water quality due to pollutants being released during inundation from flooding, tsunami, or seiche.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new bridge to replace the access provided by the tide gates would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Neither the maintenance activities nor the long-term operation of the bridge would have an adverse impact to water quality due to pollutants being released during inundation from flooding, tsunami, or seiche.

C02/C04 Channels

Direct Impacts

The downstream reach of C02 (Reach 23) is located approximately 0.75 mile from the Pacific Ocean, while the downstream reach of C04 (Reach 20) is located approximately 2.5 miles from the Pacific Ocean. According to the Tsunami Inundation Map for Emergency Planning Los Alamitos Quadrangle/Seal Beach Quadrangle (California Emergency Management et al. 2009), C02 Reach 23 and C04 Reach 20 up to Marina High School in Huntington Beach are susceptible to inundation and are within the tsunami hazard zone. The most recent tsunami for the Orange County area was March 11, 2011 and was triggered by the magnitude 9.0 earthquake in the Tohoku region of Japan. Strong tsunami currents from the event damaged harbors along the coast of California. The most devastating tsunami on record was March 28, 1964 and was triggered by a 9.2 magnitude earthquake off Alaska. The event caused powerful waves and an approximately 20-feet high water surge. Although tsunamis have occurred they are for the most part uncommon in California and have caused little or no damage when they have occurred. Therefore, modification of the C02/C04 drainage channels is expected to have no impact on water quality due to increasing the risk of pollutants being released during inundation from flooding, tsunami, or seiche.

Indirect Impacts

The C02/C04 drainage channels are being modified so as to increase conveyance efficiency of flood waters. The implementation of this measure would have no indirect impact to water quality due to pollutants being released during inundation from flooding, tsunami, or seiche.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while

at the same time minimizing the potential for any water quality impacts. Overall, the long-term operation and maintenance activities would have no impact on water quality due to pollutants being released during inundation from flooding, tsunami, or seiche.

C05/C06 Channels

Direct Impacts

The downstream reach of C05 (Reach 1) is located approximately 0.25 mile from the Pacific Ocean, while the downstream reach of C06 (Reach 13) is located approximately 4.4 miles from the Pacific Ocean. According to the Tsunami Inundation Map for Emergency Planning Los Alamitos Quadrangle/Seal Beach Quadrangle (California Emergency Management et al. 2009), C05 Reach 1 up to the Edwards Street crossing in Huntington Beach is susceptible to inundation and is within the tsunami hazard zone. The most recent tsunami for the Orange County area was March 11, 2011 and was triggered by the magnitude 9.0 earthquake in the Tohoku region of Japan. Strong tsunami currents from the event damaged harbors along the coast of California. The most devastating tsunami on record was March 28, 1964 and was triggered by a 9.2 magnitude earthquake off Alaska. The event caused powerful waves and an approximately 20-feet high water surge. Although tsunamis have occurred they are for the most part uncommon in California and have caused little or no damage when they have occurred. Therefore, modification of the C05/C06 drainage channels is expected to have no impact on water quality due to increasing the risk of pollutants being released during inundation from flooding, tsunami, or seiche.

Indirect Impacts

The C05/C06 drainage channels are being modified so as to increase conveyance efficiency of flood waters. The implementation of this measure would have no indirect impact to water quality due to pollutants being released during inundation from flooding, tsunami, or seiche.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts. Overall, the long-term operation and maintenance activities would have no impact on water quality due to pollutants being released during inundation from flooding, tsunami, or seiche.

Level of Impact for the NED Plan

No impact. Implementation of the NED Plan would not substantially increase the potential for an adverse impact to water quality due to pollutants being released during inundation from flooding, tsunami, or seiche.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

The downstream reach of C02 (Reach 23) is located approximately 0.75 mile from the Pacific Ocean, while the downstream reach of C04 (Reach 20) is located approximately 2.5 miles from the Pacific Ocean. According to the Tsunami Inundation Map for Emergency Planning Los Alamitos Quadrangle/Seal Beach Quadrangle (California Emergency Management et al. 2009), C02 Reach 23 and C04 Reach 20 up to Marina High School in Huntington Beach are susceptible to inundation and are within the tsunami hazard zone. The most recent tsunami for the Orange County area was March 11, 2011 and was triggered by the magnitude 9.0 earthquake in the Tohoku region of Japan. Strong tsunami currents from the event damaged harbors along the coast of California. The most devastating tsunami on record was March 28, 1964 and was triggered by a 9.2 magnitude earthquake off Alaska. The event caused powerful waves and an approximately 20-feet high water surge. Although tsunamis have occurred they are for the most part uncommon in California and have caused little or no damage when they have occurred. Therefore, modification of the C02/C04 drainage channels is expected to have no impact on water quality due to increasing the risk of pollutants being released during inundation from flooding, tsunami, or seiche.

Indirect Impacts

The C02/C04 drainage channels are being modified so as to increase capacity and conveyance efficiency of flood waters. The implementation of this measure would have no indirect impact to water quality due to pollutants being released during inundation from flooding, tsunami, or seiche.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts. Overall, the long-term operation and maintenance activities would have no impact on water quality due to pollutants being released during inundation from flooding, tsunami, or seiche.

C05/C06 Channels

Direct Impacts

The downstream reach of C05 (Reach 1) is located approximately 0.25 mile from the Pacific Ocean, while the downstream reach of C06 (Reach 13) is located approximately 4.4 miles from the Pacific Ocean. According to the Tsunami Inundation Map for Emergency Planning Los Alamitos Quadrangle/Seal Beach Quadrangle (California Emergency Management et al. 2009), C05 Reach 1 up to the Edwards Street crossing in Huntington Beach is susceptible to inundation and is within the tsunami hazard zone. The most recent tsunami for the Orange County area was March 11, 2011 and was triggered by the magnitude 9.0 earthquake in the Tohoku region of Japan. Strong tsunami currents from the event damaged harbors along the coast of California. The most devastating tsunami on record was March 28, 1964 and was triggered by a 9.2 magnitude earthquake off Alaska. The event caused powerful waves and an approximately 20-feet high water surge. Although tsunamis have occurred they are for the most part uncommon in California and have caused little or no damage when they have occurred. Therefore, modification of the C05/C06 drainage channels is expected to have no impact on water quality due to increasing the risk of pollutants being released during inundation from flooding, tsunami, or seiche.

Indirect Impacts

The C05/C06 drainage channels are being modified so as to increase capacity and conveyance efficiency of flood waters. The implementation of this measure would have no indirect impact to water quality due to pollutants being released during inundation from flooding, tsunami, or seiche.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts. Overall, the long-term operation and maintenance activities would have no impact on water quality due to pollutants being released during inundation from flooding, tsunami, or seiche.

Diversion Channel

Direct Impacts

The diversion channel would be located between C04 Reach 21 and Reach 20 and would be approximately 6.0 miles from the Pacific Ocean. According to the Tsunami Inundation Map for Emergency Planning Los Alamitos Quadrangle/Seal Beach Quadrangle (California Emergency Management et al. 2009), this area is not within the tsunami hazard zone and would not be susceptible to inundation. Therefore, construction of the diversion channel is expected to have no impact on water quality due to increasing the risk of pollutants being released during inundation from flooding, tsunami, or seiche.

Indirect Impacts

The diversion channel is being constructed so as to increase capacity and conveyance efficiency of flood waters within the C04 drainage channel system. The implementation of this measure would have no indirect impact to water quality due to pollutants being released during inundation from flooding, tsunami, or seiche.

Long-Term Operation and Maintenance Impacts

Operation and maintenance for the diversion channel would be similar to what occurs currently in the existing drainage channels within the C04 system. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts. Overall, the long-term operation and maintenance activities would have no impact on water quality due to pollutants being released during inundation from flooding, tsunami, or seiche.

Level of Impact for the LPP

No impact. Implementation of the LPP would not substantially increase the potential for an adverse impact to water quality due to pollutants being released during inundation from flooding, tsunami, or seiche.

5.4.4.5 IMPACT WR-5: Conflict with or obstruct implementation of a water quality plan or sustainable groundwater management plan.

ALTERNATIVE: NO ACTION

Under the No Action Alternative no federal project would be implemented. Local flooding issues would continue in the manner as they currently occur. No project would be implemented that would conflict with or obstruct implementation of a water quality plan or sustainable groundwater management plan. Any projects being implemented within the study area would need to comply with 401 Water Quality Certification and 404(b)(1).

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

The proposed project lies within the boundaries of the Water Quality Control Plan (Basin Plan) for the SAR Basin (2016). Modification of the Warner Avenue Bridge would require ground-disturbing work and the use of construction equipment at the bridge. There would be possible temporary impacts to water quality during construction, although these could be mitigated by the implementation of BMPs, erosion control measures, and the implementation of turbidity curtains, if needed. Sediment and soil would be disposed of upland to prevent water quality impacts. There would be no long-term or substantial impairments of water quality and no conflict with or obstruction of the Water Quality Control Plan for the SAR Basin. Therefore, there would be no direct impact to the implementation of a water quality control plan or sustainable groundwater management plan.

Indirect Impacts

Required construction BMPs implemented as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no conflict with or obstruction of the Water Quality Control Plan for the SAR Basin. No indirect impacts to a sustainable groundwater management

plan are expected either since the modification of the Warner Avenue Bridge would not substantially increase the amount of impermeable surface in this area. Overall, there would be no indirect impact to the implementation of a water quality control plan or sustainable groundwater management plan.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Maintenance activities are not expected to conflict with or obstruct implementation of the Water Quality Control Plan for the SAR Basin. Therefore, there would be no long-term impact to the implementation of a water quality control plan or sustainable groundwater management plan.

Tide Gates

Direct Impacts

The proposed project lies within the boundaries of the Water Quality Control Plan (Basin Plan) for the SAR Basin (2016). Permanent removal of the tide gates on C05 Reach 1 and replacement with a new small bridge would require ground-disturbing work and the use of construction equipment. There would be possible temporary impacts to water quality during construction, although these could be mitigated by the implementation of BMPs, erosion control measures, and the implementation of turbidity curtains, if needed. Sediment and soil would be disposed of upland to prevent water quality impacts. There would be no long-term or substantial impairments of water quality and no conflict with or obstruction of the Water Quality Control Plan for the SAR Basin. Therefore, there would be no direct impact to the implementation of a water quality control plan or sustainable groundwater management plan.

Indirect Impacts

Required construction BMPs implemented as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no conflict with or obstruction of the Water Quality Control Plan for the SAR Basin. No indirect impacts to a sustainable groundwater management plan are expected either since the removal of the tide gates and replacement with a bridge would not substantially increase the amount of impermeable surface in this area. Overall, there would be no indirect impact to the implementation of a water quality control plan or sustainable groundwater management plan.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new bridge to replace the access provided by the tide gates would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Maintenance activities are not expected to conflict with or obstruct implementation of the Water Quality Control Plan for the SAR Basin. Therefore, there would be no long-term impact to the implementation of a water quality control plan or sustainable groundwater management plan.

C02/C04 Channels

Direct Impacts

The proposed project lies within the boundaries of the Water Quality Control Plan (Basin Plan) for the SAR Basin (2016). Under the proposed project, no changes in the runoff water entering the channels is anticipated and the proposed project would not impact the runoff area. The conveyance efficiency of the channel would be increased by the modifications, leading to faster runoff and reduced likelihood of flooding. The proposed project would not add any new area or new sources of pollution to the channels. Downstream water quality impacts that are tied to storm water quality will remain similar to current impacts since the storm water quality will not change. Therefore, there would be no long-term or substantial impairments of water quality and no conflict with or obstruction of the Water Quality Control Plan for the SAR Basin.

Indirect Impacts

Required construction BMPs implemented as part of the NPDES Construction General Permit have been designated to isolate disturbed areas such that there would be no conflict with or obstruction of the Water Quality Control Plan for the SAR Basin. No indirect impacts to a sustainable groundwater management plan are expected either. This is because a majority of groundwater infiltration is expected to occur through the adjacent relatively permeable alluvial surface soils compared to the channels. The drainage area for the C04 system is approximately 10.9 square miles, of which 30% is assumed to be pervious (i.e., 3.27 square miles). By contrast, the area comprised by the C04 channels is less than 0.5 square mile. Because the flood control channels, particularly the upstream portions, are often dry and because the channels only constitute less than 2% of the available recharge area, lining the channels with concrete will likely have no substantial effect on groundwater infiltration and a sustainable groundwater management plan. Overall, there would be no indirect impact to the implementation of a water quality control plan or sustainable groundwater management plan.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts. Therefore, there would be no long-term operation or maintenance impacts that would conflict with or obstruct implementation of the Water Quality Control Plan for the SAR Basin.

C05/C06 Channels

Direct Impacts

The proposed project lies within the boundaries of the Water Quality Control Plan (Basin Plan) for the SAR Basin (2016). Under the proposed project, no changes in the runoff water entering the channels is anticipated and the proposed project would not impact the runoff area. The conveyance efficiency of the channel would be increased by the modifications, leading to faster runoff and reduced likelihood of flooding. The proposed project would not add any new area or new sources of pollution to the channels. Downstream water quality impacts that are tied to storm water quality will remain similar to current impacts since the storm water quality will not change. Therefore, there would be no long-term or substantial impairments of water quality and no conflict with or obstruction of the Water Quality Control Plan for the SAR Basin.

Indirect Impacts

There would be no indirect adverse impacts to water quality. Required construction BMPs implemented as part of the NPDES Construction General Permit have been designated to isolate disturbed areas such that there would be no conflict with or obstruction of the Water Quality Control Plan for the SAR Basin. No indirect impacts to a sustainable groundwater management plan are expected either. This is because a majority of groundwater infiltration is expected to occur through the adjacent relatively permeable alluvial surface soils compared to the channels. The drainage area for the C05/C06 system is approximately 28 square miles, of which 30% is assumed to be pervious (i.e., 8.4 square miles). By contrast, the area comprised by the C05/C06 channels is less than 0.5 square mile. Because the flood control channels, particularly the upstream portions, are often dry and because the channels only constitute less than 2% of the available recharge area, lining the channels with concrete will likely have no substantial effect on groundwater infiltration and a sustainable groundwater management plan. Overall, there would be no indirect impact to the implementation of a water quality control plan or sustainable groundwater management plan.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts. Therefore, there would be no long-term operation or maintenance impacts that would conflict with or obstruct implementation of the Water Quality Control Plan for the SAR Basin.

Level of Impact for the NED Plan

No Impact. The implementation of the NED Plan would have no direct, indirect, or long-term impact on the implementation of the Water Quality Control Plan for the SAR Basin nor a sustainable groundwater management plan.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

The proposed project lies within the boundaries of the Water Quality Control Plan (Basin Plan) for the SAR Basin (2016). Under the proposed project, no changes in the runoff water entering the channels is anticipated and the proposed project would not impact the runoff area. The capacity and conveyance efficiency of the channel would be increased by the modifications, leading to faster runoff and reduced likelihood of flooding. The proposed project would not add any new area or new sources of pollution to the channels. Downstream water quality impacts that are tied to storm water quality will remain similar to current impacts since the storm water quality will not change. Therefore, there would be no long-term or substantial impairments of water quality and no conflict with or obstruction of the Water Quality Control Plan for the SAR Basin.

Indirect Impacts

Required construction BMPs implemented as part of the NPDES Construction General Permit have been designated to isolate disturbed areas such that there would be no conflict with or obstruction of the Water Quality Control Plan for the SAR Basin. No indirect impacts to a sustainable groundwater management plan are expected either. This is because a majority of groundwater infiltration is expected to occur through the adjacent relatively permeable alluvial surface soils compared to the channels. The drainage area for the C04 system is approximately 10.9 square miles, of which 30% is assumed to be pervious (i.e., 3.27 square miles). By contrast, the area comprised by the C04 channels is less than 0.5 square mile. Because the flood control channels, particularly the upstream portions, are often dry and because the channels only constitute less than 2% of the available recharge area, lining the channels with concrete will likely have no substantial effect on groundwater infiltration and a sustainable groundwater management plan. Overall, there would be no indirect impact to the implementation of a water quality control plan or sustainable groundwater management plan.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts. Therefore, there would be no long-term operation or maintenance impacts that would conflict with or obstruct implementation of the Water Quality Control Plan for the SAR Basin.

C05/C06 Channels

Direct Impacts

The proposed project lies within the boundaries of the Water Quality Control Plan (Basin Plan) for the SAR Basin (2016). Under the proposed project, no changes in the runoff water entering the channels is anticipated and the proposed project would not impact the runoff area. The capacity and conveyance efficiency of the channel would be increased by the modifications, leading to faster runoff and reduced likelihood of flooding. The proposed project would not add any new area or new sources of pollution to the channels. Downstream water quality impacts that are tied to storm water quality will remain similar to current impacts since the storm water quality will not change. Therefore, there would be no long-term or substantial impairments of water quality and no conflict with or obstruction of the Water Quality Control Plan for the SAR Basin.

Indirect Impacts

Required construction BMPs implemented as part of the NPDES Construction General Permit have been designated to isolate disturbed areas such that there would be no conflict with or obstruction of the Water Quality Control Plan for the SAR Basin. No indirect impacts to a sustainable groundwater management plan are expected either. This is because a majority of groundwater infiltration is expected to occur through the adjacent relatively permeable alluvial surface soils compared to the channels. The drainage area for the C05/C06 system is approximately 28 square miles, of which 30% is assumed to be pervious (i.e., 8.4 square miles). By contrast, the area comprised by the C05/C06 channels is less than 0.5 square mile. Because the flood control channels, particularly the upstream portions, are often dry and because the channels only constitute less than 2% of the available recharge area, lining the channels with concrete will likely have no substantial effect on groundwater infiltration and a sustainable groundwater management plan. Overall, there would be no indirect impact to the implementation of a water quality control plan or sustainable groundwater management plan.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts. Therefore, there would be no long-term operation or maintenance impacts that would conflict with or obstruct implementation of the Water Quality Control Plan for the SAR Basin.

Diversion Channel

Direct Impacts

The proposed project lies within the boundaries of the Water Quality Control Plan (Basin Plan) for the SAR Basin (2016). Under the proposed project, no changes in the runoff water entering the channels is anticipated and the proposed project would not impact the runoff area. The capacity of the C04 system would be increased by construction of the diversion channel, leading to faster runoff and reduce likelihood of flooding. The proposed project would not add any new sources of pollution to the channels since runoff from the area where the diversion channel will be located already goes into the C04 drainage channel system. Downstream water quality impacts that are tied to storm water quality will remain similar to current impacts since the storm water quality will not change due to construction of the diversion channel. Therefore, there would be no long-term or substantial impairments of water quality and no conflict with or obstruction of the Water Quality Control Plan for the SAR Basin.

Indirect Impacts

Required construction BMPs implemented as part of the NPDES Construction General Permit have been designated to isolate disturbed areas such that there would be no conflict with or obstruction of the Water Quality Control Plan for the SAR Basin. No indirect impacts to a sustainable groundwater management plan are expected either. This is because a majority of groundwater infiltration is expected to occur through the adjacent relatively permeable alluvial surface soils compared to the channels. The drainage area for the C04 system is approximately 10.9 square miles, of which 30% is assumed to be pervious (i.e., 3.27 square miles). By contrast, the area comprised by the C04 channels is less than 0.5 square mile. Because the flood control channels, particularly the upstream portions, are often dry and because the channels only constitute less than 2% of the available recharge area, lining the channels with concrete will likely have no substantial effect on groundwater infiltration and a sustainable groundwater management

plan. Overall, there would be no indirect impact to the implementation of a water quality control plan or sustainable groundwater management plan.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance for the diversion channel would be similar to what it is for the existing drainage channels within the C04 system that already exist. Channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would be expected to occur within the diversion channel. It is assumed that all maintenance will occur during dry weather conditions to maximize accessibility to the features and to provide safe working conditions, while at the same time minimizing the potential for any water quality impacts. Therefore, there would be no long-term operation or maintenance impacts that would conflict with or obstruct implementation of the Water Quality Control Plan for the SAR Basin.

Level of Impact for the LPP

No Impact. The implementation of the LPP would have no direct, indirect, or long-term impact on the implementation of the Water Quality Control Plan for the SAR Basin nor a sustainable groundwater management plan.

5.5 Air Quality

5.5.1 Regulatory Framework

Sources of air emissions in this project are regulated by the U.S. Environmental Protection Agency (USEPA), California Air Resources Board (CARB), and the South Coast Air Quality Management District (SCAQMD). The role of each regulatory agency is discussed below.

5.5.1.1 Federal

Clean Air Act: The federal Clean Air Act (CAA) of 1963 and its subsequent amendments form the basis for the nation's air pollution control effort. The USEPA is responsible for implementing most aspects of the CAA. Basic elements of the CAA include the National Ambient Air Quality Standards (NAAQS) for major air pollutants, hazardous air pollutant standards, attainment plans, motor vehicle emission standards, stationary source emission standards and permits, acid rain control measures, stratospheric ozone protection, and enforcement provisions. The CAA delegates the enforcement of the federal standards to the states. In California, the California Air Resources Board (CARB) is responsible for enforcing air pollution regulations. In the air basin which includes Orange County, the South Coast Air Quality Management District (SCAQMD) is responsible for regional air quality planning efforts, including assisting lead agencies in evaluating a proposed project's potential air quality impacts and providing environmental air quality reviews according to CEQA.

General Conformity Rule: Section 176(c) of the CAA states that a federal agency cannot issue a permit for, or support an activity within, a nonattainment or maintenance area unless the agency determines it will conform to the most recent USEPA-approved State Implementation Plan (SIP). This means that projects using federal funds or requiring federal approval must not: (1) cause or contribute to any new violation of a NAAQS; (2) increase the frequency or severity of any existing violation; or (3) delay the timely attainment of any standard, interim emission reduction, or other milestone. The General Conformity Rule was updated in March 2010.

Based on the present attainment status of the county (Table 38), a federal action would conform to the SIP if its annual emissions remain below 100 tons of CO or PM_{10}, 70 tons of $PM_{2.5}$, or 10 tons of NOx or

VOCs. These *de minimis* levels apply to both construction and operation activities. SCAQMD Rule 1901 adopts the guidelines of the General Conformity Rule.

State Implementation Plan: For areas that do not attain the NAAQS, the CAA requires the preparation of a SIP, detailing how the State will attain the NAAQS within mandated timeframes. In response to this requirement, the SCAQMD and Southern California Association of Governments (SCAG) developed the 2003 Air Quality Management Plan (2003 AQMP). The focus of the 2003 AQMP was to demonstrate attainment of the federal PM_{10} standard by 2006 and the federal one-hour O_3 standard by 2010, while making expeditious progress toward attainment of State standards. The 2003 AQMP also included a NO_2 maintenance plan.

The SCAQMD and SCAG, in cooperation with the CARB and the USEPA, developed the 2007 AQMP for the primary purposes of demonstrating compliance with the new $PM_{2.5}$ and 8-hour O_3 NAAQS. This plan also provided additional measures beyond the 2003 AQMP for the attainment of the PM_{10} standard that was not attained by 2006, the one-hour O_3 NAAQS, and other planning requirements. The SCAQMD Governing Board adopted the Final 2007 AQMP on June 1, 2007 (SCAQMD, 2007).

The 2012 Air Quality Management Plan (2012 AQMP) was adopted by the SCAQMD Board on December 7, 2012 and was adopted by CARB on January 25, 2013. The 2012 AQMP was prepared in order to meet the federal Clean Air Act requirement that all 24-hour PM2.5 non-attainment areas prepare a SIP for submission to the U.S. EPA by December 14, 2012 and demonstrate attainment with the 24-hour PM2.5 standard by 2014. The 2012 AQMP demonstrated attainment of the federal 24-hour PM2.5 standard by 2014 in the Air Basin through adoption of all feasible measures, and therefore, no extension of the attainment date is needed. The 2012 AQMP also satisfied the California Clean Air Act's (CCAA) emission reductions of five percent per year or adoption of all feasible measures requirements and fulfilled the EPA's requirement to update transportation conformity emissions budgets based on the latest approved motor vehicle emissions model and planning assumptions.

The SCAQMD approved the Final 2016 AQMP on March 3, 2017 that demonstrates attainment of the 1-hr and 8-hr ozone NAAQS as well as the latest 24-hr and annual PM2.5 standards. The 2016 AQMP includes integrated strategies and measures needed to meet the NAAQS and seeks to achieve multiple goals in partnership with other entities promoting reductions in criteria pollutant, greenhouse gases, and toxic risk, as well as efficiencies in energy use, transportation, and goods movement. The SCAQMD worked closely with the CARB and the USEPA toward reducing emissions from mobile sources. The 2016 AQMP also includes transportation control measures developed by the SCAG from the 2016 Regional Transportation Plan/ Sustainable Communities Strategy. The SCAQMD has since updated the attainment demonstration of the federal 1979 1-hour ozone standard that was presented in the 2016 AQMP, provided supplemental RACM/RACT analysis for the 2006 PM2.5 standard and 2008 ozone standard, and completed a nonattainment NSR compliance demonstration for the 2008 ozone standard.

Although SCAQMD is responsible for regional air quality planning efforts, it does not have authority to directly regulate air quality issues associated with plans and new development projects throughout the air basin. Instead, this is controlled through local jurisdictions in accordance to the California Environmental Quality Act (CEQA). The SCAQMD CEQA Handbook, prepared by SCAQMD in 1993, with the most current updates found at http://www.aqmd.gov/ceqa/hdbk.html, was developed in accordance with the projections and programs detailed in the AQMPs. The purpose of the SCAQMD CEQA Handbook is to assist lead agencies and other interested parties in evaluating a proposed project's potential air quality impacts. The handbook explains the procedures that SCAQMD recommends be followed for the environmental review process required by CEQA. The SCAQMD CEQA Handbook provides direction on

how to evaluate potential air quality impacts, how to determine whether these impacts are significant, and how to mitigate these impacts. The SCAQMD intends that by providing this guidance, the air quality impacts of plans and development proposals will be analyzed accurately and consistently throughout the air basin, and adverse impacts will be minimized.

Non-Road Diesel Fuel Rule: In May 2004, the USEPA set sulfur limits for non-road diesel fuel. Under this rule, starting January 1, 2012, diesel fuel used by all non-road equipment (not including marine and aircraft fuel) would be limited to 15 ppm sulfur, which would be equivalent to the sulfur content restrictions of the California Diesel Fuel Regulations.

Emissions Standards for On-Road Trucks: To reduce emissions from on-road, heavy-duty diesel trucks, the USEPA established a series of cleaner emission standards for new engines, starting in 1988. These emission standards regulations have been revised over time and the latest effective regulation, the 2007 Heavy-Duty Highway Rule, provides for reductions in PM, NOx, and non-methane hydrocarbon emissions that were phased in during the model years 2007 through 2010.

Environmental Protection Agency Diesel Fuel Rule: This USEPA rule limited the sulfur content in on-road diesel fuel to 15 ppm starting June 1, 2006.

Off-Road Diesel Engine Rule*:* To reduce emissions from off-road diesel equipment, the USEPA established a series of increasingly strict emission standards for new engines. Locomotives and marine vessels are exempt from this rule. Manufacturers of off-road diesel engines would be required to produce engines with certain emission standards under the following compliance schedule:

- Tier 1 standards were phased in from 1996 to 2000 (year of manufacture), depending on the engine horsepower category.
- Tier 2 standards were phased in from 2001 to 2006.
- Tier 3 standards were phased in from 2006 to 2008.
- Tier 4 standards, which likely will require add-on emissions control equipment to attain them, will be phased in from 2008 to 2015.

Greenhouse Gases: Greenhouse gas (GHG) emissions are not currently subject to Federal standards. Effective April 5, 2017, the Council on Environmental Quality withdrew its “Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews.” Thus, no thresholds of significance are established for greenhouse gases under NEPA. Rather, in compliance with the NEPA implementing regulations, the anticipated estimates of greenhouse gas emissions are included herein for the purpose of disclosure.

5.5.1.2 State

California Clean Air Act: In California, the California Air Resources Board (CARB) is designated as the responsible agency for all air quality regulations. The CARB, which became part of the California Environmental Protection Agency (CalEPA) in 1991, is responsible for implementing the requirements of the federal CAA, regulating emissions from motor vehicles and consumer products, and implementing the California Clean Air Act of 1988 (CCAA). The CCAA outlines a program to attain the California Ambient Air Quality Standards (CAAQS) for O_3, NO_2, SO_2, and CO by the earliest practical date. Since the CAAQS are often more stringent than the NAAQS, attainment of these more stringent CAAQS will require more emission reductions that what will be required to show attainment of the NAAQS.

CARB Regulation for In-Use Off-Road Diesel Vehicles: On July 26, 2007, the CARB adopted a regulation to reduce diesel particulate matter (DPM) and NOx emissions from in-use off-road heavy-duty diesel vehicles in California. The regulation limits idling to no more than five consecutive minutes, requires reporting and labeling, and requires disclosure of the regulation upon vehicle sale. Performance requirements of the rule are based on a fleet's average NOx emissions, which can be met by replacing older vehicles with newer, cleaner vehicles or by applying exhaust retrofits. The regulation was amended in 2010 to delay the original timeline of the performance requirement making the first compliance deadline January 1, 2014 for large fleets (over 5,000 horsepower), 2017 for medium fleets (2,501-5,000 horsepower), and 2019 for small fleets (2,500 horsepower or less). Currently, no commercial operation in California may add any equipment to their fleet that has a Tier 0 engine and medium and large fleets are restricted from adding Tier 1 engines. Small fleets are also be restricted from adding Tier 1 engines to their fleets and medium and large fleets restricted from adding Tier 2 engines to their fleets. It should be noted that commercial fleets may continue to use their existing Tier 0 and 1 equipment, if they can demonstrate that the average emissions from their entire fleet emissions meet the NOx emissions targets.

CARB Resolution 08-43 for On-Road Diesel Truck Fleets: On December 12, 2008 the CARB adopted Resolution 08-43, which limits NOx, PM10 and PM2.5 emissions from on-road diesel truck fleets that operate in California. On October 12, 2009 Executive Order R-09-010 was adopted that codified Resolution 08-43 into Section 2025, title 13 of the California Code of Regulations. This regulation requires that by the year 2023 all commercial diesel trucks that operate in California shall meet model year 2010 (Tier 4 Final) or latter emission standards. In the interim period, this regulation provides annual interim targets for fleet owners to meet. By January 1, 2014, 50 percent of a truck fleet is required to have installed Best Available Control Technology (BACT) for NOx emissions and 100 percent of a truck fleet installed BACT for PM10 emissions. This regulation also provides a few exemptions including a onetime per year 3-day pass for trucks registered outside of California. All on-road diesel trucks utilized during construction of the proposed project will be required to comply with Resolution 08-43.

Assembly Bill (AB) 1807 – Air Toxics Program: AB 1807 established California's Air Toxics Program in 1983. The Air Toxics Program is a two-phased program for the identification and control of air toxics. During the first phase (identification), the CARB and the Office of Environmental Health Hazard Assessment (OEHHA) prepare draft reports on exposure assessment and health assessment. The draft reports are distributed for public review and comment. Comments can be made in writing or at public workshops. The report is then submitted to the independent scientific review panel (SRP), which reviews the reports for scientific accuracy and submits its findings to the CARB. The SRP is a nine-member group of professionals with backgrounds in disciplines such as medicine, atmospheric science, statistics, and toxicology. The SRP members are appointed by the Governor or the State legislature. At a public hearing, the Board decides whether to list the substance as a TAC. Once the CARB identifies a substance as a TAC, it begins the second phase (control) of California's TAC program. In this phase, an assessment is conducted to determine the need for, and degree of, further controls. As in the identification phase, public outreach is an essential element in the development of a control plan and any control measures. The CARB works with districts and holds numerous public workshops and individual meetings with stakeholders in an open public process. If appropriate, each air toxic control measure is then adopted by the CARB at a public hearing.

AB 2588 – Air Toxics "Hot Spots" Information and Assessment Act: AB 2588, enacted in 1987, is designed to provide information to State and local agencies and to the general public on the extent of airborne emissions from stationary sources and the potential public health impact of those emissions. The "Hot Spots" Act requires that OEHHA develop risk assessment guidelines for the "Hot Spots" Program (Health and Safety Code Section 44360[b][2]). In addition, the "Hot Spots" Act specifically requires

OEHHA to develop a “likelihood of risks” approach to health risk assessment. The “Hot Spots” Act requires stationary sources of TACs to prepare facility-wide health risk assessments in accordance with OEHHA guidelines, and to notify the public in the event of a potential health risk. The “Hot Spots” Act also establishes criteria for requiring implementation of risk reduction measures for high- risk facilities.

Heavy Duty Diesel Truck Idling Regulation: This CARB rule became effective February 1, 2005 and prohibits heavy-duty diesel trucks from idling for longer than five minutes at a time, unless they are queuing, provided the queue is located beyond 100 feet from any homes or schools.

CARB Drayage Truck Regulation: This CARB rule became effective December 3, 2009. The regulation requires trucks to meet engine emission requirements by a certain date. Under Phase 1, by December 31, 2012, all trucks must reduce PM emissions by 85 percent and must meet 2007 engine emission standards. The Drayage Truck Regulation also requires trucks to be registered in the Drayage Truck Registry.

California Diesel Fuel Regulations: In 2004, the CARB set limits on the sulfur content of diesel fuel sold in California for use in on-road and off-road motor vehicles (CARB, 2004). Under this rule, diesel fuel used in motor vehicles except harbor craft and intrastate locomotives has been limited to 500 ppm sulfur since 1993. The sulfur limit was reduced to 15 ppm beginning on September 1, 2006. Diesel fuel used in harbor craft in the Air Basin also was limited to 500 ppm sulfur starting January 1, 2006 and was lowered to 15 ppm sulfur on September 1, 2006.

Statewide Portable Equipment Registration Program (PERP): The PERP establishes a uniform program to regulate portable engines and portable engine-driven equipment units. Once registered in the PERP, engines and equipment units may operate throughout California without the need to obtain individual permits from local air districts, as long as the equipment is located at a single location for no more than 12 months.

Heavy-Duty Diesel Truck Idling Regulation: This CARB rule affected heavy-duty diesel trucks in California beginning in 2008. The rule requires that heavy-duty trucks be equipped with a non-programmable engine system that shuts down the engine after 5 minutes to prevent long idling times or, as an alternative, meet a stringent NOx idling emission standard.

Greenhouse Gas Emissions: CARB proposed interim statewide CEQA thresholds for GHG emissions and released “Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act” on October 24, 2008, utilized by the SCAQMD’s GHG Significance Threshold Stakeholder Working Group in their framework for developing SCAQMD’s draft GHG emissions thresholds. The State currently has no regulations that establish ambient air quality standards for GHGs. However, the State has passed laws to reduce California’s GHG emissions 40 percent below 1990 levels by 2030, and has passed laws directing CARB to develop actions to reduce GHG emissions, including Assembly Bill 1493. The ultimate climate goal is to reduce GHG emissions up to 80 percent below 1990 levels by 2050, a reduction target based on scientifically established levels needed in the U.S. limit global warming below 2 degrees Celsius.

Assembly Bill 1493: California Assembly Bill 1493 was enacted on July 22, 2002 and required CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. AB1493 requires the development and adoption of regulations to achieve ‘the maximum feasible reduction of greenhouse gases’ emitted by noncommercial passenger vehicles, light-duty trucks, and other vehicles used primarily for personal transportation. It also requires CARB to design and implement emission limits, regulations, and other measures to reduce GHG emissions to 1990 levels by 2020.

Local Regulations and Agreements: The SCAQMD is primarily responsible for planning, implementing, and enforcing federal and State ambient standards within this portion of the Air Basin. As part of its planning responsibilities SCAQMD prepares Air Quality Management Plans and Attainment Plans as necessary based on the attainment status of the air basins within its jurisdiction. The SCAQMD is also responsible for permitting and controlling stationary source criteria and air toxic pollutants as delegated by the USEPA. Through the attainment planning process, the SCAQMD develops the SCAQMD Rules and Regulations to regulate sources of air pollution in the Air Basin. Applicable SCAQMD rules to the project are listed below.

SCAQMD Rule 401 – Visible Emissions: This rule prohibits discharge of air contaminants or other material, which are as dark or darker in shade as that designated No. 1 on the Ringelmann Chart or obscure an observer's view.

SCAQMD Rule 402 – Nuisance: This rule prohibits discharge of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public; or that endanger the comfort, repose, health, or safety of any such persons or the public; or that cause, or have a natural tendency to cause, injury or damage to business or property. Compliance with Rule 402 will reduce local air quality and odor impacts to nearby sensitive receptors.

SCAQMD Rule 403 – Fugitive Dust: The purpose of this rule is to control the amount of PM entrained in the atmosphere from man-made sources of fugitive dust. Under Rule 403, no person shall conduct active operations without utilizing the applicable best available control measures to minimize fugitive dust emissions. Construction and operation fugitive dust emission sources are subject to this rule, which covers all fugitive dust emissions sources, such as unpaved and paved roads, storage piles, and earthmoving operations. Additional requirements apply to operations on a property with 50 or more acres of disturbed surface area, or for any earth-moving operation with a daily earth-moving or throughput volume of 5,000 CY or more three times during the most recent 365-day period. These requirements include submittal of a dust control plan, maintaining dust control records, and designating a SCAQMD-certified dust control supervisor. Compliance with this rule is achieved through application of standard Best Available Control Measures, and would reduce local air quality impacts to nearby sensitive receptors.

SCAQMD Rule 1113 – Architectural Coatings: This rule requires manufacturers, distributors, and end-users of architectural and industrial maintenance coatings to reduce VOC emissions from the use of these coatings, primarily by placing limits on the VOC content of various coating categories.

SCAQMD Regulation XI – Source Specific Standards: This regulation is composed of several dozen individual rules, most of which are not applicable to the project.

SCAQMD Regulation XIII – New Source Review: This regulation requires the permitting of new stationary sources and requires the use of BACT to control criteria pollutant emissions and requires offsetting emissions, other than CO, if they are over four tons per year.

5.5.2 Impact Significance Criteria

The following discussion identifies the air quality significance thresholds used to determine whether alternative impacts would be significant under NEPA and/or CEQA.

5.5.2.1 NEPA Threshold

The following impact significance criterion was used to evaluate air quality impacts associated with the project alternatives under NEPA. For purposes of this analysis, the air quality impacts of the Action Alternatives would be considered significant under NEPA if:

IMPACT AIR-1: Project-related emissions exceed General Conformity *de minimis* levels as established in 40 C.F.R. 93.153(b).

5.5.2.2 CEQA Thresholds

The following impact significance criteria are derived from Appendix G of the CEQA Guidelines, and are the same criteria utilized by SCAQMD and are consistent with County and City General Plans included in the study area. The following significance criteria were used to evaluate air quality impacts associated with the project alternatives under CEQA. For purposes of this analysis, the air quality impacts of the Action Alternatives would be considered significant under CEQA if project-related emissions:

IMPACT AIR-2: Conflict with or obstructs implementation of the applicable air quality plan.

IMPACT AIR-3: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable national or state ambient air quality standard.

IMPACT AIR-4: Expose sensitive receptors to substantial pollutant concentrations.

IMPACT AIR-5: Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

5.5.3 Significance Criteria Evaluation Methods

IMPACT AIR-1 was assessed by comparing the General Conformity *de minimis* thresholds for the air basin (Table 38) against the total direct and indirect emissions for each alternative. The USEPA established the General Conformity Rule on November 30, 1993. The rule implements the CAA conformity provision, which mandates that the Federal government not engage, support, or provide financial assistance for licensing or permitting, or approve any activity not conforming to an approved CAA implementation plan. The purpose of the General Conformity Rule was to ensure that Federal activities do not hamper local efforts to control air pollution. The total quantified emissions of nonattainment or maintenance pollutants from both direct and indirect sources is compared to rates listed in Title 40, Part 51, Section 51.853(b), considered the *de minimis* levels, where, if they are determined to exceed those levels, the Federal agency is required to conduct a Conformity Determination.

The *de minimis* levels applicable to this project are based on the NAAQS nonattainment/maintenance status for Orange County, Los Angeles-South Coast Air Basin, California. Table 38 presents the criteria pollutant attainment designations/classifications and de minimis thresholds used in this analysis (see Appendix I – General Conformity Analysis for additional information).

Table 38: General Conformity De Minimis Levels

Criteria Pollutant	Nonattainment/Maintenance Status	*De Minimis* Levels (Tons/Year)
Ozone (VOC's or NOx)	Nonattainment (Extreme)	10
CO	Attainment-Maintenance (Serious)	100
NO_2	Attainment-Maintenance (Primary)	100
PM_{10}	Attainment-Maintenance (Serious)	100
$PM_{2.5}$	Nonattainment (Serious)	70

IMPACT AIR-2 was assessed using the SCAQMD regional pollutant criteria pollutant emission thresholds (Table 39). These thresholds are based on the volume of pollution emitted rather than on actual ambient air quality because the direct air quality impact of a project is not quantifiable on a regional scale. The SCAQMD CEQA Handbook states that any project in the Air Basin with daily emissions that exceed any of the identified significance thresholds should be considered as having an individually and cumulatively significant air quality impact. For the purposes of this air quality impact analysis, a regional air quality impact would be considered significant if emissions exceed the SCAQMD significance thresholds identified in Table 39.

Table 39: SCAQMD Regional Criteria Pollutant Emission Thresholds of Significance

	Pollutant Emissions (lbs/day)						
	VOC	**NOx**	**CO**	**SOx**	**PM_{10}**	**$PM_{2.5}$**	**Lead**
Construction	75	100	550	150	150	55	3
Operation	55	55	550	150	150	55	3

Source: SCAQMD CEQA Handbook

IMPACT AIR-3 was also assessed by comparing the worst case daily emissions for each alternative to the SCAQMD daily emissions thresholds (Table 39). SCAQMD emissions thresholds are developed in consideration of both existing air quality conditions in the region, as well as future attainment of air quality standards. Therefore, if emissions are below the SCAQMD thresholds, emissions are not expected to increase the frequency or severity of existing or projected air quality violations, or delay timely attainment of air quality standards.

IMPACT AIR-4 was assessed using SCAQMD developed Localized Significant Thresholds (LSTs). LSTs are guides for determining localized air quality impacts from select criteria pollutants to nearby sensitive receptors from a project. SCAQMD Final Localized Significance Threshold Methodology (SCAQMD, 2008) found that the primary emissions of concern are NO_2, CO, PM_{10}, and $PM_{2.5}$. Mass rate look-up tables of maximum construction or operations emissions that will not contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard were developed for source areas up to 5 acres and receptor distances of 25 to 500 meters from project site. For this air quality analysis, data from the mass rate tables (Table 40) is used as a screening tool to determine if local air quality impacts could be considered significant prior to performing project specific air quality modeling.

Table 40: SCAQMD Localized Significant Thresholds (LSTs) for 5 acre site and 25 m receptor distance in applicable project source receptor areas.

Pollutant	North Orange County	Central Orange County
	lbs/day	lbs/day
NO_2	197	183
CO	1711	1253
PM_{10}	14	13
$PM_{2.5}$	9	7

IMPACT AIR-5 was evaluated by assessing whether the proposed project creates an odor nuisance pursuant to SCAMD Rule 402, including discharging quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

5.5.4 Mitigation Measures

Implementation of the mitigation measures provided below would reduce to the extent feasible, the air quality impacts associated with all alternatives (except for the No Action Alternative). With a multi-year construction schedule, these measures would mitigate short-term construction engine exhaust and fugitive dust emissions from the NED Plan and LPP.

EC-AIR-1: The project applicant shall require that all off-road diesel-powered equipment greater than 50 horsepower and utilized during implementation of Action Alternatives shall be registered with CARB and labelled detailing that the equipment meets Tier 4 Final emissions standards.

EC-AIR-2: The project applicant shall require that all haul trucks utilized during implementation of Action Alternatives shall be licensed in California and shall meet the model year 2010 (Tier 4 Final) or newer emissions standards.

EC-AIR-3: The following techniques shall be required to reduce PM10 and PM2.5 emissions:

- 1) Water active construction sites to reduce fugitive dust, including locations where grading is to occur
- 2) All trucks hauling dirt, sand, soil, or other loose materials are to be covered or should maintain at least two feet of freeboard, according to the requirements of California Vehicle Code (CVC) 7 Section 23114
- 3) During construction, the off-road equipment, vehicles, and trucks shall not idle more than five minutes in any one hour
- 4) The off-road construction equipment drivers shall have proper training in operating the equipment efficiently, taking into account ways to reduce the hours of equipment operation and/or operating the equipment at a lower load factor
- 5) Pave construction access roads at least 100 feet onto the site from main road
- 6) Reduce construction traffic speeds to 15 mph or less on unpaved surfaces
- 7) Sweep streets once a day if visible soil materials are carried to adjacent streets

5.5.5 Impact Methodology and Assumptions

This section provides an overview of the impact methodology and assumptions, and discusses use of California Emissions Estimator Model (CalEEMod) for air quality analysis (information can also be found in Appendix I - General Conformity Analysis).

CalEEMod Model: The California Emissions Estimator Model (CalEEMod Version 2016.3.2) is a modeling software supported by the South Coast Air Quality Management District (SCAQMD) that calculates potential emissions from construction and operation of land use projects (CAPCOA, 2017). It calculates the daily maximum and annual average for criteria pollutants as well as annual greenhouse gas (GHG) emissions, and combines user-defined data with default data when site-specific information is not available. It can also incorporate adjustments for mitigation. This model uses widely accepted methodologies for estimating emissions and quantifying air quality and climate change impacts as part of CEQA Environmental Impact Report preparation. In this analysis, CalEEMod Version 2016.3.2 is used to estimate average annual emissions of criteria pollutants and compared to *de minimis* levels to assess whether a conformity determination is required. It is also used to estimate daily maximum emissions of criteria pollutants for comparison with SCAQMD regional thresholds.

Model inputs include project size and location, construction schedule and phasing, equipment types and activity hours, vehicle trips, and material quantities. This information is derived from project-specific data for the Action Alternatives, including Orange County Public Works (OCPW) LPP and NED Plan project schedules (OCPW, 2019), and Westminster – East Garden Grove LPP equipment log (USACE, 2018). Site-specific information is used to the maximum extent possible to obtain realistic, representative screening estimates.

Modeling approach. The model was run for five distinct projects within the Locally Preferred Plan (LPP) that have unique features, schedules, and equipment needs: Warner Avenue channel widening and bridge expansion, tide gate removal and replacement, Reach 1 (C05) sheet pile and soil/cement mixing column installation, Reach 23 (C02) sheet pile and anchor column installation, and Reach 21 (C04) channel modification and diversion structure installation. Downstream reaches Reach 1 and Reach 23 and receiving water features Warner Avenue Bridge and tide gates will be constructed concurrently during the first years of the project to manage the efficiency and capacity increases upstream. Upstream reaches (Reaches 2-22) characterized by channel shaping, lining, and crossing activities will be constructed in series along Channels C04, C05, and C06 following downstream activities, according to the project schedules (OCPW, 2019). Reach 21 includes creation of a new diversion channel in the LPP, making it the most construction-intensive upstream reach by linear foot. Rather than model all individual upstream reaches, Reach 21 was chosen to represent the upstream since it is unlikely to underestimate emissions for other upstream projects in the LPP. The NED Plan includes the same Warner Avenue Bridge, tide gate, and Reach 1 projects, however Reach 23 and upstream reaches with significantly less modification in the NED are scaled down by construction cost resulting in fewer emissions.

Project location. The project resides in western Orange County, CA. All construction related emissions, including haul trips and worker trips are assumed to occur in Orange County. CalEEMod was run using location-specific meteorological data for climate zone 8.

Project area. Acreage information used to model individual projects is obtained from site-specific channel reach data and aerial imagery computations (Table 41). City Park land use is used to represent channels, waterways, and embankments; Other Asphalt Surfaces land use is chosen to represent maintenance roads (assumes one 15 foot maintenance road along upstream channels and two along downstream channels), tide gate crossing, and Warner Avenue Bridge extension.

Table 41: Westminster FRM Project Areas (acres).

Project Name	Total Area	City Park*	Other Asphalt Area*
Warner Avenue	1.15	0.92	0.23
Tide Gate	0.23	0.09	0.14
Reach 1	40.78	34.23	6.55
Reach 23	46.80	40.67	6.13
Reach 21	11.77	8.25	3.52

*CalEEMod Land Use input

Construction schedule. Start of construction is May 20, 2022 according to the project schedules developed by OCPW (OCPW, 2019). Downstream improvements at Warner Avenue Bridge, tide gates, and Reaches 1 and 23 are expected to occur the first two years, while improvements on upstream reaches are expected to occur between the second year (2023) and final year (2034 for the LPP) of construction (Table 42). The schedule includes no contingency (weather and tidal influences, material delivery lead time, presence of T&E species, funding availability, etc.) and therefore is likely to underestimate rather than overestimate actual construction periods. This provides assurance that calculated emissions rates are conservative and that actual emissions are likely to occur later and over a longer time period.

Table 42: Westminster LPP Construction Schedule.

Project Name	Start date	End date	Duration (calendar days)
Warner Avenue	5/20/2022	8/3/2023	440
Tide Gate	5/20/2022	12/22/2022	216
Reach 1	5/20/2022	8/3/2023	440
Reach 23	5/20/2022	12/22/2022	216
Upstream reaches on channel C04 (Reaches 20-22)	02/17/2023	1/13/2033	3618
Upstream reaches on channel C05 (Reaches 2-12)	9/29/2023	3/2/2034	3807
Upstream reaches on channel C06 (Reaches 13-19)	10/4/2024	10/26/2028	1483

Construction phases. The equipment log (USACE, 2018) breaks individual projects down into specific construction activities. Phase descriptions, numbers, and activities vary by project, but generally involve dust control, clearing/site preparation, demolition, excavation/grading, utility relocation, and building/construction. Construction phases for the modeled projects are shown in Table 43 through Table 47. Phases are dated to overlap where possible to meet the rigorous construction schedule and allow for a start in one area (e.g., the downstream end of a reach) while finishing another (e.g., the upstream end of a reach).

Table 43: Construction Phases for Warner Avenue Bridge Expansion.

Phase Name	Phase Type	Start	End	Work Days*
Demo existing bridge	Demolition	5/20/2022	2/19/2023	196
Relocate utilities throughout	Trenching	5/20/2022	8/3/2023	315
Traffic Control	Building Construction	5/20/2022	8/3/2023	315
Harbor wall armoring	Building Construction	5/20/2022	12/19/2022	152
Channel excavation and haul	Grading	6/20/2022	4/19/2023	218
New bridge structure	Building Construction	8/20/2022	8/3/2023	249
Road and parking raise	Paving	11/1/2022	8/3/2023	198

*Assume 5 working days a week.

Table 44: Construction Phases for Tide Gate Removal and Replacement.

Phase Name	Phase Type	Start	End	Work Days*
Relocate utilities	Trenching	5/20/2022	12/19/2022	152
Erosion Control and Turbidity Curtain	Trenching	5/20/2022	6/3/2022	11
Dewatering	Building Construction	6/4/2022	7/9/2022	25
Demolition and removal	Demolition	7/10/2022	9/1/2022	39
Earthwork and regrading	Grading	9/2/2022	9/17/2022	11
Bridge and roadway work	Building Construction	9/18/2022	12/19/2022	66

*Assume 5 working days a week.

Table 45: Construction Phases for Reach 1.

Phase Name	Phase Type	Start	End	Work Days*
Clear site and remove obstructions	Site Preparation	5/20/2022	12/3/2022	141
Dust control	Grading	5/20/2022	8/3/2023	315
Relocate utilities	Trenching	5/20/2022	8/3/2023	315
Road crossings	Building Construction	5/20/2022	8/3/2023	315
Dewatering	Building Construction	5/20/2022	8/3/2023	315
Concrete removal	Demolition	5/27/2022	12/30/2022	156
Sheet pile removal	Demolition	5/27/2022	12/30/2022	156
Sheet pile and soil cement mixing columns	Building Construction	6/1/2022	7/3/2023	284
Excavation	Grading	6/27/2022	7/19/2023	278
Temporary shoring	Building Construction	6/27/2022	7/19/2023	278
Aggregate base layer	Grading	7/15/2022	1/3/2023	123
Subsurface drain	Trenching	7/15/2022	12/3/2022	101
Concrete volume	Building Construction	7/20/2022	6/3/2023	228
Compacted fill	Grading	4/10/2023	8/3/2023	84

*Assume 5 working days a week.

Table 46: Construction Phases for Reach 23.

Phase Name	Phase Type	Start	End	Work Days*
Clear site and remove obstructions	Site Preparation	5/20/2022	9/1/2022	75
Dust Control	Grading	5/20/2022	12/22/2022	155
Dewatering	Building Construction	5/20/2022	12/22/2022	155
North levee slope protection	Grading	5/27/2022	12/22/2022	150
Sheet Pile & Anchor Column System	Building Construction	5/27/2022	12/22/2022	150
Excavation	Grading	6/1/2022	12/22/2022	147

*Assume 5 working days a week.

Table 47: Construction Phases for Reach 21 (LPP).

Phase Name	Phase Type	Start *	End*	Work Days**
Dust control	Grading	2/17/2023	1/16/2025	500
Dewatering	Building Construction	2/17/2023	1/16/2025	500
Clear site and remove obstructions	Site Preparation	2/24/2023	6/12/2023	77
Concrete removal	Demolition	3/4/2023	2/16/2024	250
Gravel base removal	Grading	3/4/2023	2/16/2024	250
Excavation	Grading	3/20/2023	5/17/2024	305
Temporary shoring	Building Construction	3/20/2023	12/17/2024	457
Aggregate base layer	Grading	4/3/2023	8/2/2023	88
Concrete volume	Building Construction	4/17/2023	1/16/2025	459
Compacted fill	Grading	12/18/2023	1/16/2025	284
Paving	Paving	2/17/2024	1/16/2025	239

*Reach 21 dates are shifted up to earliest possible upstream start date for conservatism (all other inputs based on original data). **Assume 5 working days a week.

Off-road equipment. The equipment log provides a list of equipment and activity hours for the phases of each project. Horsepower for specific pieces of equipment were identified using EP 1110-1-8 Volume 7 (USACE, 2016) and default CalEEMod engine load factors were used. Truck hauling of excavation spoils and demolition debris was included in the equipment log, therefore haul-off highway trucks were approximated by off-road trucks. The number of pieces of equipment and hours per day of activity were calculated assuming operation every work day of a phase, up to 8 hours of operation a day, and rounding up to the nearest full hour. The number of pieces of equipment calculated for each project are provided in Table 48 (horsepower, number of days, and number of hours each piece of equipment operates can be seen in the CalEEMod output or calculation spreadsheets provided upon request).

Table 48: Equipment Numbers for each Project.

Equipment Type	Warner Avenue	Tide Gate	Reach 1	Reach 23	Reach 21
Air Compressors	1	1	6	0	1
Bore/Drill Rigs	0	9	1	0	0
Cement and Mortar Mixers	0	0	3	0	0
Concrete/Industrial Saws	2	0	1	0	0
Cranes	10	9	18	4	2
Crawler Tractors	1	5	8	2	6
Crushing/Proc. Equipment	0	0	0	2	0
Excavators	5	4	7	2	4
Generator Sets	1	0	4	4	1
Graders	1	3	2	1	1
Off-Highway Trucks	31	11	28	14	23
Other Construction Equipment	6	5	10	5	3
Pavers	1	1	1	0	1
Plate Compactors	1	1	1	0	0
Pumps	2	4	11	0	2
Rollers	4	5	6	0	4
Rubber Tired Dozers	0	0	0	0	0
Rubber Tired Loaders	1	1	0	0	0
Tractors/Loaders/Backhoes	5	4	11	6	9
Welders	1	1	1	0	0

Acres graded, material movement, demolition amount, haul trips, and worker trips.

All projects involve site grading. Total acreage of the project sites were assumed graded (from one to three passes) during excavation, earthwork, slope protection, and compacted fill construction phases.

All projects include removal of excess soil during excavation phase. Excavation spoil volumes are based on project-specific quantities being removed for disposal.

All projects (except Reach 23) included removal of concrete during demolition phase. Amounts of demolition debris are calculated from project-specific quantities of concrete removed for disposal.

All projects require import of construction materials such as concrete, steel, sheet pile, binder, temporary shoring, asphalt, and aggregate. These trips are included as separate off-site haul trips (they were not included in the equipment log or accounted for as off-road equipment) based on project-specific quantities of materials required for construction. The number of haul trips was calculated assuming 20 tons of material per trip (except concrete trucks assumed to transport eight cubic yards per trip).

Numbers of workers were estimated based on historic OCPW data for similar projects. No vendor trips were added, since they were included as haul trips instead. Additional trip data (lengths, speeds, fleet mix, etc.) were left as default.

Mitigation. In addition to calculating unmitigated construction emissions, emissions were estimated after applying mitigation measures for off-road equipment and fugitive dust. Model runs for mitigated construction considers all pieces of off-road construction equipment as 'Tier 4 Final' engines that meet more stringent USEPA emission standards than the statewide fleet mix, providing reductions in NOx, VOC, SO2 and PM emissions. The construction site was also assumed to be frequently (3 times a day) exposed to water to minimize the release of fugitive dust.

5.5.6 Air Quality Impacts

Air Quality Impacts under NEPA

5.5.6.1 IMPACT AIR-1: Project-related emissions exceed General Conformity *de minimis* levels as established in 40 C.F.R. 93.153(b)

ALTERNATIVE: NO ACTION

Under the No Action Alternative no project would be implemented. There would be no construction or operation air emissions that could have the potential to exceed the Federal General Conformity Rule.

ALTERNATIVE: NED PLAN

Direct Impacts

Construction activities create fugitive dust from grading, construction, and driving, and produce emissions from off-road construction equipment, on-road truck hauling and worker vehicle trips, and asphalt paving. These activities impact air quality in the short term and vary with each alternative.

Both of the Action Alternatives modify "downstream" projects Warner Avenue Bridge expansion and channel excavation, tide gate removal and replacement, and Reach 1 sheet pile and soil cement column installation to the same maximum extent. The only downstream project that varies between action alternatives is Reach 23. In the NED Plan it includes a single sheet pile wall at the south levee with no excavation, while in the LPP (Maximum Channel Modifications alternative) it includes a single sheet pile wall and anchor column system at the south levee and widening the channel bottom to the south. The minimum modifications on Reach 23 would amount to 57% of the maximum modifications construction cost, therefore emissions can be expected to drop significantly as well.

The "upstream" portions of the project (Reaches 2-22 in C04, C05, and C06) vary much more between action alternatives. Six reaches modified in the LPP are proposed to remain in their existing condition for the NED Plan. Of the modified reaches, the NED Plan involves lining reaches with no significant demolition, re-shaping, splash wall installation, or diversion on Reach 21, and with significantly less haul-off material. On the other hand, the LPP involves reconfiguring trapezoidal channels to rectangular cross section and lining in concrete to increase both conveyance and capacity, and adding floodwalls if additional elevation is needed. This alternative also includes the Westminster Mall diversion, a 1.5 mile bypass channel for parts of Reach 21 in and the only new section of channel proposed. When upstream

reaches are considered together, the NED Plan construction cost is only 27% of the LPP cost, resulting in substantially less emissions.

The construction period for all downstream reaches is the same between the NED Plan and LPP, however the construction periods for upstream reaches on channels C04, C05, and C06 are shorter in the NED Plan (Table 49).

Table 49: Westminster NED Plan Construction Schedule.

Project Name	Start date	End date	Duration (calendar days)
Warner Avenue	5/20/2022	8/3/2023	440
Tide Gate	5/20/2022	12/22/2022	216
Reach 1	5/20/2022	8/3/2023	440
Reach 23	5/20/2022	12/22/2022	216
Upstream reaches on channel C04	02/17/2023	11/22/2029	2470
Upstream reaches on channel C05	9/29/2023	7/31/2031	2862
Upstream reaches on channel C06	9/29/2023	1/21/2027	1210

With unmitigated construction, maximum NED Plan emissions would occur during the first year, contributed primarily by Reach 1 and Warner Avenue Bridge (Table 50). In 2022 and 2023, NOx emissions exceed *de minimis* thresholds (Table 51), but no other *de minimis* exceedance are observed.

Table 50: Estimated Emissions with Unmitigated Construction for Individual NED Plan Projects.

Year	ROG	NOx	CO	SO2	PM10	PM2.5
	Tons/yr	Tons/yr	Tons/yr	Tons/yr	Tons/yr	Tons/yr
Warner Ave Bridge						
2022	0.4118	3.4704	2.8580	9.79e-003	0.2069	0.1365
2023	0.4187	3.2053	2.9444	0.0105	0.1582	0.1206
Tide Gate						
2022	0.1353	1.2116	1.0777	3.14e-003	0.1820	0.0798
Reach 1						
2022	1.3132	12.0025	10.0878	0.0316	3.1770	1.7950
2023	0.9502	7.8670	7.2441	0.0243	1.2348	0.7458
Reach 23						
2022	0.3034	2.5073	2.3618	0.0065	1.0788	0.6194
Reach 21						
2023	0.1774	1.3572	1.2156	0.0048	0.2094	0.1108
2024	0.2286	1.6952	1.6792	0.0060	0.1332	0.0900
2025	0.0072	0.0500	0.0573	0.0002	0.0078	0.0035
***De Minimis* Emission Levels**	10	10	100	100	100	70

Table 51: Estimated Emissions with Unmitigated Construction for the NED Plan.

Year	ROG	NOx	CO	SO2	PM10	PM2.5
	Tons/yr	Tons/yr	Tons/yr	Tons/yr	Tons/yr	Tons/yr
2022	2.16	19.19	16.39	0.06	4.65	2.63
2023	1.67	13.42	12.52	0.04	1.58	0.99
2024	0.67	8.48	8.40	0.03	0.67	0.45
2025	0.67	8.48	8.40	0.03	0.67	0.45
2026	0.67	8.48	8.40	0.03	0.67	0.45
2027	0.47	3.49	3.46	0.01	0.27	0.19
2028	0.46	3.39	3.36	0.01	0.27	0.18
2029	0.43	3.21	3.18	0.01	0.25	0.17
2030	0.23	1.70	1.68	0.01	0.13	0.09
2031	0.13	0.98	0.98	0.00	0.08	0.09
Maximum Emissions	**2.16**	**19.19**	**16.39**	**0.06**	**4.65**	**2.63**
De Minimis Emission Levels	10	10	100	100	100	70

With mitigation including Tier 4 engines and frequent watering of the construction sites, most emissions drop significantly except for CO (Table 52). NOx emissions fall below the *de minimis* level of 10 tons/year for all years, with a maximum of 4.13 tons/yr emitted 2022 (Table 53). With mitigation in place, all emissions are considered *de minimis* and no general conformity determination is needed for the NED Plan.

Table 52: Estimated Emissions with Mitigated Construction for Individual NED Plan Projects.

Year	ROG	NOx	CO	SO2	PM10	PM2.5
	Tons/yr	Tons/yr	Tons/yr	Tons/yr	Tons/yr	Tons/yr
Warner Ave Bridge						
2022	0.1240	0.6912	4.3977	9.79e-003	0.0610	0.0254
2023	0.1314	0.7270	4.7018	0.0105	0.0447	0.0234
Tide Gate						
2022	0.0390	0.2326	1.5208	3.14e-003	0.0599	0.0189
Reach 1						
2022	0.3758	2.7535	14.0647	0.0316	1.1687	0.5937
2023	0.2845	1.7683	10.8239	0.0243	0.4524	0.2285
Reach 23						
2022	0.0754	0.456976	2.940912	0.005928	0.361868	0.196716
Reach 21						
2023	0.070257	0.364023	2.542617	0.005874	0.095007	0.042339
2024	0.091839	0.506781	3.334353	0.007326	0.052239	0.027819
2025	0.0031581	0.018447	0.113718	0.0002508	0.005676	0.0018513
***De Minimis* Emission Levels**	10	10	100	100	100	70

Table 53: Estimated Emissions with Mitigated Construction for the NED Plan.

Year	ROG	NOx	CO	SO2	PM10	PM2.5
	Tons/yr	Tons/yr	Tons/yr	Tons/yr	Tons/yr	Tons/yr
2022	0.614	4.134	22.924	0.050	1.651	0.835
2023	0.486	2.859	18.068	0.041	0.592	0.294
2024	0.162	0.871	5.877	0.013	0.147	0.070
2025	0.276	1.520	10.003	0.022	0.157	0.083
2026	0.276	1.520	10.003	0.022	0.157	0.083
2027	0.276	1.520	10.003	0.022	0.157	0.083
2028	0.159	0.852	5.763	0.013	0.142	0.068
2029	0.095	0.525	3.448	0.008	0.058	0.030
2030	0.095	0.525	3.448	0.008	0.058	0.030
2031	0.095	0.525	3.448	0.008	0.058	0.030
2032	0.095	0.525	3.448	0.008	0.058	0.030
2033	0.070	0.364	2.543	0.006	0.095	0.042
2034	0.003	0.018	0.114	0.000	0.006	0.002
Maximum Emissions	**0.61**	**4.13**	**22.92**	**0.05**	**1.65**	**0.84**
De Minimis Emission Levels	10	10	100	100	100	70
Conformity Determination Required?	No	No	No	No	No	No

The NED Plan is expected to have the least overall impact on air quality of the Action Alternatives, however it would exceed General Conformity NOx *de minimis* levels for two years without mitigation. Implementation of mitigation measures reduces air quality impacts to a less than significant (below *de minimis*) level.

Indirect Impacts

The Action Alternatives are not expected to change indirect rates or amounts of pollutants being emitted to the atmosphere. The proposed alternatives improve existing flood control features and are consistent with current land-use patterns and future growth used in formulating the AQMP. The projects may positively impact air quality over time by reducing traffic delays and congestion related to inundation of major roads.

Long-Term Operation and Maintenance Impacts

The Action Alternatives are not expected to change rates or amounts of pollutants being directly emitted to the atmosphere in the long term from O&M activities. No alternatives propose new facilities or features that have on-going energy needs or air emissions. Periodic inspections, vegetation and rodent control, sediment and debris removal, and repairs may continue as needed and result in minimal generation of emissions. Because operation and maintenance activities are designed to be minimal and similar to those of the existing project, no additional emissions are generated or evaluated for impacts to air quality. Less than significant impacts are anticipated from additional O&M activities.

Level of Impact for the NED Plan

With mitigation measures, a General Conformity Determination is not required for the NED Plan and the NED Plan would result in a less than significant air quality impact.

ALTERNATIVE: LPP

Direct Impacts

Table 54 presents annual criteria pollutant emissions calculated in CalEEMod for each LPP project assuming no mitigation. In general, Reach 1 produces the highest emission rates, followed by Reach 21 and Reach 23. Reach 1 emits 12 tons NOx in 2022, exceeding the *de minimis* threshold of 10 tons/year.

Table 54: CalEEMod Estimated Emissions with Unmitigated Construction for LPP Projects.

Year	ROG	NOx	CO	SO2	PM10	PM2.5
	Tons/yr	Tons/yr	Tons/yr	Tons/yr	Tons/yr	Tons/yr
Warner Ave Bridge						
2022	0.4118	3.4704	2.8580	9.79e-003	0.2069	0.1365
2023	0.4187	3.2053	2.9444	0.0105	0.1582	0.1206
Tide Gate						
2022	0.1353	1.2116	1.0777	3.14e-003	0.1820	0.0798
Reach 1						
2022	1.3132	12.0025	10.0878	0.0316	3.1770	1.7950
2023	0.9502	7.8670	7.2441	0.0243	1.2348	0.7458
Reach 23						
2022	0.5323	4.3988	4.1435	0.0114	1.8926	1.0866
Reach 21						
2023	0.6569	5.0268	4.5021	0.0178	0.7755	0.4103
2024	0.8467	6.2784	6.2194	0.0222	0.4933	0.3332
2025	0.0265	0.1850	0.2123	7.60e-004	0.0290	0.0131
***De Minimis* Emission Levels**	10	10	100	100	100	70

Table 55 presents emissions estimates for the LPP compared with *de minimis* levels. Note that upstream reach construction emissions are estimated by applying Reach 21 emission rates to the full upstream construction periods of each Channel (2/17/2023-1/13/2033 for C04, 9/29/2023-3/2/2034 for C05, and 10/4/2024-10/26/2028 for C06). Maximum emissions of NOx (21 tons) occur the first year of construction, about twice the *de minimis* level of 10 tons/year. NOx levels exceed the *de minimis* threshold all years except the last two. VOC, CO, SO_2, PM_{10} and $PM_{2.5}$ emissions are well below their respective *de minimis* pollutant levels.

Table 55: CalEEMod Estimated Emissions with Unmitigated Construction for the LPP.

Year	ROG	NOx	CO	SO2	PM10	PM2.5
	Tons/yr	Tons/yr	Tons/yr	Tons/yr	Tons/yr	Tons/yr
2022	2.39	21.08	18.17	0.06	5.46	3.10
2023	2.33	18.22	17.24	0.06	2.20	1.17
2024	1.90	14.21	14.01	0.05	1.61	0.61
2025	2.55	19.00	18.73	0.07	2.16	0.81
2026	2.55	19.00	18.73	0.07	2.16	0.81
2027	2.55	19.00	18.73	0.07	2.16	0.81
2028	2.39	17.87	17.62	0.06	2.03	0.77
2029	1.70	12.67	12.49	0.05	1.44	0.54
2030	1.70	12.67	12.49	0.05	1.44	0.54
2031	1.70	12.67	12.49	0.05	1.44	0.54
2032	1.70	12.67	12.49	0.05	1.44	0.54
2033	0.88	6.56	6.47	0.02	0.74	0.28
2034	0.14	1.06	1.04	0.00	0.12	0.05
Maximum Emissions	**2.55**	**21.08**	**18.73**	**0.07**	**5.46**	**3.10**
De Minimis Emission Levels	10	10	100	100	100	70

Emission estimates were also calculated assuming use of Tier 4 engines for off-road construction equipment and frequent watering of construction sites. Results (Table 56) show a significant reduction in NOx (77.7%), ROG (69.8%), PM_{10} (63.8%), and $PM_{2.5}$ (68.5%) emissions. CO emissions increase by about 50% with Tier 4 engine use.

Table 56: CalEEMod Estimated Emissions with Mitigated Construction for LPP Projects.

Year	ROG	NOx	CO	SO2	PM10	PM2.5
	Tons/yr	Tons/yr	Tons/yr	Tons/yr	Tons/yr	Tons/yr
Warner Ave Bridge						
2022	0.1240	0.6912	4.3977	9.79e-003	0.0610	0.0254
2023	0.1314	0.7270	4.7018	0.0105	0.0447	0.0234
Tide Gate						
2022	0.0390	0.2326	1.5208	3.14e-003	0.0599	0.0189
Reach 1						
2022	0.3758	2.7535	14.0647	0.0316	1.1687	0.5937
2023	0.2845	1.7683	10.8239	0.0243	0.4524	0.2285
Reach 23						
2022	0.1450	0.8788	5.6556	0.0114	0.6959	0.3783
Reach 21						
2023	0.2129	1.1031	7.7049	0.0178	0.2879	0.1283
2024	0.2783	1.5357	10.1041	0.0222	0.1583	0.0843
2025	9.57e-003	0.0559	0.3446	7.60e-004	0.0172	5.61e-003
***De Minimis* Emission Levels**	10	10	100	100	100	70

With mitigation, NOx emissions fall below 10 tons/year for all years, with a maximum of 5.12 tons/yr emitted from 2025 to 2027 (Table 57). The maximum CO emissions rate is still significantly less than the *de minimis* level of 100 tons/yr. With Tier 4 mitigation and frequent watering of construction sites, all emissions are considered *de minimis* and no general conformity determination is needed.

Table 57: CalEEMod Estimated Emissions with Mitigated Construction for the LPP.

Year	ROG	NOx	CO	SO2	PM10	PM2.5
	Tons/yr	Tons/yr	Tons/yr	Tons/yr	Tons/yr	Tons/yr
2022	0.684	4.556	25.639	0.056	1.986	1.016
2023	0.749	4.421	26.831	0.060	1.003	0.395
2024	0.661	3.828	22.474	0.050	0.733	0.216
2025	0.884	5.118	30.047	0.068	0.854	0.257
2026	0.884	5.118	30.047	0.068	0.854	0.257
2027	0.884	5.118	30.047	0.068	0.854	0.257
2028	0.832	4.814	28.264	0.063	0.826	0.247
2029	0.590	3.412	20.032	0.045	0.694	0.203
2030	0.590	3.412	20.032	0.045	0.694	0.203
2031	0.590	3.412	20.032	0.045	0.694	0.203
2032	0.590	3.412	20.032	0.045	0.694	0.203
2033	0.305	1.767	10.373	0.023	0.179	0.059
2034	0.049	0.285	1.674	0.004	0.027	0.009
Maximum Emissions	**0.88**	**5.12**	**30.05**	**0.07**	**1.99**	**1.02**
De Minimis Emission Levels	10	10	100	100	100	70
Conformity Determination Required?	No	No	No	No	No	No

Although Tier 4 standards are only applied to off-road construction equipment in the model, similar mitigation can be achieved for on-road haul trucks meeting EPA emission standards for heavy-duty highway engines and vehicles produced after January 1, 2010 (EPA, 2016). By using highway trucks built (or repowered with new engines) after 2010, additional reductions may be obtained.

The LPP is expected to have greater overall impact on air quality than other alternatives, and exceeds the General Conformity NOx *de minimis* levels eleven years without mitigation. However, implementation of mitigation measures reduces these air quality impacts to a less than significant (below *de minimis*) level, so no conformity determination would be required. See Appendix I General Conformity Analysis for additional details.

Mitigation measures are planned for the project regardless of implementation of the NED Plan or LPP. Therefore, remaining CEQA analyses will focus on mitigated CalEEMod emission results.

Indirect Impacts

The Action Alternatives are not expected to change indirect rates or amounts of pollutants being emitted to the atmosphere. The proposed alternatives improve existing flood control features and are consistent with current land-use patterns and future growth used in formulating the AQMP. The projects may positively impact air quality over time by reducing traffic delays and congestion related to inundation of major roads.

Long-Term Operation and Maintenance Impacts

The Action Alternatives are not expected to change rates or amounts of pollutants being directly emitted to the atmosphere in the long term from O&M activities. No alternatives propose new facilities or features that have on-going energy needs or air emissions. Periodic inspections, vegetation and rodent control, sediment and debris removal, and repairs may continue as needed and result in minimal generation of emissions. Because operation and maintenance activities are designed to be minimal and similar to those of the existing project, no additional emissions are generated or evaluated for impacts to air quality. Less than significant impacts are anticipated from additional O&M activities.

Level of Impact for the LPP

With mitigation measures, a General Conformity Determination is not required for the LPP and the LPP would result in a less than significant air quality impact.

Air Quality Impacts under CEQA

5.5.6.2 IMPACT AIR-2: Conflicts with or obstructs implementation of the applicable air quality plan.

ALTERNATIVE: NO ACTION

Under the No Action Alternative no project would be implemented. No conflicts with air quality plans would occur.

ALTERNATIVE: NED PLAN

CEQA requires a discussion of any inconsistencies between a project's activities and applicable local government General Plans and regional plans. The regional plan that would apply to the alternatives would be the SCAQMD AQMP.

Direct Impacts

The SCAQMD 2016 AQMP outlines control strategies to achieve PM2.5 and ozone air quality standards, and maintain CO, NO2, PM10 and Pb standards. Strategies consider expected growth and development in the region. Because the proposed alternative follows OCPW land use plans, capital improvement program, and function of the existing flood control features, it is consistent with the growth and development patterns used in formulating the AQMP.

It has been determined above (also see Appendix I General Conformity Analysis) that with mitigation, conformity is being met and would not impact the AQMP general conformity budgets. A comparison of daily maximum emissions with SCAQMD regional criteria pollutant thresholds also shows that daily emissions would not be expected to have significant regional air quality impacts (Table 58).

Table 58: Maximum daily CalEEMod emissions (winter) and SCAQMD regional thresholds for NED Plan construction with mitigation.

Year	ROG	NOx	CO	SO2	PM10	PM2.5
	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day
2022	9.6639	67.5039	359.4006	0.7878	13.1240	3.7176
2023	8.4423	50.6449	312.6979	0.7125	24.4088	8.2978
2024	2.3763	13.0173	80.6716	0.1791	3.0072	0.8713
2025	2.3763	13.0173	80.6716	0.1791	3.0072	0.8713
2026	2.3763	13.0173	80.6716	0.1791	3.0072	0.8713
2027	2.3763	13.0173	80.6716	0.1791	3.0072	0.8713
2028	2.3763	13.0173	80.6716	0.1791	3.0072	0.8713
2029	1.5842	8.6782	53.7811	0.1194	2.0048	0.5809
2030	1.5842	8.6782	53.7811	0.1194	2.0048	0.5809
2031	1.5842	8.6782	53.7811	0.1194	2.0048	0.5809
2032	1.5842	8.6782	53.7811	0.1194	2.0048	0.5809
2033	1.5842	8.6782	53.7811	0.1194	2.0048	0.5809
2034	0.7921	4.3391	26.8905	0.0597	1.0024	0.2904
Maximum Emissions	9.66	67.50	359.40	0.79	24.41	8.30
SCAQMD thresholds	75	100	550	150	150	55
Significant impact?	No	No	No	No	No	No

Indirect Impacts

The Action Alternatives are not expected to change indirect rates or amounts of pollutants being emitted to the atmosphere. The proposed alternatives improve existing flood control features and are consistent with current land-use patterns and future growth used in formulating the AQMP. The projects may positively impact air quality over time by reducing traffic delays and congestion related to inundation of major roads.

Long-Term Operation and Maintenance Impacts

The Action Alternatives are not expected to change rates or amounts of pollutants being directly emitted to the atmosphere in the long term from O&M activities. No alternatives propose new facilities or features that have on-going energy needs or air emissions. Periodic inspections, vegetation and rodent control, sediment and debris removal, and repairs may continue as needed and result in minimal generation of emissions. Because operation and maintenance activities are designed to be minimal and similar to those of the existing project, no additional emissions are generated or evaluated for impacts to air quality. Less than significant impacts are anticipated from additional O&M activities.

Level of Impact for the NED Plan

With mitigation measures, the NED Plan is consistent with the SCAQMD 2016 Air Quality Management Plan and would result in a less than significant air quality impact.

ALTERNATIVE: LPP

Direct Impacts

The SCAQMD 2016 AQMP outlines control strategies to achieve PM2.5 and ozone air quality standards, and maintain CO, NO2, PM10 and Pb standards. Strategies consider expected growth and development in the region. Because the proposed alternative follows OCPW land use plans, capital improvement program, and function of the existing flood control features, it is consistent with the growth and development patterns used in formulating the AQMP.

It has been determined above (also see Appendix I General Conformity Analysis) that with mitigation, conformity is being met and would not impact the AQMP general conformity budgets. A comparison of maximum daily emissions with SCAQMD regional pollutant criteria pollutant emission thresholds also shows that daily emissions would not be expected to have significant regional air quality impacts (Table 59).

Table 59: Maximum daily CalEEMod estimates (winter) and SCAQMD regional thresholds for LPP construction with mitigation.

Year	ROG	NOx	CO	SO2	PM10	PM2.5
	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day
2022	10.7657	74.3947	401.9661	0.8823	15.787	4.5235
2023	13.0108	78.3145	464.3568	1.0427	41.3548	11.1484
2024	8.8011	48.2124	298.7838	0.6633	11.1378	3.2271
2025	8.8011	48.2124	298.7838	0.6633	11.1378	3.2271
2026	8.8011	48.2124	298.7838	0.6633	11.1378	3.2271
2027	8.8011	48.2124	298.7838	0.6633	11.1378	3.2271
2028	8.8011	48.2124	298.7838	0.6633	11.1378	3.2271
2029	5.8674	32.1416	199.1892	0.4422	7.4252	2.1514
2030	5.8674	32.1416	199.1892	0.4422	7.4252	2.1514
2031	5.8674	32.1416	199.1892	0.4422	7.4252	2.1514
2032	5.8674	32.1416	199.1892	0.4422	7.4252	2.1514
2033	5.8674	32.1416	199.1892	0.4422	7.4252	2.1514
2034	2.9337	16.0708	99.5946	0.2211	3.7126	1.0757
Maximum Emissions	13.01	78.31	464.36	1.04	41.35	11.15
SCAQMD thresholds	75	100	550	150	150	55
Significant impact?	No	No	No	No	No	No

Indirect Impacts

The Action Alternatives are not expected to change indirect rates or amounts of pollutants being emitted to the atmosphere. The proposed alternatives improve existing flood control features and are consistent with current land-use patterns and future growth used in formulating the AQMP. The projects may positively impact air quality over time by reducing traffic delays and congestion related to inundation of major roads.

Long-Term Operation and Maintenance Impacts

The Action Alternatives are not expected to change rates or amounts of pollutants being directly emitted to the atmosphere in the long term from O&M activities. No alternatives propose new facilities or features

that have on-going energy needs or air emissions. Periodic inspections, vegetation and rodent control, sediment and debris removal, and repairs may continue as needed and result in minimal generation of emissions. Because operation and maintenance activities are designed to be minimal and similar to those of the existing project, no additional emissions are generated or evaluated for impacts to air quality. Less than significant impacts are anticipated from additional O&M activities.

Level of Impact for the LPP

With mitigation measures, the LPP is consistent with the SCAQMD 2016 Air Quality Management Plan and would result in a less than significant air quality impact.

5.5.6.3 IMPACT AIR-3: Results in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable national or state ambient air quality standard.

ALTERNATIVE: NO ACTION

Under the No Action Alternative no project would be implemented. There would be no construction or operation of air emissions that could contribute cumulatively to exceed State or Federal air quality standards.

ALTERNATIVE: NED PLAN

Direct Impacts

SCAMD established regional mass emission thresholds to help attain or maintain attainment of applicable criteria pollutants. As presented above (Table 53), no emissions are expected to exceed the SCAQMD regional emission threshold with mitigation in place. Although the NED Plan will cause a temporary decrease in air quality, the emission increase will likely result in a less than significant ‘cumulatively considerable’ net increase of the pollutant in the air basin over time. Long-term emissions may actually reduce as a result of decrease in traffic congestion, delays, and detours and from decreases in flood repair and clean-up activities. These reductions would not be fully realized till after construction and would not directly offset increases during construction, however they could provide significant, ongoing, cumulative air quality benefits that contribute toward attainment of air quality standards in the future.

Indirect Impacts

The Action Alternatives are not expected to change indirect rates or amounts of pollutants being emitted to the atmosphere. The proposed alternatives improve existing flood control features and are consistent with current land-use patterns and future growth used in formulating the AQMP. The projects may positively impact air quality over time by reducing traffic delays and congestion related to inundation of major roads.

Long-Term Operation and Maintenance Impacts

The Action Alternatives are not expected to change rates or amounts of pollutants being directly emitted to the atmosphere in the long term from O&M activities. No alternatives propose new facilities or features that have on-going energy needs or air emissions. Periodic inspections, vegetation and rodent control,

sediment and debris removal, and repairs may continue as needed and result in minimal generation of emissions. Because operation and maintenance activities are designed to be minimal and similar to those of the existing project, no additional emissions are generated or evaluated for impacts to air quality. Less than significant impacts are anticipated from additional O&M activities.

Level of Impact for the NED Plan

With mitigation measures, a less than significant regional air quality impact would result from implementation of the NED Plan.

ALTERNATIVE: LPP

Direct Impacts

SCAMD established regional mass emission thresholds to help attain or maintain attainment of applicable criteria pollutants. As presented above (Table 57), no emissions are expected to exceed the SCAQMD regional emission threshold with mitigation in place. Although the LPP will cause a temporary decrease in air quality, the emission increase will likely result in a less than significant 'cumulatively considerable' net increase of the pollutant in the air basin over time. Long-term emissions may actually reduce as a result of decrease in traffic congestion, delays, and detours and from decreases in flood repair and clean-up activities. These reductions would not be fully realized till after construction and would not directly offset increases during construction, however they could provide significant, ongoing, cumulative air quality benefits that contribute toward attainment of air quality standards in the future.

Indirect Impacts

The Action Alternatives are not expected to change indirect rates or amounts of pollutants being emitted to the atmosphere. The proposed alternatives improve existing flood control features and are consistent with current land-use patterns and future growth used in formulating the AQMP. The projects may positively impact air quality over time by reducing traffic delays and congestion related to inundation of major roads.

Long-Term Operation and Maintenance Impacts

The Action Alternatives are not expected to change rates or amounts of pollutants being directly emitted to the atmosphere in the long term from O&M activities. No alternatives propose new facilities or features that have on-going energy needs or air emissions. Periodic inspections, vegetation and rodent control, sediment and debris removal, and repairs may continue as needed and result in minimal generation of emissions. Because operation and maintenance activities are designed to be minimal and similar to those of the existing project, no additional emissions are generated or evaluated for impacts to air quality. Less than significant impacts are anticipated from additional O&M activities.

Level of Impact for the LPP

With mitigation measures, a less than significant regional air quality impact would result from implementation of the LPP.

5.5.6.4 IMPACT AIR-4: Exposes sensitive receptors to substantial pollutant concentrations.

ALTERNATIVE: NO ACTION

Under the No Action Alternative no project would be implemented. There would be no construction or operation of air emissions that could have the potential to expose sensitive receptors to substantial pollutant concentrations.

ALTERNATIVE: NED PLAN

Direct Impacts

Projects analyzed for General Conformity and regional significance are also analyzed for localized impacts. Residential neighborhoods border most of the drainage channels and are considered the nearest receptor population. For the purposes of this air quality impact analysis, a localized air quality impact could be considered significant if emissions exceed the SCAQMD Local Significance Thresholds (LSTs) identified in Table 40. The LST's are obtained from mass rate look-up tables of maximum construction or operations emissions that will not contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard, for areas up to 5 acres and receptor distances of 25 to 500 meters from project site. They are used in a screening tool to determine if local air quality impacts could be considered significant prior to performing project specific air quality modeling.

Drainage channels are routed through residential neighborhoods, therefore individual residences bordering the channels are the nearest sensitive receptors. In addition to adjacent residences, there are numerous schools, churches, hospitals, and nursing homes within 0.25 miles (402 meters) of NED Plan reaches. Except for tide gates that are more than 50 meters from a sensitive receptor (Pacific Coast Highway), all projects are considered 25 meters from receptors.

The overall NED Plan size is about 210 acres and spans two Source-Receptor Areas (North Orange County and Central Orange County), however projects are broken down and analyzed by channel reach and downstream feature. The following tables (Table 60 through Table 64) compare individual projects by most applicable LST's.

Table 60: Maximum daily emissions and SCAQMD localized significance thresholds for mitigated construction at Warner Avenue Bridge (1.15 acres).

Year	NOx	CO	PM10	PM2.5
	lbs/day	lbs/day	lbs/day	lbs/day
2022	17.2221	105.4483	1.8152	0.6005
2023	15.7101	102.6605	0.9531	0.4908
LTS for construction assuming 1 acre site and 25 m receptor distance	81 (central OC) 103 (north OC)	485 (central OC) 522 (north OC)	4 (central OC) 4 (north OC)	3 (central OC) 3 (north OC)
Possibility for localized impact?	No	No	No	No

Table 61: Maximum daily emissions and SCAQMD localized significance thresholds for mitigated construction on Reach 1 (40.78 acres).

Year	NOx	CO	PM10	PM2.5
	lbs/day	lbs/day	lbs/day	lbs/day
2022	40.8293	194.7494	3.5366	1.2681
2023	31.5971	163.4743	26.5400	6.9366
LTS for construction assuming 5 acre site and 25 m receptor distance	183 (central OC) 197(north OC)	1253 (central OC) 1711 (north OC)	13 (central OC) 14 (north OC)	7 (central OC) 9 (north OC)
Possibility for localized impact?	No	No	Yes	No

Table 62: Maximum daily emissions and SCAQMD localized significance thresholds for mitigated construction on Tide Gate (0.23 acres).

Year	NOx	CO	PM10	PM2.5
	lbs/day	lbs/day	lbs/day	lbs/day
2022	6.3645	24.6755	2.0155	0.3748
LTS for construction assuming 1 acre site and 50 m receptor distance	83 (central OC) 104 (north OC)	753 (central OC) 685 (north OC)	12 (central OC) 10 (north OC)	4 (central OC) 4 (north OC)
Possibility for localized impact?	Unknown	Unknown	Unknown	Unknown

Table 63: Maximum daily emissions and SCAQMD localized significance thresholds for mitigated NED Plan construction on Reach 23 (46.8 acres).

Year	NOx	CO	PM10	PM2.5
	lbs/day	lbs/day	lbs/day	lbs/day
2022	6.413732	40.760668	0.570284	0.199784
LTS for construction assuming 5 acre site and 25 m receptor distance	183 (central OC) 197(north OC)	1253 (central OC) 1711 (north OC)	13 (central OC) 14 (north OC)	7 (central OC) 9 (north OC)
Possibility for localized impact?	No	No	No	No

Table 64: Maximum daily emissions and SCAQMD localized significance thresholds for mitigated NED Plan construction of upstream Reach 21 (11.77 acres).

Year	NOx	CO	PM10	PM2.5
	lbs/day	lbs/day	lbs/day	lbs/day
2023	4.1773	25.6303	0.4901	0.1742
2022	4.3391	26.8905	0.3793	0.1547
2024	2.7678	15.3719	1.0024	0.2904
LTS for construction assuming 5 acre site and 25 m receptor distance	183 (central OC) 197(north OC)	1253 (central OC) 1711 (north OC)	13 (central OC) 14 (north OC)	7 (central OC) 9 (north OC)
Possibility for localized impact?	No	No	No	No

Reach 1, Reach 23, and Reach 21 are in excess of 5 acres, and comparing their total emission rates with 5 acre source area LST's are thought to be protective though outside the bounds of the LST methodology. Tide gates on the other hand are less than 1 acre, but they are compared with 1 acre source area LSTs. One LST is exceeded in this analysis (Table 61), PM10 emissions from Reach 1 in 2023.

Because the size of the NED Plan project is more than 5 acres, project-specific air quality modeling would best confirm if the project exceeds air quality standards or causes localized impacts. Air quality at particular locations depends on the rate and location of pollutant emissions, as well as the meteorological conditions that influence pollutant movement and dispersal. Since the potential for localized impacts cannot be ruled out with this analysis, it is considered a significant impact. Note that all feasible mitigation measures are being proposed to minimize impacts, including dust control best management practices and compliance with SCAQM Rule 403 for PM10. If dispersion modeling is required, it shall be performed during Preliminary Engineering and Design stage when additional data and design details are available.

Indirect Impacts

The Action Alternatives are not expected to change indirect rates or amounts of pollutants being emitted to the atmosphere. The proposed alternatives improve existing flood control features and are consistent with current land-use patterns and future growth used in formulating the AQMP. The projects may positively impact air quality over time by reducing traffic delays and congestion related to inundation of major roads.

Long-Term Operation and Maintenance Impacts

The Action Alternatives are not expected to change rates or amounts of pollutants being directly emitted to the atmosphere in the long term from O&M activities. No alternatives propose new facilities or features that have on-going energy needs or air emissions. Periodic inspections, vegetation and rodent control, sediment and debris removal, and repairs may continue as needed and result in minimal generation of emissions. Because operation and maintenance activities are designed to be minimal and similar to those of the existing project, no additional emissions are generated or evaluated for impacts to air quality. Less than significant impacts are anticipated from additional O&M activities.

Level of Impact for the NED Plan

The implementation of the NED Plan may result in potentially significant unavoidable localized impacts. A potentially significant unavoidable impact is caused from PM10 emissions during 2023 construction of Reach 1 (C05) in North Orange County.

ALTERNATIVE: LPP

Direct Impacts

The overall LPP site is about 233 acres spanning North Orange County and Central Orange County Source-Receptor Areas. Receptors include 26 schools, three hotels, four hospitals, seven nursing homes, 23 churches, and three cemeteries within 0.25 miles (402 meters) of the LPP reaches. Reach 1, Warner Avenue Bridge, and Tide Gate daily maximum emission rates are the same for the LPP and NED Plan, and compared with LSTs in Table 60 through Table 62. Reach 23 and Reach 21 emissions for the LPP are compared to the most applicable LSTs in Table 65 and Table 66, with no exceedance.

The LST comparison for Reach 1 (Table 61) identified a potential localized impact from PM10 in 2023. Because the project area exceeds 5 acres, project-specific air quality modeling would best confirm whether this is a significant impact. Since the potential for localized impacts cannot be ruled out, it is considered a significant impact. All feasible mitigation measures including dust control best management practices and compliance with SCAQM Rule 403 for PM10 shall be implemented. If dispersion modeling is required, it shall be performed during Preliminary Engineering and Design stage when additional data and design details are available.

Table 65: Maximum daily emissions and SCAQMD localized significance thresholds for LPP construction on Reach 23 (46.8 acres).

Year	NOx	CO	PM10	PM2.5
	lbs/day	lbs/day	lbs/day	lbs/day
2022	12.3341	78.3859	1.0967	0.3842
LTS for construction assuming 5 acre site and 25 m receptor distance	183 (central OC) 197(north OC)	1253 (central OC) 1711 (north OC)	13 (central OC) 14 (north OC)	7 (central OC) 9 (north OC)
Possibility for localized impact?	No	No	No	No

Table 66: Maximum daily emissions and SCAQMD localized significance thresholds for Reach 21 (11.77 acres).

Year	NOx	CO	PM10	PM2.5
	lbs/day	lbs/day	lbs/day	lbs/day
2023	15.4716	94.9271	1.8152	0.6451
2022	16.0708	99.5946	1.4049	0.5730
2024	10.2510	56.9329	3.7126	1.0757
LTS for construction assuming 5 acre site and 25 m receptor distance	183 (central OC) 197(north OC)	1253 (central OC) 1711 (north OC)	13 (central OC) 14 (north OC)	7 (central OC) 9 (north OC)
Possibility for localized impact?	No	No	No	No

Indirect Impacts

The Action Alternatives are not expected to change indirect rates or amounts of pollutants being emitted to the atmosphere. The proposed alternatives improve existing flood control features and are consistent with current land-use patterns and future growth used in formulating the AQMP. The projects may positively impact air quality over time by reducing traffic delays and congestion related to inundation of major roads.

Long-Term Operation and Maintenance Impacts

The Action Alternatives are not expected to change rates or amounts of pollutants being directly emitted to the atmosphere in the long term from O&M activities. No alternatives propose new facilities or features that have on-going energy needs or air emissions. Periodic inspections, vegetation and rodent control, sediment and debris removal, and repairs may continue as needed and result in minimal generation of emissions. Because operation and maintenance activities are designed to be minimal and similar to those of the existing project, no additional emissions are generated or evaluated for impacts to air quality. Less than significant impacts are anticipated from additional O&M activities.

Level of Impact for the LPP

The implementation of the LPP may result in potentially significant unavoidable localized impacts. Like the NED Plan, a potentially significant unavoidable impact is caused from PM10 emissions during 2023 construction of Reach 1 (C05) in North Orange County.

5.5.6.5 IMPACT AIR-5: Results in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

ALTERNATIVE: NO ACTION

Under the No Action Alternative no project would be implemented. There would be no construction or operation of air emissions that could have the potential to generate objectionable odors.

ALTERNATIVE: NED PLAN

Direct Impacts

Odors from construction activities are not anticipated to have a significant impact on the community. Odor from asphalt paving activities will only occur a limited number of days (15 days maximum, typically no more than 1 week) at each location. Contaminated areas should be avoided during construction and no waste or objectionable material is expected to be encountered within the channel alignment. None of the alternatives include land use or operations typically associated with odor complaints (agriculture, wastewater treatment, food or chemical processing, refineries, waste management, etc.). Therefore, less than significant odor impacts are expected from the proposed plan.

Indirect Impacts

Construction activities associated with the NED Plan would generate direct odor emissions from equipment diesel exhaust. The construction activities would not generate notable indirect odors. As such, indirect impacts would be less than significant.

Long-Term Operation and Maintenance Impacts

Emissions from operation and maintenance are likely to be substantially less than those associated with construction activities. Periodic inspections, vegetation and rodent control, sediment and debris removal, and repairs may continue as needed and result in minimal generation of emissions. Because operation and maintenance activities are designed to be minimal and similar to those of the existing project, no additional emissions are generated or evaluated for impacts to air quality. Thus, less than significant impacts are anticipated from additional O&M activities.

Level of Impact for the NED Plan

A less than significant odor impact is expected to occur from implementation of the NED Plan.

ALTERNATIVE: LPP

Direct Impacts

Odors from construction activities are not anticipated to have a significant impact on the community. Odor from asphalt paving activities will only occur a limited number of days (15 days maximum, typically no more than 1 week) at each location. Contaminated areas should be avoided during construction and no waste or objectionable material is expected to be encountered within the channel alignment. None of the alternatives include land use or operations typically associated with odor complaints (agriculture, wastewater treatment, food or chemical processing, refineries, waste management, etc.). Therefore, less than significant odor impacts are expected from the proposed plan.

Indirect Impacts

Construction activities associated with the LPP would generate direct odor emissions from equipment diesel exhaust. The construction activities would not generate notable indirect odors. As such, indirect impacts would be less than significant.

Long-Term Operation and Maintenance Impacts

Emissions from operation and maintenance are likely to be substantially less than those associated with construction activities. Periodic inspections, vegetation and rodent control, sediment and debris removal, and repairs may continue as needed and result in minimal generation of emissions. Because operation and maintenance activities are designed to be minimal and similar to those of the existing project, no additional emissions are generated or evaluated for impacts to air quality. Thus, less than significant impacts are anticipated from additional O&M activities.

Level of Impact for the LPP

A less than significant odor impact is expected to occur from implementation of the LPP.

5.5.7 Greenhouse Gas Impacts

CEQA Thresholds

The following impact significance criteria are derived from Appendix G of the CEQA Guidelines. The following significance criteria were used to evaluate GHG emissions impacts associated with the project alternatives under CEQA. For purposes of this analysis, the GHG impacts of the NED Plan or LPP would be considered significant under CEQA if the project were to:

IMPACT GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

IMPACT GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

5.5.8 Significance Criteria Evaluation Method

The proposed project is located within the jurisdiction of the SCAQMD. To identify significance criteria under CEQA for development projects, SCAQMD initiated a Working Group which provided detailed methodology for evaluating significance of GHG impacts. At the September 28, 2010 Working Group meeting, the SCAQMD released a recent version of draft GHG emissions thresholds, which recommends a tiered approach that provides a quantitative annual threshold of 3,000 metric tons of CO_2 equivalent (e) ($MTCO_{2e}$) for all land use projects. The SCAQMD provided substantial evidence supporting the use of

the above threshold, however as of May 2017 the SCAQMD Board has not yet considered or approved the thresholds. In order to provide a conservative analysis, the Working Group's interim thresholds have been utilized.

IMPACT GHG-1 was assessed by comparing the SCAQMD GHG Working Group draft annual GHG emissions threshold of 3,000 $MTCO_{2e}$ against the total construction GHG emissions for each alternative amortized over 30 years. The proposed project would be considered to create a significant cumulative GHG impact if the proposed project would exceed the annual threshold of 3,000 $MTCO_{2e.}$

IMPACT GHG-2 was evaluated by assessing if approved federal, state, or district GHG thresholds for construction conflict with the proposed project. It was also assessed by comparing the SCAQMD draft annual Working Group GHG emission threshold with amortized CO_2e emissions generated by the project. The proposed project would be considered to create a significant GHG impact if it would conflict with approved construction thresholds, exceed the annual threshold of 3,000 $MTCO_{2e,}$ or change the development pattern of local or regional plans.

5.5.9 Impact Methodology and Assumptions

GHG emissions for the LPP and NED Plan projects were calculated using the California Emissions Estimator Model (CalEEMod Version 2016.3.2) authorized by the SCAQMD. As described above, model inputs include project size and location, construction schedule and phasing, equipment numbers and activity hours, vehicle mileage, and transported soil and material amounts. This information is based on best-available project data (OCPW, 2019; USACE 2018). When data are unavailable, conservative defaults and assumptions are used to develop the modeling scenario, specifications, and inputs to obtain cautious yet realistic screening estimates and safeguard against underestimating actual emissions. Emissions generated during project construction are the focus of this GHG evaluation because no additional emission-producing sources or activities are proposed for operations and maintenance.

5.5.10 GHG Emissions Impact under CEQA

5.5.10.1 IMPACT GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

ALTERNATIVE: NO ACTION

Under No Action Plan none of the proposed measures would be implemented. There would be no construction and operational maintenance activities that would generate greenhouse gas emissions.

ALTERNATIVE: NED PLAN

Direct Impacts/Indirect Impacts

Emission estimates indicate a maximum of 4,385.25 $MTCO_{2e}$/yr are emitted from fossil fuel combustion during NED Plan construction (Table 67). Most years, the project generates less than 3,000 $MTCO_{2e}$. Construction emissions amortized over 30 years are 678.47 $MTCO_{2e}$/yr, less than the CO2e threshold of significance and therefore a less than significant GHG impact.

Table 67: Estimated GHG emissions during NED Plan construction.*

Year	Total CO2	CH_4	CO2e
	MTons/yr	MTons/yr	MTons/yr
2022	4384.19	1.06	4385.25
2023	3454.69	0.84	3455.53
2024	1206.40	0.30	1206.70
2025	1612.96	0.40	1613.35
2026	1612.96	0.40	1613.35
2027	1612.96	0.40	1613.35
2028	1517.21	0.37	1517.58
2029	1075.30	0.26	1075.57
2030	1075.30	0.26	1075.57
2031	1075.30	0.26	1075.57
2032	1075.30	0.26	1075.57
2033	556.80	0.14	556.94
2034	89.85	0.02	89.87
Maximum Emissions	4384.19	1.06	4385.25
Total annual emissions	20349.22	4.98	20354.20
Amortized emissions (30 years)	678.31	0.17	678.47
SCAQMD Draft Threshold of Significance			**3000**
Significant Impact?			No

*Emissions are the same with or without Tier 4 mitigation. Zero N20 emissions are generated. Construction emission for all 13 years amortized over 30 years as recommended by SCAQMD GHG CEQA Working Group Significance Threshold Stakeholder Working Group, November 19, 2009.

Direct GHG emissions would be temporary, and permanently cease once project construction is complete. During construction, the annual construction emissions would comprise a tiny fraction (between 0.00066 and 0.00172 percent) of the 2020 California Greenhouse Gas Goal of 431 million metric tons. Although the project will cause a small, temporary increase in direct GHG emissions, the increase will result in a less than significant impact on the environment.

Indirect GHG emissions generated by the production of construction materials (cement, pre-cast concrete, reinforced concrete, sheet pile, etc.) is not captured by CalEEMod and not included in Table 67 estimates. The GHG emissions embodied in production of construction materials is likely a major source of construction-related GHG emissions. Even considering an additional increase in emissions, the overall impact is likely to be less than significant.

Long-Term Operation and Maintenance Impacts

GHG impacts over the long term should improve with the implementation of the NED Plan due to reduced inundation of major roads and structures. Long-term emissions reductions result from decreases in traffic congestion, delays, and detours and from decreases in flood repairs and clean-up activities. These reductions would not be fully realized till after construction and would not directly offset increases during construction. However they could provide significant, ongoing, cumulative benefits that contribute toward meeting GHG goals in the future.

Level of Impact for the NED Plan

Implementation of the NED Plan will cause a small, temporary increase in direct GHG emissions and have a less than significant GHG impact.

ALTERNATIVE: LPP

Direct Impacts/Indirect Impacts

Emission estimate results indicate a maximum of 6,011 $MTCO_{2e}$/yr are emitted from fossil fuel combustion during LPP construction (Table 38). Construction emissions amortized over 30 years are 1897.42 $MTCO_{2e}$/yr, less than the CO2e threshold of significance and therefore a less than significant GHG impact.

Table 68: Estimated GHG emissions during LPP construction.*

Year	Total CO2	CH_4	CO2e
	MTons/yr	MTons/yr	MTons/yr
2022	4926.06	1.19	4955.9
2023	5314.91	1.29	5347.08
2024	4468.15	1.1	4495.65
2025	5973.91	1.47	6010.66
2026	5973.91	1.47	6010.66
2027	5973.91	1.47	6010.66
2028	5619.29	1.38	5653.86
2029	3982.6	0.98	4007.11
2030	3982.6	0.98	4007.11
2031	3982.6	0.98	4007.11
2032	3982.6	0.98	4007.11
2033	2062.23	0.51	2074.91
2034	332.79	0.08	334.84
Maximum Emissions	5973.91	1.47	6010.66
Total annual emissions	56575.57	13.88	56922.66
Amortized emissions (30 years)	1885.85	0.46	1897.42
SCAQMD Draft Threshold of Significance			**3000**
Significant Impact?			No

*Emissions are the same with or without Tier 4 mitigation. Zero N20 emissions are generated. Construction emission for all 13 years amortized over 30 years as recommended by SCAQMD GHG CEQA Working Group Significance Threshold Stakeholder Working Group, November 19, 2009.

Direct GHG emissions would be temporary, and permanently cease once project construction is complete. During construction, the annual construction emissions would comprise a tiny fraction (between 0.00066 and 0.00172 percent) of the 2020 California Greenhouse Gas Goal of 431 million metric tons. The small, temporary increase in direct GHG emissions from the LPP will result in a less than significant impact on the environment.

Indirect GHG emissions generated by the production of construction materials (cement, pre-cast concrete, reinforced concrete, sheet pile, etc.) is not captured by CalEEMod or included in Table 68 estimates. The

GHG emissions embodied in production of construction materials is likely a major source of construction-related GHG emissions. Even considering this increase in emissions, the overall impact is likely to be less than significant.

Long-Term Operation and Maintenance Impacts

GHG impacts over the long term should improve with the implementation of the LPP due to reduced inundation of major roads and structures. Long-term emissions reductions result from decreases in traffic congestion, delays, and detours and from decreases in flood repairs and clean-up activities. These reductions would not be fully realized till after construction and would not directly offset increases during construction. However they could provide significant, ongoing, cumulative benefits that contribute toward meeting GHG goals in the future.

Level of Impact for the LPP

Implementation of the LPP will cause a small, temporary increase in direct GHG emissions and have a less than significant GHG impact.

5.5.10.2 IMPACT GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

ALTERNATIVE: NO ACTION

Under the No Action Alternative no project would be implemented. There would be no construction or operational maintenance activities that emit greenhouse gases and there would be no potential for conflicts with applicable plans, policies, or regulations that would reduce the emission of greenhouse gas emissions.

ALTERNATIVE: NED PLAN

Direct Impacts/Indirect Impacts

There are no federal, state, or district GHG thresholds approved for construction. The SCAQMD Working Group draft GHG emissions threshold provides a quantitative annual threshold of 3,000 $MTCO_{2e}$ for all land use projects, however this has not been approved by the SCAQMD board. Amortized CO_2e emissions generated by the project do not exceed the draft GHG thresholds (Table 67).

Furthermore, the flood control project would not change the development pattern of the surrounding area, and therefore would not be expected to obstruct implementation of GHG reduction measures of local or regional plans.

Long-Term Operation and Maintenance Impacts

The NED Plan is not expected to change rates or amounts of GHGs being directly emitted to the atmosphere in the long term from operations and maintenance (O&M) activities. The NED Plan does not propose new facilities or features that have on-going energy needs or air emissions. Periodic inspections, vegetation and rodent control, sediment and debris removal, and repairs may continue as needed and

result in minimal generation of emissions. Because O&M activities are designed to be minimal and similar to those of the existing project, no additional GHG emissions are generated.

Level of Impact for the NED Plan

Implementation of the NED Plan does not conflict with GHG reduction plans, policies, or regulations and results in a less than significant GHG impact.

ALTERNATIVE: LPP

Direct Impacts/Indirect Impacts

There are no federal, state, or district GHG thresholds approved for construction. The SCAQMD Working Group draft GHG emissions threshold provides a quantitative annual threshold of 3,000 $MTCO_{2e}$ for all land use projects, however this has not been approved by the SCAQMD board. Amortized CO_2e emissions generated by the project do not exceed the draft GHG thresholds (Table 68).

Furthermore, the flood control project would not change the development pattern of the surrounding area, and therefore would not be expected to obstruct implementation of GHG reduction measures of local or regional plans.

Long-Term Operation and Maintenance Impacts

The LPP is not expected to change rates or amounts of GHGs being directly emitted to the atmosphere in the long term from operations and maintenance (O&M) activities. Alternative 3 does not propose new facilities or features that have on-going energy needs or air emissions. Periodic inspections, vegetation and rodent control, sediment and debris removal, and repairs may continue as needed and result in minimal generation of emissions. Because O&M activities are designed to be minimal and similar to those of the existing project, no additional GHG emissions are generated.

Level of Impact for the LPP

Implementation of the LPP does not conflict with GHG reduction plans, policies, or regulations and results in a less than significant GHG impact.

5.6 Energy

5.6.1 Regulatory Framework

5.6.1.1 Federal

The Federal Power Act: The original Federal Power Act was enacted in 1920 and provides for cooperation between the Federal Energy Regulatory Commission and other Federal agencies, including resource agencies, in licensing and relicensing power projects. The 1986 amendments to the Federal Power Act entitled the Electric Consumers Protection Act and mandated several fish and wildlife provisions. Amendments passed in 1992 direct the Secretary of Energy, in consultation with the Secretary of the Interior and the Secretary for the Army, to study cost-effective opportunities to increase hydropower production from federally-owned or operated facilities. The amendments also authorized the

completion of a study on the Nation's principal river basins to find opportunities to more efficiently generate hydroelectric power from federal facilities. Finally, the 1992 amendments authorized the collection of reasonable and necessary fees by the Federal government, as well as state fish and wildlife agencies, for the purposes of implementing licensing provisions of the Federal Power Act.

5.6.1.2 State

Warren-Alquist Act: The Warren-Alquist Act established the California Energy Commission in 1974 to respond to the energy crisis of the early 1970s and the state's unsustainable growing demand for energy resources.

Building Energy Efficiency Standards: The Building Energy Efficiency Standards were first adopted in 1976. The Standards contain energy and water efficiency requirements (and indoor air quality requirements) for newly constructed buildings, additions to existing buildings, and alterations to existing buildings.

5.6.2 Impact Significance Criteria

The impact criteria below were taken from Appendix G of the CEQA guidelines and are also being adopted for NEPA. For purposes of this analysis, the No Action Plan, NED Plan, and LPP would have a significant impact related to Energy if it would:

IMPACT EN-1: Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.

IMPACT EN-2: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Energy impacts are assessed by looking at the entirety of the proposed project instead of by measure for each proposed project. This is because energy consumption required by the entire project is expected to be greater than energy consumption by measure; therefore, the greater impact would be shown by assessing the entire project as a whole.

5.6.3 Mitigation Measures

Implementation of the mitigation measures provided below would reduce to the extent feasible, energy usage impacts associated with the NED Plan and LPP.

MM-EN-1	Phase haul-in/haul-out of materials to avoid empty haul-back and reduce number of trips.
MM-EN-2	The number of pieces of construction equipment operating simultaneously shall be minimized through efficient management practices to ensure that the smallest practical number are operating at any one time.
MM-EN-3	Substitute electric equipment or alternative fuels whenever possible for diesel- or gasoline-powered equipment.
MM-EN-4	Maintain all equipment as recommended by manufacturers' manuals.
MM-EN-5	Construction worker trips should be minimized by requiring carpooling and by providing for lunch onsite.
MM-EN-6	Shut down any equipment when not in use.
MM-EN-7	Maintain on-road and off-road vehicle tire pressures to manufacturer specifications. Check tires and re-inflate at regular intervals.
MM-EN-8	Use locally made materials for construction to the extent feasible.

5.6.4 Energy Impacts

5.6.4.1 IMPACT EN-1: Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Plan no federal project would be implemented. No construction or long-term operation and maintenance activities would occur without implementation of the project. Therefore, no project would be implemented that would potentially result in significant environmental impact due to wasteful energy consumption.

Although no project would be implemented, energy consumption within the region would continue. Consumption of electricity and natural gas within southern California has generally decreased since 2013 while automotive fuel consumption within southern California has generally increased since 2013. These trends are expected to continue into the future.

ALTERNATIVE: NED PLAN

Direct Impacts

Addressing energy impacts requires an agency to make a determination as to what constitutes a significant impact. There are no established thresholds of significance, statewide or locally, for what constitutes a wasteful, inefficient, and unnecessary consumption of energy for a proposed project. For the purpose of this analysis, the amount of CO_2 emissions that would be produced during construction was doubled to account for trips to and from the project area by construction vehicles and construction personnel. The doubled number of CO_2 emissions was then used to calculate approximately how many gallons of diesel would be used per construction year for the project. Per one gallon of diesel fuel, approximately 22.44 pounds of carbon dioxide emissions are produced (USEPA 2019). Energy consumption associated with the proposed project is summarized in Table 69.

Table 69: Estimated Automotive Fuel Consumption during Construction of NED Plan

Year	Energy Type	Annual Energy Consumption (gallons of diesel/year)	Percentage Increase Countywide
2022	Automotive Fuel Consumption	31,845	0.00228%
2023		50,981	0.00365%
2024		27,771	0.00199%
2025		26,093	0.00187%
2026		24,602	0.00176%
2027		17,706	0.00127%
2028		17,054	0.00122%
2029		10,499	0.00075%
2030		6,461	0.00046%
2031		3,728	0.00027%

Notes: The Project increases in automotive fuel consumption are compared with the countywide fuel consumption in 2018, the most recent full year of data.

As shown in Table 69, the NED Plan's diesel fuel consumption during the multi-year construction period ranges from approximately 31,845 gallons of diesel in 2022 to 3,728 gallons of diesel towards the end of construction in 2031. This would increase the annual construction-related diesel fuel use in Orange County by 0.00228 percent and 0.00027 percent, respectively, from the start of construction in 2022 to the end of construction in 2031. As such, project construction would have a nominal effect on local and regional energy supplies. Although the NED Plan would have a less than significant impact on energy consumption, mitigation measures MM-EN-1 through MM-EN-8 would be implemented during construction activities to further reduce the amount of transportation fuel demand during project construction.

Indirect Impacts

Indirect impacts would occur if construction activities associated with the proposed project caused road closures that forced roadway users to take less efficient detours to their destinations, thereby increasing their energy consumption. The NED Plan does not include any road closures, although there would be temporary single lane closures on some portions of roadways along C04 due to staging of construction equipment. These single lane closures would not require detours, therefore, no indirect impact to energy consumption would occur.

Long-Term Operation and Maintenance

Maintenance activities associated with the NED Plan would be no different than maintenance activities that are currently carried out at Warner Avenue Bridge, the new access bridge replacing the tide gates, and the drainage channels. Maintenance activities would be minor and would typically not require large construction equipment. Therefore, no long-term operation and maintenance impact to energy consumption would occur.

Level of Impact for the NED Plan

No Impact. The NED Plan would not result in wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation. To ensure the implementation of the NED Plan would have no impact, mitigation measures MM-EN-1 through MM-EN-8 would be implemented during construction activities to further reduce the amount of transportation fuel demand during project construction. These mitigation measures reduce the inefficient use of energy by implementing BMPs such as requiring equipment to be shut down if not in use, substitution of electric equipment or alternative fuels when possible, and use of locally made materials to the extent feasible.

ALTERNATIVE: LPP

Direct Impacts

Addressing energy impacts requires an agency to make a determination as to what constitutes a significant impact. There are no established thresholds of significance, statewide or locally, for what constitutes a wasteful, inefficient, and unnecessary consumption of energy for a proposed project. For the purpose of this analysis, the amount of CO_2 emissions that would be produced during construction was doubled to account for trips to and from the project area by construction vehicles and construction personnel. The doubled number of CO_2 emissions was then used to calculate approximately how many gallons of diesel would be used per construction year for the project. Per one gallon of diesel fuel,

approximately 22.44 pounds of carbon dioxide emissions are produced (USEPA 2019). Energy consumption associated with the proposed project is summarized in Table 70.

Table 70: Estimated Automotive Fuel Consumption during Construction of LPP

Year	Energy Type	Annual Energy Consumption	Percentage Increase Countywide
2022	Automotive Fuel Consumption	31,845	0.00228
2023		47,216	0.00338
2024		19,011	0.00136
2025		26,093	0.00187
2026		21,993	0.00157
2027		27,212	0.00195
2028		24,043	0.00172
2029		11,431	0.00082
2030		10,313	0.00074
2031		10,934	0.00078
2032		10,065	0.00072
2033		5,716	0.00041
2034		559	0.00004

Notes: The Project increases in automotive fuel consumption are compared with the countywide fuel consumption in 2018, the most recent full year of data.

As shown in Table 70, the LPP's diesel fuel consumption during the multi-year construction period ranges from approximately 31,845 gallons of diesel in 2022 to 559 gallons of diesel towards the end of construction in 2034. This would increase the annual construction-related diesel fuel use in the county by 0.00228 percent and 0.00004 percent, respectively, from the start of construction in 2022 to the end of construction in 2034. As such, project construction would have a nominal effect on local and regional energy supplies. Although the LPP would have a less than significant impact on energy consumption, mitigation measures MM-EN-1 through MM-EN-8 would be implemented during construction activities to further reduce the amount of transportation fuel demand during project construction.

Indirect Impacts

Maintenance activities associated with the proposed project would be no different than maintenance activities that are currently carried out at Warner Avenue Bridge, the new access bridge replacing the tide gates, and the drainage channels. Maintenance activities would be minor and would typically not require large construction equipment. Therefore, no long-term operation and maintenance impact to energy consumption would occur.

Long-Term Operation and Maintenance

Maintenance activities associated with the proposed project would be no different than maintenance activities that are currently carried out at Warner Avenue Bridge, the new access bridge replacing the tide gates, and the drainage channels. Maintenance activities would be minor and would typically not require large construction equipment. Therefore, no long-term operation and maintenance impact to energy consumption would occur.

Level of Impact for the LPP

No Impact. The LPP would not result in wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation. To ensure the implementation of the LPP would have no impact, mitigation measures MM-EN-1 through MM-EN-8 would be implemented during construction activities to further reduce the amount of transportation fuel demand during project construction. These mitigation measures reduce the inefficient use of energy by implementing BMPs such as requiring equipment to be shut down if not in use, substitution of electric equipment or alternative fuels when possible, and use of locally made materials to the extent feasible.

5.6.4.2 IMPACT EN-2: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no project would be implemented. No construction or long-term operation and maintenance activities would occur without implementation of the project. Therefore, no project would be implemented that would conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

ALTERNATIVE: NED PLAN

Direct Impacts

The NED Plan includes the modification of the Warner Avenue Bridge, removal of tide gates and replacement with an access bridge, and modification of the drainage channels to increase conveyance efficiency. The project does not include the construction of a development that would require the use of energy resources, except during construction when fuel would be required for construction and construction personnel vehicles. Since the NED Plan does not include the construction of facilities that would require long-term energy usage, the proposed project would not conflict or obstruct any local or state plans for renewable energy or energy efficiency. There would be no direct impact.

Indirect Impacts

The proposed project includes the modification of the Warner Avenue Bridge, removal of tide gates and replacement with an access bridge, and modification of the drainage channels to increase conveyance efficiency. The NED Plan does not include the construction of a development that would require the use of energy resources, except during construction when fuel would be required for construction and construction personnel vehicles. Since the NED Plan does not include the construction of facilities that would require long-term energy usage, the proposed project would not conflict or obstruct any local or state plans for renewable energy or energy efficiency. There would be no indirect impact.

Long-Term Operation and Maintenance

The NED Plan would require maintenance of the modified flood control channels and maintenance of the Warner Avenue Bridge and the access bridge built to replace the tide gates. Typical maintenance activities for the flood control channels would include repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. Typical maintenance activities

that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Maintenance activities would require the use of maintenance vehicles and potentially construction vehicles depending on the maintenance activity occurring. These vehicles would require the use of fuel, however, their use would be temporary and infrequent. Overall, since the operation of the drainage channels does not include the construction of facilities that would require long-term energy usage, the proposed project would not conflict or obstruct any local or state plans for renewable energy or energy efficiency. There would be no long-term operation or maintenance impacts.

Level of Impact for the NED Plan

No Impact. The NED Plan would not conflict or obstruct any local or state plans for renewable energy or energy efficiency.

ALTERNATIVE: LPP

Direct Impacts

The proposed project includes the modification of the Warner Avenue Bridge, removal of tide gates and replacement with an access bridge, and modification of the drainage channels to increase conveyance efficiency. The LPP does not include the construction of a development that would require the use of energy resources, except during construction when fuel would be required for construction and construction personnel vehicles. Since the LPP does not include the construction of facilities that would require long-term energy usage, the proposed project would not conflict or obstruct any local or state plans for renewable energy or energy efficiency. There would be no direct impact.

Indirect Impacts

The proposed project includes the modification of the Warner Avenue Bridge, removal of tide gates and replacement with an access bridge, and modification of the drainage channels to increase conveyance efficiency. The LPP does not include the construction of a development that would require the use of energy resources, except during construction when fuel would be required for construction and construction personnel vehicles. Since the LPP does not include the construction of facilities that would require long-term energy usage, the proposed project would not conflict or obstruct any local or state plans for renewable energy or energy efficiency. There would be no indirect impact.

Long-Term Operation and Maintenance

The LPP would require maintenance of the modified flood control channels and maintenance of the Warner Avenue Bridge and the access bridge built to replace the tide gates. Typical maintenance activities for the flood control channels would include repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Maintenance activities would require the use of maintenance vehicles and potentially construction vehicles depending on the maintenance activity occurring. These vehicles would require the use of fuel, however, their use would be temporary and infrequent. Overall, since the operation of the drainage channels does not include the construction of facilities that would require long-term energy usage, the

proposed project would not conflict or obstruct any local or state plans for renewable energy or energy efficiency. There would be no long-term operation or maintenance impacts.

Level of Impact for the LPP

No Impact. The LPP would not conflict or obstruct any local or state plans for renewable energy or energy efficiency.

5.7 Noise

5.7.1 Regulatory Framework

5.7.1.1 State

State Office of Noise Control Standards: The California Office of Noise Control has set the land use compatibility noise standards for different types of land uses and has encouraged local jurisdictions to adopt them.

According to the land use compatibility noise standards, for commercial and industrial uses, long-term noise levels up to 65 Community Noise Equivalent Level (CNEL) are “normally acceptable”; noise levels between 65 and 75 dBA CNEL are “conditionally acceptable”, which means that noise levels are acceptable only when a detailed noise analysis is conducted and needed noise insulation features are included in the design. Long term noise levels between 70 and 80 dBA CNEL are “generally unacceptable”.

For residential development and schools, long term exterior noise levels ranging up to 60 dBA CNEL are classified as “normally acceptable” based upon the assumption that the homes are built with normal conventional construction. Long term noise levels ranging up to 70 dBA CNEL are “conditionally acceptable” and noise levels in the 70- to 75-dBA CNEL range are classified as “generally unacceptable”, but could proceed if a detailed noise analysis is conducted and needed noise insulation features are included in the design.

5.7.1.2 Local

The local noise regulations that would be applicable to the study area would be noise ordinances and/or General Plan Noise Elements for Orange County and the Cities of Fountain Valley, Garden Grove, Huntington Beach, Santa Ana, Seal Beach, and Westminster. Table 71 summarizes the noise standards by the various jurisdictions in and around the study area and focal area they are applicable to.

Table 71: Summary of noise ordinances related to construction within the study area.

Jurisdiction	Noise Ordinance or General Plan Standards	Exemptions	Municipal Code Location	Applicable Focal Area
Fountain Valley	Residential: 55 dB(A) 7 a.m. – 10 p.m.; 50 dB(A) 10 p.m. – 7 a.m.	Exempts noises associated with construction, repair, remodeling or grading, provided that the activities take place between the hours of 7:00 a.m. and 8:00 p.m. on Monday through Friday, 9:00 a.m. through 8:00 p.m. on Saturday and at no time on Sunday or any legal holiday.	Section 6.28.050	C06 Reaches: 15, 16, 17, 18, & 19
Garden Grove	Residential: 55 dB(A) 7 a.m. – 10 p.m.; 50 db(A) 10 p.m. – 7 a.m. Institutional/Office-Professional/Hotels & Motels: 65 dB(A) anytime Commercial and Industrial Uses: 70 dB(A) anytime Commercial/Industrial Uses within 150 feet of Residential:65 dB(A) 7 a.m. – 10 p.m.; 50 dB(A) 10 p.m. – 7 a.m.	Unlawful for any person within a residential area, or within a radius of 500 feet therefrom, to operate equipment or perform any outside construction or repair work on buildings, structures, or projects, or to operate any pile driver, power shovel, pneumatic hammer, derrick, power hoist, or any other construction type devise between the hours of 10:00 p.m. of one day and 7:00 a.m. of the next day in such a manner that a person of normal sensitiveness, as determined utilizing the criteria established in Section 8.47.050(a), is caused discomfort or annoyance unless such operations are of an emergency nature.	Section 8.47.060(D)	C04 Reaches: 22 C05 Reaches: 5, 8, 9, 10, 11, & 12
Huntington Beach	Residential: 55 dB(A) 7 a.m. – 10 p.m.; 50 dB(A) 10 p.m. – 7 a.m. Institutional/Office-Professional: 55 dB(A) anytime Commercial Properties (excluding office-professional properties): 60 dB(A) anytime Industrial Properties: 70 dB(A) anytime	Exempts noise sources associated with construction activities from the City's exterior and interior noise standards provided that a permit has been obtained from the City and that the construction activities do not occur between the hours of 8:00 p.m. and 7:00 a.m. on weekdays and Saturday or at any time on Sundays or federal holidays.	Chapter 8.40.050	C02 Reaches: 23 C04 Reaches: 20 C05 Reaches: 1, 2, & 3 C06 Reaches:

Jurisdiction	Noise Ordinance or General Plan Standards	Exemptions	Municipal Code Location	Applicable Focal Area
				13, 14, & 15 Warner Avenue Bridge Tide Gates
Santa Ana	Residential: 55 dB(A) 7 a.m. – 10 p.m.; 50 dB(A) 10 p.m. – 7 a.m.	Exempts noise sources associated with construction, repair, remodeling, or grading of any real property, provided said activities do not take place between the hours of 8 p.m. and 7 a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday, and noise sources associated with maintenance of real property, provided said activities take place between 7 a.m. and 8 p.m. on any day except Sunday or a federal holiday, or between the hours of 9 a.m. and 8 p.m. on Sunday or a federal holiday.	Section 18-312	C05 Reaches: 5, 6, 7, & 8
Seal Beach	Residential: 55 dB(A) 7 a.m. – 10 p.m.; 50 dB(A) 10 p.m. – 7 a.m. Commercial Properties: 65 dB(A) anytime Industrial, Manufacturing, & Oil Properties: 70 dB(A) anytime	Exempts noise associated with construction, repair, remodeling or grading of real property performed in the following periods: between 7:00 a.m. and 8:00 p.m. on weekdays and between 8:00 a.m. and 8:00 p.m. on Saturday.	Section 7.15.025	C02 Reaches: 23
Westminster	Residential: 55 dB(A) 7 a.m. – 10 p.m.; 55 dB(A) 10 p.m. – 7 a.m. Commercial/Industrial Properties: 60 dB(A) 7 a.m. – 10 p.m.; 55 dB(A) 10 p.m. – 7 a.m.	Exempts noise sources associated with construction repair, remodeling, or grading of any real property from the exterior noise standards, provided that the activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or	Section 8.28	C04 Reaches: 20, 21, & 22 C05 Reaches: 3, 4, & 5

Jurisdiction	Noise Ordinance or General Plan Standards	Exemptions	Municipal Code Location	Applicable Focal Area
		at any time on Sunday or a federal holiday.		

Sources: Fountain Valley Municipal Code Section 6.28.050, Garden Grove Municipal Code Section 8.47.040, Huntington Beach Municipal Code Section 8.40.050, Santa Ana Municipal Code Section 18-312, Seal Beach Municipal Code Section 7.15.015, Westminster Municipal Code Section 8.28.040, and Orange County Municipal Code Section 4-6-5.

5.7.2 Impact Significance Criteria

The impact criteria below were taken from Appendix G of the CEQA guidelines and are also being adopted for NEPA. For purposes of this analysis, the No Action Plan, NED Plan, and LPP would have a significant impact related to Noise if it would:

IMPACT NV-1: Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

IMPACT NV-2: Generation of excessive groundborne vibration or groundborne noise levels.

IMPACT NV-3: For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.

5.7.3 Mitigation Measures

MM-NV-1 The contractor will prepare a construction noise and vibration plan prior to construction. The noise and vibration plan will detail BMPs to be incorporated such as use of construction equipment equipped with noise-reduction devices, use of electrically powered equipment when feasible, and use of silent-pile driver where applicable. The plan will also detail the location of stationary noise-generating equipment such as generators, cement batch plant, etc., and the location of temporary sound walls that will be installed to minimize noise levels during construction activities. The plan will also detail how noise complaints will be received and resolved by the contractor.

MM-NV-2 Before construction activity begins within 50 feet of one or more residences or businesses, the local sponsor (i.e., OCPW) shall provide written notification to the potentially affected residents or business owners, identifying the type, duration, and frequency of construction activities. A noise disturbance coordinator shall be designated and contact information shall be provided in the notices and posted near the project area in a conspicuous location that is clearly visible to nearby receptors most likely to be disturbed. The coordinator shall manage complaints and concerns resulting from noise-generating activities. The severity of the noise concern would be assessed by the coordinator and if necessary, evaluated by a qualified noise control engineer.

MM-NV-3 To minimize noise impacts the following measures will be implemented:

- Place portable acoustic panels next to residential areas, sensitive receptors, or other locations where heavy equipment is operating to minimize construction noise levels. Portable acoustic panels are anticipated to result in a minimum 5 dB of noise reduction.
- All construction equipment will be equipped with noise reduction features, such as mufflers and engine shrouds.
- Onsite generators and booster pumps will be enclosed entirely.
- Use of quieter than standard equipment, including electrically powered equipment instead of internal combustion equipment, where use of such equipment is a readily available substitute that accomplishes project tasks in the same manner as internal combustion equipment.

MM-NV-4 A silent pile driver may be used instead of an impact or vibratory pile driver where sensitive ecological resources, where sensitive receptors are nearby, or other locations where applicable.

MM-NV-5 The use of bells, whistles, alarms and horns shall be restricted to safety warning purposes only.

5.7.4 Noise Impacts

5.7.4.1 IMPACT NV-1: Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Plan, demolition and construction activities associated with the various alternatives would not occur. Therefore, no direct noise impacts would result from the No Action Plan. However, ambient noise levels along the channels and within OBB would continue to be affected by the traffic noise from PCH as well as surrounding arterial streets. In addition, repair work within the channels could be required in the future, and these repairs which could be minor to extensive depending on the scope and location of the work would generate temporary noise impacts. Noise levels would return to pre-repair work levels upon completion of any construction activities.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

Implementation of the Warner Avenue Bridge measure would involve construction activities to increase the length of the bridge and remove the constriction point upstream of the bridge. The bridge is located in an urbanized area with residential use to the north, BCER to the south and east, and the Pacific Ocean to the west. The project would not generate any new long-term operational noise, such as mechanical equipment or vehicle trips. However, the project would require the use of construction equipment, which generates noise.

The residential area that may be affected by project noise is located in Huntington Beach. The City of Huntington Beach General Plan and City municipal codes regulate land uses and noise creating activities in the proposed project area. The City of Huntington Beach Municipal Code identifies exterior noise standards for various land uses. For Huntington Beach, noise levels at residential land uses are considered to be normally acceptable if noise levels are 55 dBA CNEL between 7:00 a.m. and 10:00 p.m. and 50 dBA CNEL 10:00 p.m. to 7:00 a.m. (Table 71).

The City of Huntington Beach Municipal Code exempts construction noise from the noise ordinance standards. The code states that the following activities shall be exempted from the provisions of the noise ordinance: "Noise sources associated with construction repair, remodeling, or grading of any real property, provided said activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday or at any time on Sunday or a federal holiday…"

Noise would be produced during the construction phase of the proposed project. The total proposed duration is estimated to be approximately 15 months. Construction activities would occur Monday through Friday, from 7:00 a.m. to 3:30 p.m.

Noise would be produced during the construction phase of the proposed project. The total proposed duration is estimated to be approximately 1 year and two and a half months. Construction activities would occur Monday through Friday, from 7:00 a.m. to 3:30 p.m.

Project construction temporarily would increase noise levels at residences and within BCER near the project site. The magnitude of the increases would depend on the type of construction activity, the noise level generated by various pieces of construction equipment, site geometry (i.e., shielding from intervening terrain or other structures), and the distance between the noise source and receiver.

Noise from construction activity would be generated by the broad array of powered, noise-producing mechanical equipment used in the construction process. This equipment ranges from hand-held pneumatic tools to dump trucks, concrete pump trucks, excavators, and pile drivers. The exact complement of noise-producing equipment that would be in use during various phases of a typical construction project were evaluated in the Mitigated Negative Declaration for the Westminster Channel (C04) from Hoover Street to Beach Boulevard (ICF Jones & Stokes 2009) and are used for the evaluation of this proposed project. Noise levels associated with various construction phases when all pertinent equipment is present and operating, at a reference distance of 50 feet, are shown in Table 72. This analysis uses the average noise levels shown in Table 72 for the loudest construction phase. This information indicates that the overall average noise level generated on a construction site (excluding pile driving activities) could be 89 dBA at a distance of 50 feet during excavation and finishing phases.

Table 72: Typical Noise Levels from Construction Activities for Public Works Projects

Construction Activity	Average Sound Level at 50 feet (dBA L_{eq})[1]	Standard Deviation (dB)
Ground Clearing	84	7
Excavation	89	6
Foundations	78	3
Erection	87	6
Finishing	89	7

[1] Sound level with all pertinent equipment operating.
Source: Bolt, Beranek and Newman (Prepared under contract for the EPA), Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances, December 31, 1971.

The proposed modification of the Warner Avenue Bridge and the removal of the upstream constriction point noise level of 89 dBA L_{eq} at 50 feet would attenuate to approximately 69 dBA L_{eq} at the residences approximately 280 feet north of the bridge and approximately 79 dBA Leq at the Bolsa Chica Conservancy building located approximately 150 feet west of the bridge. Using the established standards for exterior noise levels at residential land uses (Table 71) as the threshold for a significant adverse impact, the above noise levels are approximately 14-19 decibels and 24-29 higher, respectively, than the established standards. Noise-level increases of this magnitude, although temporary, would be readily audible, would dominate the noise environment in the area during construction operations, and would be considered a significant adverse impact. While mitigation measures MM-NV-1 through MM-NV-5 would be implemented to minimize construction noise impacts, it is unlikely that these mitigation measures would reduce the noise levels to below the exterior noise levels at residential land uses threshold. Therefore, this would be a potentially significant impact that is unavoidable, but is temporary lasting only the duration of construction activities.

In addition to general construction activities, the proposed lengthening of the Warner Avenue Bridge would also involve pile driving for installation of new bridge piers. Typical noise levels associated with impact pile driving is 101 dBA L_{eq} at 50 feet (USDOT 2006). This noise level would attenuate to approximately 81 dBA L_{eq} at the residences approximately 280 feet north of the proposed project and approximately 91 dBA Leq at the Bolsa Chica Conservancy building located approximately 150 feet west of the proposed project. Using the established standards for exterior noise levels at residential land uses (Table 71) as the threshold for a significant adverse impact, the above noise levels are approximately 26-31 decibels and 36-41 decibels higher, respectively, than the established standards. Noise level increases of this magnitude, although temporary, would be readily audible, would dominate the noise environment in the area during construction operations, and would be considered a significant adverse impact. Mitigation measure MM-NV-4, which is the use of a silent pile driver would be implemented to minimize this potential noise adverse impact. A Giken silent pile machine pushes the pile into the ground without an impact hammer or vibration. The operation, with the exception of a crane engine (to hold the sheet) and the generator to power the Giken machine, is almost silent. Therefore, use of the Giken machine would reduce airborne noise levels typically associated with pile driving. As mentioned, use of the Giken would require a crane and generator. A crane typically produces noise levels of 87 dBA at a distance of 50 feet from the source while a generator typically produces noise levels of 87 dBA at a distance of 50 feet from the source. These noise levels would attenuate to approximately 67 dBA Leq at the residences approximately 280 feet north of the proposed project and approximately 77 dBA Leq at the Bolsa Chica Conservancy building located approximately 150 feet west of the proposed project. These noise levels are approximately 12 decibels and 22 decibels higher, respectively, than the established standards. Although mitigation measure MM-NV-4 would be implemented and would reduce the noise level typically associated with pile driving, the noise level would still exceed established standards for exterior noise levels at residential land uses threshold. Therefore, this would be a potentially significant impact that is unavoidable, but is temporary lasting only the duration of construction activities.

Overall, while mitigation measures MM-NV-1 through MM-NV-5 would be implemented to minimize construction noise impacts, it is unlikely that these mitigation measures would reduce the noise levels to below the exterior noise levels at residential land uses threshold. Therefore, this would be a potentially significant impact that is unavoidable, but is temporary lasting only the duration of construction activities.

Indirect Impacts

Indirect noise-related impacts would occur from off-site vehicle travel (e.g., haul trucks) associated with construction of the proposed project. Because no local noise standards directly apply to such sources of

noise, the off-site vehicle travel noise impacts would not conflict with any local general plan or noise ordinance and there would be no impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. All operation and maintenance activities would occur during the daytime hours when construction noise would be exempt under local ordinances. Therefore, the long-term operation and maintenance activities would not conflict with standards established in the local general plans or noise ordinance standards and there would be no impact.

Tide Gates

Direct Impacts

Implementation of this measure would involve construction activities to permanently remove the tide gates located at the downstream end of C05 Reach 1. The tide gates are located in the vicinity of the BCER with residential use to the east, the BCER to the north and south, and the Pacific Ocean to the west. The project would not generate any new long-term operational noise, such as mechanical equipment or vehicle trips. However, the project would require the use of construction equipment, which generates noise.

The residential area that may be affected by project noise is located in Huntington Bach. The City of Huntington Beach General Plan and City municipal codes regulate land uses and noise creating activities in the proposed project area. The City of Huntington Beach Municipal Code identifies exterior noise standards for various land uses. For Huntington Beach, noise levels at residential land uses are considered to be normally acceptable if noise levels are 55 dBA CNEL between 7:00 a.m. and 10:00 p.m. and 50 dBA CNEL 10:00 p.m. to 7:00 a.m. (Table 71).

The City of Huntington Beach Municipal Code exempts construction noise from the noise ordinance standards. Both codes state that the following activities shall be exempted from the provisions of the noise ordinance: “Noise sources associated with construction repair, remodeling, or grading of any real property, provided said activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday or at any time on Sunday or a federal holiday…”

Noise would be produced during the construction phase of the proposed project. The total proposed duration is estimated to be approximately 15 months. Construction activities would occur Monday through Friday, from 7:00 a.m. to 3:30 p.m.

Project construction temporarily would increase noise levels within the BCER near the project site. Construction is not expected to increase noise levels at the residences located approximately 2,500 feet east of the project, since noise levels would attenuate to below established standards (e.g., 49 dBA L_{eq} at approximately 450 feet) for exterior noise levels at residential land uses (Table 71). The magnitude of the increase would depend on the type of construction activity, the noise level generated by various pieces of construction equipment, site geometry (i.e., shielding from intervening terrain or other structures), and the distance between the noise source and receiver.

Noise from construction activity would be generated by the broad array of powered, noise-producing mechanical equipment used in the construction process. This equipment ranges from hand-held pneumatic tools to dump trucks, concrete pump trucks, excavators, and pile drivers. The exact complement of noise-producing equipment that would be in use during various phases of a typical construction project were evaluated in the Mitigated Negative Declaration for the Westminster Channel (C04) from Hoover Street to Beach Boulevard (ICF Jones & Stokes 2009) and are used for the evaluation of this proposed project. Noise levels associated with various construction phases when all pertinent equipment is present and operating, at a reference distance of 50 feet, are shown in Table 72. This analysis uses the average noise levels shown in Table 72 for the loudest construction phase. This information indicates that the overall average noise level generated on a construction site (excluding pile driving activities) could be 89 dBA at a distance of 50 feet during excavation and finishing phases.

The proposed removal of the tide gates and replacement with an access bridge would generate a noise level of 89 dBA L_{eq} at 50 feet within the BCER which surrounds the area. Using the established standards for exterior noise levels at residential land uses (Table 71) as the threshold for a significant adverse impact, the above noise levels are approximately 34-39 decibels higher than the established standards. Noise-level increases of this magnitude, although temporary, would be readily audible, would dominate the noise environment in the area during construction operations, and would be considered a significant adverse impact. While mitigation measures MM-NV-1 through MM-NV-5 would be implemented to minimize construction noise impacts, it is unlikely that these mitigation measures would reduce the noise levels to below the exterior noise levels at residential land uses threshold. Therefore, this would be a potentially significant impact that is unavoidable, but is temporary lasting only the duration of construction activities.

Indirect Impacts

Indirect noise-related impacts would occur from off-site vehicle travel (e.g., haul trucks) associated with permanent removal of the tide gates on C05 Reach 1. Because no local noise standards directly apply to such sources of noise, the off-site vehicle travel noise impacts would not conflict with any local general plan or noise ordinance and there would be no impact.

Long-Term Operation and Maintenance Impacts

The proposed project calls for the replacement of the tide gates with a new access bridge that would require maintenance. Maintenance activities associated with the access bridge would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. All operation and maintenance activities would occur during the daytime hours when construction noise would be exempt under local ordinances. Therefore, the long-term operation and maintenance activities would not conflict with standards established in the local general plans or noise ordinance standards and there would be no impact.

Channels C02/C04

Direct Impacts

Modification of the C02/C04 channels would involve construction activities to increase the conveyance efficiency of the channels. The channels are located in an urbanized area with a mix of residential and industrial use. One exception is C02 Reach 23 which has residential located to the west, south, and east

and the SBNWR and Seal Beach Naval Weapons Station located to the north. The project would not generate any new long-term operational noise, such as mechanical equipment or vehicle trips. However, the project would require the use of construction equipment, which generates noise.

The residential areas that may be affected by project noise are located in the Cities of Huntington Beach, Westminster, and Garden Grove. The Cities of Huntington Beach, Westminster, and Garden Grove General Plans and City municipal codes regulate land uses and noise creating activities in the proposed project area. The City of Huntington Beach and City of Westminster municipal codes identifies exterior noise standards for various land uses. For Garden Grove and Huntington Beach, noise levels at residential land uses are considered to be normally acceptable if noise levels are 55 dBA CNEL between 7:00 a.m. and 10:00 p.m. and 50 dBA CNEL 10:00 p.m. to 7:00 a.m. (Table 71). For Westminster, noise levels at residential land uses are considered to be normally acceptable if noise levels are 55 dBA CNEL between 7:00 a.m. and 10:00 p.m. and 55 dBA CNEL 10:00 p.m. to 7:00 a.m. (Table 71).

The City of Huntington Beach, City of Garden Grove, and City of Westminster municipal codes exempt construction noise from the noise ordinance standards. The City of Huntington Beach and City of Westminster codes state that the following activities shall be exempted from the provisions of the noise ordinance: “Noise sources associated with construction repair, remodeling, or grading of any real property, provided said activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday or at any time on Sunday or a federal holiday…” The City of Garden Grove code states that the following activities shall be exempted from the provisions of the noise ordinance: “It shall be unlawful for any person within a residential area, or within a radius of 500 feet therefrom, to operate equipment or perform any outside construction or repair work on buildings, structures, or projects, or to operate any pile driver, power shovel, pneumatic hammer, derrick, power hoist, or any other construction type device between the hours of 10:00 p.m. of one day and 7:00 a.m. of the next day…”

Noise would be produced during the construction phase of the proposed project. The total proposed duration is estimated to be approximately 6 years and 9 months. Construction activities would occur Monday through Friday, from 7:00 a.m. to 3:30 p.m.

Project construction temporarily would increase noise levels at residences within the vicinities of the channels and within the SBNWR and Seal Beach Naval Weapons Station which is located north of C02 Reach 23. The magnitude of the increases would depend on the type of construction activity, the noise level generated by various pieces of construction equipment, site geometry (i.e., shielding from intervening terrain or other structures), and the distance between the noise source and receiver.

Noise from construction activity would be generated by the broad array of powered, noise-producing mechanical equipment used in the construction process. This equipment ranges from hand-held pneumatic tools to dump trucks, concrete pump trucks, excavators, and pile drivers. The exact complement of noise-producing equipment that would be in use during various phases of a typical construction project were evaluated in the Mitigated Negative Declaration for the Westminster Channel (C04) from Hoover Street to Beach Boulevard (ICF Jones & Stokes 2009) and are used for the evaluation of this proposed project. Noise levels associated with various construction phases when all pertinent equipment is present and operating, at a reference distance of 50 feet, are shown in Table 72. This analysis uses the average noise levels shown in Table 72 for the loudest construction phase. This information indicates that the overall average noise level generated on a construction site (excluding pile driving activities) could be 89 dBA at a distance of 50 feet during excavation and finishing phases.

The proposed modification of the C02/C04 channels would generate a noise level of 89 dBA L_{eq} at 50 feet which is as close as some of the residences within the area are to the channels. This noise level is approximately 34-39 decibels higher than the established standards for exterior noise levels at residential land uses (Table 71). Noise-level increases of this magnitude, although temporary, would be readily audible and would dominate the noise environment in the area during construction operations. Although the various Cities and County's noise ordinances exempt construction activities from the noise standard (providing that such activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday), mitigation measures are recommended to control and reduce the noise levels to the extent practicable.

The proposed modification of the C02/C04 channels would generate a noise level of 89 dBA L_{eq} at 50 feet which is as close as some of the residences within the area are to the channels. Using the established standards for exterior noise levels at residential land uses (Table 71) as the threshold for a significant adverse impact, the above noise level is approximately 34-39 decibels higher than the established standards. Noise-level increases of this magnitude, although temporary, would be readily audible, would dominate the noise environment in the area during construction operations, and would be considered a significant adverse impact. While mitigation measures MM-NV-1 through MM-NV-5 would be implemented to minimize construction noise impacts, it is unlikely that these mitigation measures would reduce the noise levels to below the exterior noise levels at residential land uses threshold. Therefore, this would be a potentially significant impact that is unavoidable, but is temporary lasting only the duration of construction activities.

In addition to general construction activities, the modification of C02 Reach 23 would involve pile driving for installation of a sheet pile wall along the south side of the channel. Typical noise levels associated with impact pile driving is 101 dBA L_{eq} at 50 feet (USDOT 2006). This noise level would attenuate to approximately 86 dBA L_{eq} and 91 dBA L_{eq} at the SBNWR and Seal Beach Naval Weapons Station located approximately 200 feet north and the residences located approximately 150 feet south of the proposed project, respectively. Using the established standards for exterior noise levels at residential lands uses (Table 71) as the threshold for a significant adverse impact, the above noise levels are approximately 36-31 decibels and 36-41 decibels higher, respectively, than the established standards. Noise level increases of this magnitude, although temporary, would be readily audible, would dominate the noise environment in the area during construction operations, and would be considered a significant adverse impact. Mitigation measure MM-NV-4, which is the use of a silent pile driver would be implemented to minimize this potential noise adverse impact. Use of the silent pile driver would reduce airborne noise levels typically associated with pile driving. The operation of a silent pile driver requires the use of a crane and generator which typically produce noise levels of 87 dBA at a distance of 50 feet from the source. These noise levels would attenuate to approximately 72 dBA Leq at the Seal Beach Naval Weapons Station approximately 200 feet north and approximately 77 dBA Leq at the residences about 150 feet south of the proposed project. These noise levels are approximately 17 decibels and 22 decibels higher, respectively, than the established standards. Although mitigation measure MM-NV-4 would be implemented and would reduce the noise level typically associated with pile driving, the noise level would still exceed established standards for exterior noise levels at residential land uses threshold. Therefore, this would be a potentially significant impact that is unavoidable, but is temporary lasting only the duration of construction activities.

Overall, while mitigation measures MM-NV-1 through MM-NV-5 would be implemented to minimize construction noise impacts, it is unlikely that these mitigation measures would reduce the noise levels to below the exterior noise levels at residential land uses threshold. Therefore, this would be a potentially significant impact that is unavoidable, but is temporary lasting only the duration of construction activities.

Indirect Impacts

Indirect noise-related impacts would occur from off-site vehicle travel (e.g., haul trucks) associated with construction of the proposed project. Because no local noise standards directly apply to such sources of noise, the off-site vehicle travel noise impacts would not conflict with any local general plan or noise ordinance and there would be no impact.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. All operation and maintenance activities would occur during the daytime hours when construction noise would be exempt under local ordinances. Therefore, the long-term operation and maintenance activities would not conflict with standards established in the local general plans or noise ordinance standards and there would be no impact.

Channels C05/C06

Direct Impacts

Modification of the C05/C06 channels would involve construction activities to increase the conveyance efficiency of the channels. The channels are located in an urbanized area with a mix of residential and industrial use. One exception is C05 Reach 1, of which from the downstream end upstream approximately 2,600 feet is surrounded by the BCER. The remainder of C05 Reach 1 is surrounds by a mix of residential and industrial use. The project would not generate any new long-term operational noise, such as mechanical equipment or vehicle trips. However, the project would require the use of construction equipment, which generates noise.

The residential areas that may be affected by project noise are located in the Cities of Garden Grove, Fountain Valley, Huntington Beach, Santa Ana, and Westminster. The Cities of Garden Grove, Fountain Valley, Huntington Beach, Santa Ana, and Westminster General Plans and City municipal codes regulate land uses and noise creating activities in the proposed project area. The City of Fountain Valley, City of Garden Grove, City of Huntington Beach, City of Santa Ana, and City of Westminster municipal codes identify exterior noise standards for various land uses. For Fountain Valley, Garden Grove, Huntington Beach, and Santa Ana, noise levels at residential land uses are considered to be normally acceptable if noise levels are 55 dBA CNEL between 7:00 a.m. and 10:00 p.m. and 50 dBA CNEL 10:00 p.m. to 7:00 a.m. (Table 71). For Westminster, noise levels at residential land uses are considered to be normally acceptable if noise levels are 55 dBA CNEL between 7:00 a.m. and 10:00 p.m. and 55 dBA CNEL 10:00 p.m. to 7:00 a.m. (Table 71). The City of Fountain Valley, City of Garden Grove, City of Huntington Beach, City of Santa Ana, and City of Westminster municipal codes exempt construction noise from the noise ordinance standards.

The City of Huntington Beach, City of Santa Ana, and City of Westminster codes state that the following activities shall be exempted from the provisions of the noise ordinance: “Noise sources associated with construction repair, remodeling, or grading of any real property, provided said activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday or at any time on Sunday or a federal holiday…” The City of Garden Grove code states that the following activities shall be exempted from the provisions of the noise ordinance: “It shall be unlawful for any person within a residential area, or within a radius of 500 feet therefrom, to operate equipment or perform any outside construction or repair work on buildings, structures, or projects, or to operate any pile driver, power shovel, pneumatic hammer, derrick, power hoist, or any other construction type device between the hours

of 10:00 p.m. of one day and 7:00 a.m. of the next day…" The City of Fountain Valley code states that the following activities shall be exempted from the provisions of the noise ordinance: "Noise sources associated with the construction, repair, remodeling or grading or any real property, provided said activities take place between the hours of 7:00 a.m. and 8:00 p.m. Monday through Friday, 9:00 a.m. through 8:00 p.m. on Saturday and at no time on Sunday or any legal holiday…"

Noise would be produced during the construction phase of the proposed project. The total proposed duration is estimated to be approximately 11 years and four months. Construction activities would occur Monday through Friday, from 7:00 a.m. to 3:30 p.m.

Project construction temporarily would increase noise levels at residences within the vicinities of the channels and within the BCER which surrounds C05 Reach 1 from the downstream end upstream approximately 2,600 feet. The magnitude of the increases would depend on the type of construction activity, the noise level generated by various pieces of construction equipment, site geometry (i.e., shielding from intervening terrain or other structures), and the distance between the noise source and receiver.

Noise from construction activity would be generated by the broad array of powered, noise-producing mechanical equipment used in the construction process. This equipment ranges from hand-held pneumatic tools to dump trucks, concrete pump trucks, excavators, and pile drivers. The exact complement of noise-producing equipment that would be in use during various phases of a typical construction project were evaluated in the Mitigated Negative Declaration for the Westminster Channel (C04) from Hoover Street to Beach Boulevard (ICF Jones & Stokes 2009) and are used for the evaluation of this proposed project. Noise levels associated with various construction phases when all pertinent equipment is present and operating, at a reference distance of 50 feet, are shown in Table 72. This analysis uses the average noise levels shown in Table 72 for the loudest construction phase. This information indicates that the overall average noise level generated on a construction site (excluding pile driving activities) could be 89 dBA at a distance of 50 feet during excavation and finishing phases.

The proposed modification of the C05/C06 channels would generate a noise level of 89 dBA L_{eq} at 50 feet which is as close as some of the residences within the area are to the channels. Using the established standards for exterior noise levels at residential land uses (Table 71) as the threshold for a significant adverse impact, the above noise level is approximately 34-39 decibels higher than the established standards. Noise-level increases of this magnitude, although temporary, would be readily audible, would dominate the noise environment in the area during construction operations, and would be considered a significant adverse impact. While mitigation measures MM-NV-1 through MM-NV-5 would be implemented to minimize construction noise impacts, it is unlikely that these mitigation measures would reduce the noise levels to below the exterior noise levels at residential land uses threshold. Therefore, this would be a potentially significant impact that is unavoidable, but is temporary lasting only the duration of construction activities.

In addition to general construction activities, the modification of C05 Reach 1 would involve pile driving for installation of double sheet pile walls along the north and south sides of the channel. Typical noise levels associated with impact pile driving is 101 dBA L_{eq} at 50 feet (USDOT 2006) which is as close as BCER and some residences within the vicinity of C05 Reach 1 are located. Using the established standards for exterior noise levels at residential land uses (Table 71) as the threshold for a significant adverse impact, the above noise level is approximately 51-46 decibels higher than the established standards. Noise level increases of this magnitude, although temporary, would be readily audible, would dominate the noise environment in the area during construction operations, and would be considered a

significant adverse impact. Mitigation measure MM-NV-4, which is the use of a silent pile driver would be implemented to minimize this potential noise adverse impact. Use of the silent pile driver would reduce airborne noise levels typically associated with pile driving. The operation of a silent pile driver requires the use of a crane and generator which typically produce noise levels of 87 dBA at a distance of 50 feet from the source. Since BCER and some residences within the vicinity of C05 Reach 1 are located within 50 feet of the channel, the noise level during silent pile driving would be 87 dBA. This noise level is approximately 32 decibels higher than the established standard. Although mitigation measure MN-NV-5 would be implemented and would reduce the noise level typically associated with impact pile driving, the noise level would still exceed established standards for exterior noise levels at residential land uses threshold. Therefore, this would be a potentially significant impact that is unavoidable, but is temporary lasting only the duration of construction activities.

Overall, while mitigation measures MM-NV-1 through MM-NV-5 would be implemented to minimize construction noise impacts, it is unlikely that these mitigation measures would reduce the noise levels to below the exterior noise levels at residential land uses threshold. Therefore, this would be a potentially significant impact that is unavoidable, but is temporary lasting only the duration of construction activities.

Indirect Impacts

Indirect noise-related impacts would occur from off-site vehicle travel (e.g., haul trucks) associated with construction of the channels. Because no local noise standards directly apply to such sources of noise, the off-site vehicle travel noise impacts would not conflict with any local general plan or noise ordinance and there would be no impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the channels would be no different than maintenance activities that are undertaken currently for the channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. All maintenance activities would occur during the daytime hours when construction noise would be exempt under local ordinances. Therefore, the long-term operation and maintenance activities would not conflict with standards established in the local general plans or noise ordinance standards and there would be no impact.

Level of Impact for the NED Plan

Potentially Significant Impact. Mitigation measures MM-NV-1 through MM-NV-5 would be implemented during construction activities to minimize noise levels during construction activities, however, it is unlikely that these mitigation measures would reduce construction noise levels to below the exterior noise levels at residential land uses threshold. Therefore, a potentially significant direct impact is anticipated due to construction activities. This would only be a temporary direct impact lasting only the duration of construction activities. Once construction is complete, noise levels would return to pre-project levels. It is important to note, that although construction noise is being considered a potentially significant impact, construction noise is exempted from the various City noise ordinances.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Channels C02/C04

Direct Impacts

Modification of the C02/C04 channels would involve construction activities to increase the capacity and conveyance efficiency of the channels. The channels are located in an urbanized area with a mix of residential and industrial use. One exception is C02 Reach 23 which has residential located to the west, south, and east and the SBNWR and Seal Beach Naval Weapons Station located to the north. The project would not generate any new long-term operational noise, such as mechanical equipment or vehicle trips. However, the project would require the use of construction equipment, which generates noise.

The residential areas that may be affected by project noise are located in the Cities of Huntington Beach, Westminster, and Garden Grove. The Cities of Huntington Beach, Westminster, and Garden Grove General Plans and City municipal codes regulate land uses and noise creating activities in the proposed project area. The City of Huntington Beach, City of Garden Grove, and City of Westminster municipal codes identify exterior noise standards for various land uses. For Garden Grove and Huntington Beach, noise levels at residential land uses are considered to be normally acceptable if noise levels are 55 dBA CNEL between 7:00 a.m. and 10:00 p.m. and 50 dBA CNEL 10:00 p.m. to 7:00 a.m. (Table 71). For Westminster, noise levels at residential land uses are considered to be normally acceptable if noise levels are 55 dBA CNEL between 7:00 a.m. and 10:00 p.m. and 55 dBA CNEL 10:00 p.m. to 7:00 a.m. (Table 71).

The City of Huntington Beach, City of Garden Grove, and City of Westminster municipal codes exempt construction noise from the noise ordinance standards. The City of Huntington Beach and City of Westminster codes state that the following activities shall be exempted from the provisions of the noise ordinance: “Noise sources associated with construction repair, remodeling, or grading of any real property, provided said activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday or at any time on Sunday or a federal holiday…” The City of Garden Grove code states that the following activities shall be exempted from the provisions of the noise ordinance: “It shall be unlawful for any person within a residential area, or within a radius of 500 feet therefrom, to operate equipment or perform any outside construction or repair work on buildings, structures, or projects, or to operate any pile driver, power shovel, pneumatic hammer, derrick, power hoist, or any other construction type device between the hours of 10:00 p.m. of one day and 7:00 a.m. of the next day…”

Noise would be produced during the construction phase of the proposed project. The total proposed duration is estimated to be approximately 9 years and six months. Construction activities would occur Monday through Friday, from 7:00 a.m. to 3:30 p.m.

Project construction temporarily would increase noise levels at residences within the vicinities of the channels and within the SBNWR and Seal Beach Naval Weapons Station which is located north of C02 Reach 23. The magnitude of the increases would depend on the type of construction activity, the noise level generated by various pieces of construction equipment, site geometry (i.e., shielding from intervening terrain or other structures), and the distance between the noise source and receiver.

Noise from construction activity would be generated by the broad array of powered, noise-producing mechanical equipment used in the construction process. This equipment ranges from hand-held pneumatic tools to dump trucks, concrete pump trucks, excavators, and pile drivers. The exact complement of noise-producing equipment that would be in use during various phases of a typical construction project were evaluated in the Mitigated Negative Declaration for the Westminster Channel (C04) from Hoover Street to Beach Boulevard (ICF Jones & Stokes 2009) and are used for the evaluation of this proposed project. Noise levels associated with various construction phases when all pertinent equipment is present and operating, at a reference distance of 50 feet, are shown in Table 72. This analysis uses the average noise levels shown in Table 72 for the loudest construction phase. This information indicates that the overall average noise level generated on a construction site (excluding pile driving activities) could be 89 dBA at a distance of 50 feet during excavation and finishing phases.

The proposed modification of the C02/C04 channels would generate a noise level of 89 dBA L_{eq} at 50 feet which is as close as some of the residences within the area are to the channels. Using the established standards for exterior noise levels at residential land uses (Table 71) as the threshold for a significant adverse impact, the above noise level is approximately 34-39 decibels higher than the established standards. Noise-level increases of this magnitude, although temporary, would be readily audible, would dominate the noise environment in the area during construction operations, and would be considered a significant adverse impact. While mitigation measures MM-NV-1 through MM-NV-5 would be implemented to minimize construction noise impacts, it is unlikely that these mitigation measures would reduce the noise levels to below the exterior noise levels at residential land uses threshold. Therefore, this would be a potentially significant impact that is unavoidable, but is temporary lasting only the duration of construction activities.

In addition to general construction activities, the modification of C02 Reach 23 would involve pile driving for installation of a sheet pile wall along the south side of the channel. Typical noise levels associated with impact pile driving is 101 dBA L_{eq} at 50 feet (USDOT 2006). This noise level would attenuate to approximately 86 dBA L_{eq} and 91 dBA L_{eq} at the SBNWR and Seal Beach Naval Weapons Station located approximately 200 feet north and the residences located approximately 150 feet south of the proposed project, respectively. Using the established standards for exterior noise levels at residential land uses (Table 71) as the threshold for a significant adverse impact, the above noise levels are approximately 36-31 decibels and 36-41 decibels higher, respectively, than the established standards. Noise level increases of this magnitude, although temporary, would be readily audible, would dominate the noise environment in the area during construction operations, and would be considered a significant adverse impact. Mitigation measure MM-NV-4, which is the use of a silent pile driver would be implemented to minimize this potential noise adverse impact. Use of the silent pile driver would reduce airborne noise levels typically associated with pile driving. The operation of a silent pile driver requires the use of a crane and generator which typically produce noise levels of 87 dBA at a distance of 50 feet from the source. These noise levels would attenuate to approximately 72 dBA Leq at the Seal Beach Naval Weapons Station approximately 200 feet north and approximately 77 dBA Leq at the residences about 150 feet south of the proposed project. These noise levels are approximately 17 decibels and 22 decibels higher, respectively, than the established standards. Although mitigation measure MM-NV-4 would be implemented and would reduce the noise level typically associated with pile driving, the noise

level would still exceed established standards for exterior noise levels at residential land uses threshold. Therefore, this would be a potentially significant impact that is unavoidable, but is temporary lasting only the duration of construction activities.

Overall, while mitigation measures MM-NV-1 through MM-NV-5 would be implemented to minimize construction noise impacts, it is unlikely that these mitigation measures would reduce the noise levels to below the exterior noise levels at residential land uses threshold. Therefore, this would be a potentially significant impact that is unavoidable, but is temporary lasting only the duration of construction activities.

Indirect Impacts

Indirect noise-related impacts would occur from off-site vehicle travel (e.g., haul trucks) associated with construction of the proposed project. Because no local noise standards directly apply to such sources of noise, the off-site vehicle travel noise impacts would not conflict with any local general plan or noise ordinance and there would be no impact.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. All operation and maintenance activities would occur during the daytime hours when construction noise would be exempt under local ordinances. Therefore, the long-term operation and maintenance activities would not conflict with standards established in the local general plans or noise ordinance standards and there would be no impact.

Channels C05/C06

Direct Impacts

Modification of the C05/C06 channels would involve construction activities to increase the capacity and conveyance efficiency of the channels. The channels are located in an urbanized area with a mix of residential and industrial use. One exception is C05 Reach 1, of which from the downstream end upstream approximately 2,600 feet is surrounded by the BCER. The remainder of C05 Reach 1 is surrounds by a mix of residential and industrial use. The project would not generate any new long-term operational noise, such as mechanical equipment or vehicle trips. However, the project would require the use of construction equipment, which generates noise.

The residential areas that may be affected by project noise are located in the Cities of Garden Grove, Fountain Valley, Huntington Beach, Santa Ana, and Westminster. The Cities of Garden Grove, Fountain Valley, Huntington Beach, Santa Ana, and Westminster General Plans and City municipal codes regulate land uses and noise creating activities in the proposed project area. The City of Fountain Valley, City of Garden Grove, City of Huntington Beach, City of Santa Ana, and City of Westminster municipal codes identify exterior noise standards for various land uses. For Fountain Valley, Garden Grove, Huntington Beach, and Santa Ana, noise levels at residential land uses are considered to be normally acceptable if noise levels are 55 dBA CNEL between 7:00 a.m. and 10:00 p.m. and 50 dBA CNEL 10:00 p.m. to 7:00 a.m. (Table 71). For Westminster, noise levels at residential land uses are considered to be normally acceptable if noise levels are 55 dBA CNEL between 7:00 a.m. and 10:00 p.m. and 55 dBA CNEL 10:00 p.m. to 7:00 a.m. (Table 71).

The City of Fountain Valley, City of Garden Grove, City of Huntington Beach, City of Santa Ana, and City of Westminster municipal codes exempt construction noise from the noise ordinance standards. The

City of Huntington Beach, City of Santa Ana, and City of Westminster codes state that the following activities shall be exempted from the provisions of the noise ordinance: “Noise sources associated with construction repair, remodeling, or grading of any real property, provided said activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday or at any time on Sunday or a federal holiday…” The City of Garden Grove code states that the following activities shall be exempted from the provisions of the noise ordinance: “It shall be unlawful for any person within a residential area, or within a radius of 500 feet therefrom, to operate equipment or perform any outside construction or repair work on buildings, structures, or projects, or to operate any pile driver, power shovel, pneumatic hammer, derrick, power hoist, or any other construction type device between the hours of 10:00 p.m. of one day and 7:00 a.m. of the next day…” The City of Fountain Valley code states that the following activities shall be exempted from the provisions of the noise ordinance: “Noise sources associated with the construction, repair, remodeling or grading or any real property, provided said activities take place between the hours of 7:00 a.m. and 8:00 p.m. Monday through Friday, 9:00 a.m. through 8:00 p.m. on Saturday and at no time on Sunday or any legal holiday…”

Noise would be produced during the construction phase of the proposed project. The total proposed duration is estimated to be approximately 13 years and six months. Construction activities would occur Monday through Friday, from 7:00 a.m. to 3:30 p.m.

Project construction temporarily would increase noise levels at residences within the vicinities of the channels and within the BCER which surrounds C05 Reach 1 from the downstream end upstream approximately 2,600 feet. The magnitude of the increases would depend on the type of construction activity, the noise level generated by various pieces of construction equipment, site geometry (i.e., shielding from intervening terrain or other structures), and the distance between the noise source and receiver.

Noise from construction activity would be generated by the broad array of powered, noise-producing mechanical equipment used in the construction process. This equipment ranges from hand-held pneumatic tools to dump trucks, concrete pump trucks, excavators, and pile drivers. The exact complement of noise-producing equipment that would be in use during various phases of a typical construction project were evaluated in the Mitigated Negative Declaration for the Westminster Channel (C04) from Hoover Street to Beach Boulevard (ICF Jones & Stokes 2009) and are used for the evaluation of this proposed project. Noise levels associated with various construction phases when all pertinent equipment is present and operating, at a reference distance of 50 feet, are shown in Table 72. This analysis uses the average noise levels shown in Table 72for the loudest construction phase. This information indicates that the overall average noise level generated on a construction site (excluding pile driving activities) could be 89 dBA at a distance of 50 feet during excavation and finishing phases.

The proposed modification of the C05/C06 channels would generate a noise level of 89 dBA L_{eq} at 50 feet which is as close as some of the residences within the area are to the channels. Using the established standards for exterior noise levels at residential land uses (Table 71) as the threshold for a significant adverse impact, the above noise levels are approximately 34-39 decibels higher than the established standards. Noise-level increases of this magnitude, although temporary, would be readily audible, would dominate the noise environment in the area during construction operations, and would be considered a significant adverse impact. While mitigation measures MM-NV-1 through MM-NV-5 would be implemented to minimize construction noise impacts, it is unlikely that these mitigation measures would reduce the noise levels to below the exterior noise levels at residential land uses threshold. Therefore, this would be a potentially significant impact that is unavoidable, but is temporary lasting only the duration of construction activities.

In addition to general construction activities, the modification of C05 Reach 1 would involve pile driving for installation of double sheet pile walls along the north and south sides of the channel. Typical noise levels associated with impact pile driving is 101 dBA L_{eq} at 50 feet (USDOT 2006) which is as close as BCER and some residences within the vicinity of C05 Reach 1 are located. Using the established standards for exterior noise levels at residential land uses (Table 71) as the threshold for a significant adverse impact, the above noise levels is approximately 51-46 decibels higher than the established standards. Noise level increases of this magnitude, although temporary, would be readily audible, would dominate the noise environment in the area during construction operations, and would be considered a significant adverse impact. Mitigation measure MM-NV-4, which is the use of a silent pile driver would be implemented to minimize this potential noise adverse impact. Use of the silent pile driver would reduce airborne noise levels typically associated with pile driving. The operation of a silent pile driver requires the use of a crane and generator which typically produce noise levels of 87 dBA at a distance of 50 feet from the source. Since BCER and some residences within the vicinity of C05 Reach 1 are located within 50 feet of the channel, the noise level during silent pile driving would be 87 dBA. This noise level is approximately 32 decibels higher than the established standard. Although mitigation measure MN-NV-5 would be implemented and would reduce the noise level typically associated with impact pile driving, the noise level would still exceed established standards for exterior noise levels at residential land uses threshold. Therefore, this would be a potentially significant impact that is unavoidable, but is temporary lasting only the duration of construction activities.

Overall, while mitigation measures MM-NV-1 through MM-NV-5 would be implemented to minimize construction noise impacts, it is unlikely that these mitigation measures would reduce the noise levels to below the exterior noise levels at residential land uses threshold. Therefore, this would be a potentially significant impact that is unavoidable, but is temporary lasting only the duration of construction activities.

Indirect Impacts

Indirect noise-related impacts would occur from off-site vehicle travel (e.g., haul trucks) associated with construction of the channels. Because no local noise standards directly apply to such sources of noise, the off-site vehicle travel noise impacts would not conflict with any local general plan or noise ordinance and there would be no impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the channels would be no different than maintenance activities that are undertaken currently for the channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. All maintenance activities would occur during the daytime hours when construction noise would be exempt under local ordinances. Therefore, the long-term operation and maintenance activities would not conflict with standards established in the local general plans or noise ordinance standards and there would be no impact.

Diversion Channel

Direct Impacts

Construction of the diversion channel would involve construction activities to increase the capacity and conveyance efficiency of the C04 channel system. The location where the diversion channel would be constructed is located in an urbanized area with a mix of residential and industrial use. The project would not generate any new long-term operational noise, such as mechanical equipment or vehicle trips. However, the project would require the use of construction equipment, which generates noise.

The residential areas that may be affected by project noise are located in the City of Westminster and the City of Westminster General Plan and City municipal code regulates land uses and noise creating activities in the proposed project area. The City of Westminster municipal code identifies exterior noise standards for various land uses. For Westminster, noise levels at residential land uses are considered to be normally acceptable if noise levels are 55 dBA CNEL between 7:00 a.m. and 10:00 p.m. and 55 dBA CNEL 10:00 p.m. to 7:00 a.m. (Table 71).

The City of Westminster municipal code exempts construction noise from the noise ordinance standards. The City of Westminster code states that the following activities shall be exempted from the provisions of the noise ordinance: "Noise sources associated with construction repair, remodeling, or grading of any real property, provided said activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday or at any time on Sunday or a federal holiday…"

Noise would be produced during the construction phase of the proposed project. The total proposed duration is estimated to be approximately 2 years. Construction activities would occur Monday through Friday, from 7:00 a.m. to 3:30 p.m.

Project construction temporarily would increase noise levels at residences within the vicinity of where the diversion channel would be constructed. The magnitude of the increases would depend on the type of construction activity, the noise level generated by various pieces of construction equipment, site geometry (i.e., shielding from intervening terrain or other structures), and the distance between the noise source and receiver.

Noise from construction activity would be generated by the broad array of powered, noise-producing mechanical equipment used in the construction process. This equipment ranges from hand-held pneumatic tools to dump trucks, concrete pump trucks, and excavators. The exact complement of noise-producing equipment that would be in use during various phases of a typical construction project were evaluated in the Mitigated Negative Declaration for the Westminster Channel (C04) from Hoover Street to Beach Boulevard (ICF Jones & Stokes 2009) and are used for the evaluation of this proposed project. Noise levels associated with various construction phases when all pertinent equipment is present and operating, at a reference distance of 50 feet, are shown in Table 72. This analysis uses the average noise levels shown in Table 72 for the loudest construction phase. This information indicates that the overall average noise level generated on a construction site could be 89 dBA at a distance of 50 feet during excavation and finishing phases.

The proposed construction of the diversion channel would generate a noise level of 89 dBA L_{eq} at 50 feet, which some residences within the area are located less than 50 feet from where construction would be occurring. Using the established standards for exterior noise levels at residential lands uses (Table 71) as the threshold for a significant adverse impact, the above noise level is approximately 34-39 decibels higher than the established standards. Noise-level increases of this magnitude, although temporary, would be readily audible, would dominate the noise environment in the area during construction operations, and would be considered a significant adverse impact. While mitigation measures MM-NV-1 through MM-NV-5 would be implemented to minimize construction noise impacts, it is unlikely that these mitigation measures would reduce the noise levels to below the exterior noise levels at residential land uses threshold. Therefore, this would be a potentially significant impact that is unavoidable, but is temporary lasting only the duration of construction activities.

Indirect Impacts

Indirect noise-related impacts would occur from off-site vehicle travel (e.g., haul trucks) associated with construction of the diversion channel. Because no local noise standards directly apply to such sources of noise, the off-site vehicle travel noise impacts would not conflict with any local general plan or noise ordinance and there would be no impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the diversion channel would be no different than maintenance activities that are undertaken currently for the channels within the C02/C04 system. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. All maintenance activities would occur during the daytime hours when construction noise would be exempt under local ordinances. Therefore, the long-term operation and maintenance activities would not conflict with standards established in the local general plans or noise ordinance standards and there would be no impact.

Level of Impact for the LPP

Potentially Significant Impact. Mitigation measures MM-NV-1 through MM-NV-5 would be implemented during construction activities to minimize noise levels during construction activities, however, it is unlikely that these mitigation measures would reduce construction noise levels to below the exterior noise levels at residential land uses threshold. Therefore, a potentially significant direct impact is anticipated due to construction activities. This would only be a temporary direct impact lasting only the duration of construction activities. Once construction is complete, noise levels would return to pre-project levels. It is important to note, that although construction noise is being considered a potentially significant impact, construction noise is exempted from the various City noise ordinances.

5.7.4.2 IMPACT NV-2: Generation of excessive groundborne vibration or groundborne noise levels.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Plan, the demolition and construction activities associated with the various alternatives would not occur. Therefore, no direct noise impacts would result from the No Action Plan. However, ambient noise levels along the channels and within OBB would continue to be affected by the traffic noise from PCH as well as surrounding arterial streets. In addition, repair work within the channels could be required in the future, and these repairs which could be minor to extensive depending on the scope and location of the work would generate temporary noise impacts. Noise levels would return to pre-repair work levels upon completion of any construction activities. Noise-sensitive land uses (i.e., residential uses) are dense throughout the area in which repair-related construction could be needed. Without these sensitive receptors present, potential impacts related to temporary and short-term construction groundborne vibration associated with channel repair would not be anticipated.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

Construction activities associated with the modification of the Warner Avenue Bridge and removal of the upstream constriction may result in some minor amount of ground vibration. Vibration from construction activity is typically below the threshold of perception when the activity is more than approximately 50 feet from the receiver, and below a level of damage to structures within a considerably smaller distance. Additionally, vibration from these activities would be short-term and would end when construction is complete.

Pile driving associated with the modification of the Warner Avenue Bridge could potentially impact near-by residences due to excessive vibration levels. The equation to determine vibration levels at a specific distance states that

$PPV_{equip} = PPV_{ref} \text{ x } (25/D)^{\wedge 1.5}$

Where PPV_{ref} is the Peak Particle Velocity at a reference distance of 25 feet, and D is the distance from the equipment to the sensitive receptor (USDOT 2006).

The closest sensitive receptors are the Bolsa Chica Conservancy building located approximately 150 feet west of Warner Avenue Bridge and residences located approximately 280 feet north of the bridge. Typical impact pile driving vibration levels produce a PPV of 0.644 inches per second (in/sec) at a reference distance of 25 feet. This vibration level would attenuate to approximately 0.044 in/sec for the Bolsa Chica Conservancy building and 0.017 in/sec for the nearby residences. Both of these values are under the thresholds for structural damage listed in Table 73 for continuous/frequent intermittent sources. In addition, these values are at the distinctly perceptible and barely perceptible, for the BCER and the nearby residences respectively, thresholds for human annoyance listed in Table 74 for continuous/frequent intermittent sources. Due to the proximity of Warner Avenue Bridge to the BCER and potential sensitive ecological resources, mitigation measure MM-NV-4 would be implemented to reduce significant adverse impacts to sensitive receptors and sensitive ecological resources due to pile driving. Mitigation measure MM-NV-4 is the use of a silent pile driver which requires a crane and generator for operation. Operation of the crane and generator would produce a PPV equivalent to that of a small bulldozer (0.003 in/sec PPV at a reference of 25 feet). This vibration level would attenuate to approximately 0.0002 in/sec for the Bolsa Chica Conservancy building and 0.00008 in/sec for the nearby residences. Both of these values are under the thresholds for structural damage listed in Table 73 for continuous/frequent intermittent sources. In addition, these values are at the barely perceptible threshold for human annoyance listed in Table 74 for continuous/frequent intermittent sources. Ultimately, impacts associated with groundborne vibration and noise would be less than significant since the proposed project would be under the thresholds for structural damage and under the thresholds for human annoyance with the implementation of mitigation measure MM-NV-4.

Table 73: Vibration Criteria for Structural Damage

Structure and Condition	Maximum Vibration Level (in/sec PPV)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
Newer residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Notes: Transient sources create a single vibration event, such as blasting or ball drops. Continuous/frequent intermittent sources include pile drivers, pogo-stick compactors, and vibratory pile drivers.
Source: Caltrans 2004

Table 74: Vibration Criteria for Human Annoyance

Structure and Condition	Maximum Vibration Level (in/sec PPV)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.1
Severe	2.0	0.4

Notes: Transient sources create a single vibration event, such as blasting or ball drops. Continuous/frequent intermittent sources include pile drivers, pogo-stick compactors, and vibratory pile drivers. Source: Caltrans 2004

Indirect Impacts

Indirect groundborne vibration or groundborne noise would likely be generated from movement of construction vehicles from staging areas to the project site, dump truck hauling trips, and delivery of materials. The level of groundborne vibration or noise generated from this movement of construction associated vehicles would most likely not be discernable from the ambient groundborne vibration or noise occurring along the nearby roadways. Therefore, there would be no indirect impacts due to generation of groundborne vibration or groundborne noise due to project implementation.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. During long-term operation and maintenance activities, there would be substantially less truck hauling and mobilization and demobilization of heavy construction equipment that could generate groundborne vibration or noise. A majority of the vehicle trips associated with maintenance activities would involve the use of light to medium trucks that would generate minimal groundborne vibration or noise. Therefore,

there would be no long-term operation or maintenance impacts due to generation of groundborne vibration or noise.

Tide Gates

Direct Impacts

Construction activities associated with the permanent removal of the tide gates on C05 Reach 1 may result in some minor amount of ground vibration. Vibration from construction activity is typically below the threshold of perception when the activity is more than approximately 50 feet from the receiver, and below a level of damage to structures within a considerably smaller distance. Additionally, vibration from these activities would be short-term and would end when construction is complete. No pile driving would occur as part of the tide gate removal, which would have the potential to cause excessive vibration levels.

A hoe ram (breaker) excavator would likely be used for the removal of the tide gates and would be expected to have the greatest potential for excessive vibration levels that could potentially impact near-by residences.

The closest sensitive receptors are people using the trail system within the BCER and residences located approximately 2,500 feet east of the tide gates. Typical hoe ram (breaker) excavators produce a PPV of 0.089 in/sec at a reference distance of 25 feet (Table 75). For the BCER, trails are located on either side of the tide gates and the tide gates themselves act as a bridge to connect the recreational trails on either side of it. For the analysis on potential vibration impacts to trail users within BCER, the nearby scenic overlook located approximately 100 feet north of the tide gates was used as a reference point. The vibration levels produced by the hoe ram (breaker) excavator would attenuate to approximately 0.01 in/sec for the nearby scenic overlook and approximately 0.000089 in/sec for the residences located east of the tide gates. Both of these values are under the thresholds for structural damage listed in Table 73 for continuous/frequent intermittent sources. In addition, these values are at or below the barely perceptible threshold for human annoyance listed in Table 74 for continuous/frequent intermittent sources. Therefore, impacts associated with groundborne vibration and noise would be less than significant since the proposed project would be under the thresholds for structural damage and at or below the low thresholds for human annoyance.

Table 75: Vibration Source Levels for Construction Equipment

Equipment	PPV1 at 25 feet (in/sec)
Large bulldozer	0.089
Loaded trucks	0.076
Jackhammer	0.035
Small bulldozer	0.003
Auger/drill rigs	0.089
Hoe ram	0.089
Pile driver (impact)	0.644 to 1.518
Pile driver (sonic/vibratory)	0.170 to 0.734
Vibratory compactor/roller	0.210

Source: FTA 2006.
[1] Peak particle ground velocity measures at 25 feet unless noted otherwise.

Indirect Impacts

Indirect groundborne vibration or groundborne noise would likely be generated from movement of construction vehicles from staging areas to the project site, dump truck hauling trips, and delivery of materials. The level of groundborne vibration or noise generated from the movement of construction associated vehicles would most likely not be discernable from the ambient groundborne vibration or noise occurring along the nearby roadways. Therefore, there would be no indirect impacts due to generation of groundborne vibration or groundborne noise due to project implementation.

Long-Term Operation and Maintenance Impacts

There would be no long-term operation or maintenance activities associated with the tide gates since they are being permanently removed. Therefore, there would be no long-term operation or maintenance impacts due to generation of groundborne vibration or groundborne noise with implementation of this measure.

Channels C02/C04

Direct Impacts

Construction activities associated with the modification of the C02/C04 drainage channels may result in some minor amount of ground vibration. Vibration from construction activity is typically below the threshold of perception when the activity is more than approximately 50 feet from the receiver, and below a level of damage to structures within a considerably smaller distance. Additionally, vibration from these activities would be short-term and would end when construction is complete.

In regards to C02 Reach 23, pile driving would occur along the south side of the channel bank which could potentially impact near-by residences due to excessive vibration levels. The closest sensitive receptors for C02 Reach 23 are the SBNWR and Seal Beach Naval Weapons Station located approximately 200 feet north and the residences located approximately 150 feet south. Typical impact pile driving vibration levels produce a PPV of 0.644 inches per second (in/sec) at a reference distance of 25 feet. This vibration level would attenuate to approximately 0.028 in/sec and 0.044 in/sec for the SBNWR/Seal Beach Naval Weapons Station and the nearby residences, respectively. Both of these values are under the thresholds for structural damage listed in Table 73 for continuous/frequent intermittent sources. In addition, these values are at or lower than the distinctly perceptible threshold for human annoyance listed in Table 74 for continuous/frequent intermittent sources. Due to the proximity of C02 Reach 23 to the SBNWR and potential sensitive ecological resources, mitigation measure MM-NV-4 would be implemented to reduce significant adverse impacts to sensitive receptors and sensitive ecological resources due to pile driving. Mitigation measure MM-NV-4 is the use of a silent pile driver which requires a crane and generator for operation. Operation of the crane and generator would produce a PPV equivalent to that of a small bulldozer (0.003 in/sec PPV at a reference of 25 feet). This vibration level would attenuate to approximately 0.0001 in/sec for the SBNWR and 0.0002 in/sec for the nearby residences. Both of these values are under the thresholds for structural damage listed in Table 73 for continuous/frequent intermittent sources. In addition, these values are at the barely perceptible threshold for human annoyance listed in Table 74 for continuous/frequent intermittent sources.

In regards to the reaches to be modified within C04, pile driving would not occur. However, equipment such as a bulldozer may be used during construction. A bulldozer would have the greatest potential for excessive vibration levels that could potentially impact near-by residences. The closest sensitive receptors to the reaches to be modified within C04 are between 30 and 50 feet of the channels. Typical bulldozers produce a PPV of 0.089 in/sec at a reference distance of 25 feet (Table 75). The vibration levels produced

by the bulldozer would attenuate to approximately 0.068 to 0.031 in/sec for residences located within 30 to 50 feet, respectively, of the channels. Both of these values are under the thresholds for structural damage listed in Table 73 for continuous/frequent intermittent sources. In addition, these values are just slightly above and below the distinctly perceptible threshold for human annoyance listed in Table 74 for continuous/frequent intermittent sources.

Overall, groundborne vibration and noise would be under the thresholds for structural damage and slightly above and below the distinctly perceptible threshold for human annoyance throughout C02/C04. In C02 Reach 23 where pile driving would occur and there is the potential for sensitive ecological resources, mitigation measures MM-NV-4 would be implemented to reduce impacts to less than significant.

Indirect Impacts

Indirect groundborne vibration or groundborne noise would likely be generated from movement of construction vehicles from staging areas to the project site, dump truck hauling trips, and delivery of materials. The level of groundborne vibration or noise generated from the movement of construction associated vehicles would most likely not be discernable from the ambient groundborne vibration or noise occurring along the nearby roadways. Therefore, there would be no indirect impacts due to generation of groundborne vibration or groundborne noise due to project implementation.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the channels would be no different than maintenance activities that are undertaken currently for the channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Typical maintenance activities can entail the operation of support vehicles and equipment. During long-term operation and maintenance activities, there would be substantially less truck hauling and mobilization and demobilization of heavy construction equipment that could generate groundborne vibration or noise. A majority of the vehicle trips associated with maintenance activities would involve the use of light to medium trucks that would generate minimal groundborne vibration or noise. Therefore, there would be no long-term operation or maintenance impacts due to generation of groundborne vibration or noise.

Channels C05/C06

Direct Impacts

Construction activities associated with the modification of the C05/C06 drainage channels may result in some minor amount of ground vibration. Vibration from construction activity is typically below the threshold of perception when the activity is more than approximately 50 feet from the receiver, and below a level of damage to structures within a considerably smaller distance. Additionally, vibration from these activities would be short-term and would end when construction is complete.

In regards to C05 Reach 1, pile driving would occur along the south side of the channel bank which could potentially impact near-by residences due to excessive vibration levels. The closest sensitive receptors for C05 Reach 1 are the BCER and nearby residences, both of which are located within 30 to 50 feet of the channel. Typical impact pile driving vibration levels produce a PPV of 0.644 inches per second (in/sec) at a reference distance of 25 feet. This vibration level would attenuate to approximately 0.228 in/sec to 0.490 in/sec for the BCER and the nearby residences. Both of these values are above the thresholds for potential structural damage to all types of structures in various conditions listed in Table 73 for

continuous/frequent intermittent sources. In addition, these values are just below or above the severe threshold for human annoyance listed in Table 74 for continuous/frequent intermittent sources. Due to the proximity of C05 Reach 1 to the BCER and potential sensitive ecological resources, mitigation measure MM-NV-4 would be implemented to reduce significant adverse impacts to sensitive receptors and sensitive ecological resources due to pile driving. Mitigation measure MM-NV-4 is the use of a silent pile driver which requires a crane and generator for operation. Operation of the crane and generator would produce a PPV equivalent to that of a small bulldozer (0.003 in/sec PPV at a reference of 25 feet). This vibration level would attenuate to approximately 0.002 in/sec to 0.001 in/sec for the BCER and the nearby residences. Both of these values are under the thresholds for structural damage listed in Table 73 for continuous/frequent intermittent sources. In addition, these values are at the barely perceptible threshold for human annoyance listed in Table 74 for continuous/frequent intermittent sources.

In regards to the reaches to be modified within the remaining reaches of C05 and C06, pile driving would not occur. However, equipment such as a bulldozer may be used during construction. A bulldozer would have the greatest potential for excessive vibration levels that could potentially impact near-by residences. The closest sensitive receptors to the remaining reaches to be modified within C05/C06 are between 30 and 50 feet of the channels. Typical bulldozers produce a PPV of 0.089 in/sec at a reference distance of 25 feet (Table 75). The vibration levels produced by the bulldozer would attenuate to approximately 0.068 to 0.031 in/sec for residences located within 30 to 50 feet, respectively, of the channels. Both of these values are under the thresholds for structural damage listed in Table 73 for continuous/frequent intermittent sources. In addition, these values are just slightly above and below the distinctly perceptible threshold for human annoyance listed in Table 74 for continuous/frequent intermittent sources.

Overall, groundborne vibration and noise would be under the thresholds for structural damage and slightly above or below the low thresholds for human annoyance throughout the majority of C05/C06. In C05 Reach 1 where pile driving would occur and thresholds for potential structural damage and human annoyance would be met or exceeded, mitigation measure MM-NV-4 would be implemented to reduce impacts to less than significant.

Indirect Impacts

Indirect groundborne vibration or groundborne noise would likely be generated from movement of construction vehicles from staging areas to the project site, dump truck hauling trips, and delivery of materials. The level of groundborne vibration or noise generated from the movement of construction associated vehicles would most likely not be discernable from the ambient groundborne vibration or noise occurring along the nearby roadways. Therefore, there would be no indirect impacts due to generation of groundborne vibration or groundborne noise due to project implementation.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the channels would be no different than maintenance activities that are undertaken currently for the channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Typical maintenance activities can entail the operation of support vehicles and equipment. During long-term operation and maintenance activities, there would be substantially less truck hauling and mobilization and demobilization of heavy construction equipment that could generate groundborne vibration or noise. A majority of the vehicle trips associated with maintenance activities would involve the use of light to medium trucks that would generate minimal groundborne vibration or noise. Therefore, there would be no long-term operation or maintenance impacts due to generation of groundborne vibration or noise.

Level of Impact for the NED Plan

Less than Significant Impact with Mitigation Incorporated. Where pile driving is occurring, mitigation measure MM-NV-4 would be implemented to reduce potentially significant adverse impacts to less than significant during construction of the proposed project. All other construction activities generate groundborne vibration that is under the thresholds for structural damage and at or below the thresholds for human annoyance without the implementation of mitigation measures. No long-term groundborne vibration or groundborne noise levels would be generated by operation of the proposed project.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

Construction activities associated with the modification of the C02/C04 drainage channels may result in some minor amount of ground vibration. Vibration from construction activity is typically below the threshold of perception when the activity is more than approximately 50 feet from the receiver, and below a level of damage to structures within a considerably smaller distance. Additionally, vibration from these activities would be short-term and would end when construction is complete.

In regards to C02 Reach 23, pile driving would occur along the south side of the channel bank which could potentially impact near-by residences due to excessive vibration levels. The closest sensitive receptors for C02 Reach 23 are the SBNWR and Seal Beach Naval Weapons Station located approximately 200 feet north and the residences located approximately 150 feet south. Typical impact pile driving vibration levels produce a PPV of 0.644 inches per second (in/sec) at a reference distance of 25 feet. This vibration level would attenuate to approximately 0.028 in/sec and 0.044 in/sec for the SBNWR/Seal Beach Naval Weapons Station and the nearby residences, respectively. Both of these values are under the thresholds for structural damage listed in Table 73 for continuous/frequent intermittent sources. In addition, these values are at or lower than the distinctly perceptible threshold for human annoyance listed in Table 74 for continuous/frequent intermittent sources. Due to the proximity of C02 Reach 23 to the SBNWR and potential sensitive ecological resources, mitigation measure MM-NV-4 would be implemented to reduce significant adverse impacts to sensitive receptors and sensitive ecological resources due to pile driving. Mitigation measure MM-NV-4 is the use of a silent pile driver which requires a crane and generator for operation. Operation of the crane and generator would produce a PPV equivalent to that of a small bulldozer (0.003 in/sec PPV at a reference of 25 feet). This vibration level would attenuate to approximately 0.0001 in/sec for the SBNWR and 0.0002 in/sec for the nearby residences. Both of these values are under the thresholds for structural damage listed in Table 73 for

continuous/frequent intermittent sources. In addition, these values are at the barely perceptible threshold for human annoyance listed in Table 74 for continuous/frequent intermittent sources.

In regards to the reaches to be modified within C04, pile driving would not occur. However, equipment such as a hoe ram (breaker) excavator would be used to break up concrete in reaches that are concrete trapezoidal being replaced with open rectangular concrete channels. In addition, a hoe ram (breaker) excavator would be used to break up crossings that are being replaced as part of the proposed project. The use of the hoe ram (breaker) excavator has the same or greatest potential to impact near-by residences due to excessive vibration levels when compared to other equipment that will be used during construction (refer to Table 75).

The closest sensitive receptors to the reaches to be modified in C04 are within 30 to 50 feet of the channels. Typical hoe ram (breaker) excavators produce a PPV of 0.089 in/sec at a reference distance of 25 feet (Table 75). The vibration levels produced by the hoe ram (breaker) excavator would attenuate to approximately 0.068 to 0.031 in/sec for residences located within 30 to 50 feet, respectively, of the channels. Both of these values are under the thresholds for structural damage listed in Table 73 for continuous/frequent intermittent sources. In addition, these values are just slightly above and below the distinctly perceptible threshold for human annoyance listed in Table 74 for continuous/frequent intermittent sources.

Overall, groundborne vibration and noise would be under the thresholds for structural damage and slightly above and below the distinctly perceptible threshold for human annoyance throughout C02/C04. In C02 Reach 23 where pile driving would occur and there is the potential for sensitive ecological resources, mitigation measures MM-NV-4 would be implemented to reduce impacts to less than significant.

Indirect Impacts

Indirect groundborne vibration or groundborne noise would likely be generated from movement of construction vehicles from staging areas to the project site, dump truck hauling trips, and delivery of materials. The level of groundborne vibration or noise generated from the movement of construction associated vehicles would most likely not be discernable from the ambient groundborne vibration or noise occurring along the nearby roadways. Therefore, there would be no indirect impacts due to generation of groundborne vibration or groundborne noise due to project implementation.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the channels would be no different than maintenance activities that are undertaken currently for the channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Typical maintenance activities can entail the operation of support vehicles and equipment. During long-term operation and maintenance activities, there would be substantially less truck hauling and mobilization and demobilization of heavy construction equipment that could generate groundborne vibration or noise. A majority of the vehicle trips associated with maintenance activities would involve the use of light to medium trucks that would generate minimal groundborne vibration or noise. Therefore, there would be no long-term operation or maintenance impacts due to generation of groundborne vibration or noise.

C05/C06 Channels

Direct Impacts

Construction activities associated with the modification of the C05/C06 drainage channels may result in some minor amount of ground vibration. Vibration from construction activity is typically below the threshold of perception when the activity is more than approximately 50 feet from the receiver, and below a level of damage to structures within a considerably smaller distance. Additionally, vibration from these activities would be short-term and would end when construction is complete.

In regards to C05 Reach 1, pile driving would occur along both the north and south side of the channel bank which could potentially impact near-by residences due to excessive vibration levels. The closest sensitive receptors for C05 Reach 1 are the BCER and nearby residences, both of which are located within 30 to 50 feet of the channel. Typical impact pile driving vibration levels produce a PPV of 0.644 inches per second (in/sec) at a reference distance of 25 feet. This vibration level would attenuate to approximately 0.228 in/sec to 0.490 in/sec for the BCER and the nearby residences. Both of these values are above the thresholds for potential structural damage to all types of structures in various conditions listed in Table 73 for continuous/frequent intermittent sources. In addition, these values are just below or above the severe threshold for human annoyance listed in Table 74 for continuous/frequent intermittent sources. Due to the proximity of C05 Reach 1 to the BCER and potential sensitive ecological resources, mitigation measure MM-NV-4 would be implemented to reduce significant adverse impacts to sensitive receptors and sensitive ecological resources due to pile driving. Mitigation measure MM-NV-4 is the use of a silent pile driver which requires a crane and generator for operation. Operation of the crane and generator would produce a PPV equivalent to that of a small bulldozer (0.003 in/sec PPV at a reference of 25 feet). This vibration level would attenuate to approximately 0.002 in/sec to 0.001 in/sec for the BCER and the nearby residences. Both of these values are under the thresholds for structural damage listed in Table 73 for continuous/frequent intermittent sources. In addition, these values are at the barely perceptible threshold for human annoyance listed in Table 74 for continuous/frequent intermittent sources.

In regards to the channels to be modified within the remaining reaches of C05 and C06, pile driving would not occur. However, equipment such a hoe ram (breaker) excavator would be used to break up concrete in reaches that are concrete trapezoidal being replaced with open rectangular concrete channels. In addition, a hoe ram (breaker) excavator would be used to break up crossings that are being replaced as part of the proposed project. The use of the hoe ram (breaker) excavator has the same or greatest potential to impact near-by residences due to excessive vibration levels when compared to other equipment that will be used during construction (refer to Table 75).

The closest sensitive receptors to the remaining reaches to be modified within C05/C06 are within 30 to 50 feet of the channels. Typical hoe ram (breaker) excavators produce a PPV of 0.089 in/sec at a reference distance of 25 feet (Table 75). The vibration levels produced by the bulldozer would attenuate to approximately 0.068 to 0.031 in/sec for residences located within 30 to 50 feet, respectively, of the channels. Both of these values are under the thresholds for structural damage listed in Table 73 for continuous/frequent intermittent sources. In addition, these values are just slightly above and below the distinctly perceptible threshold for human annoyance listed in Table 74 for continuous/frequent intermittent sources.

Overall, groundborne vibration and noise would be under the thresholds for structural damage and slightly above or below the low thresholds for human annoyance throughout the majority of C05/C06. In C05 Reach 1 where pile driving would occur and thresholds for potential structural damage and human

annoyance would be met or exceeded, mitigation measure MM-NV-4 would be implemented to reduce impacts to less than significant.

Indirect Impacts

Indirect groundborne vibration or groundborne noise would likely be generated from movement of construction vehicles from staging areas to the project site, dump truck hauling trips, and delivery of materials. The level of groundborne vibration or noise generated from the movement of construction associated vehicles would most likely not be discernable from the ambient groundborne vibration or noise occurring along the nearby roadways. Therefore, there would be no indirect impacts due to generation of groundborne vibration or groundborne noise due to project implementation.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the channels would be no different than maintenance activities that are undertaken currently for the channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Typical maintenance activities can entail the operation of support vehicles and equipment. During long-term operation and maintenance activities, there would be substantially less truck hauling and mobilization and demobilization of heavy construction equipment that could generate groundborne vibration or noise. A majority of the vehicle trips associated with maintenance activities would involve the use of light to medium trucks that would generate minimal groundborne vibration or noise. Therefore, there would be no long-term operation or maintenance impacts due to generation of groundborne vibration or noise.

Diversion Channel

Direct Impacts

Construction activities associated with construction of the diversion channel may result in some minor amount of ground vibration. Vibration from construction activity is typically below the threshold of perception when the activity is more than approximately 50 feet from the receiver, and below a level of damage to structures within a considerably smaller distance. Additionally, vibration from these activities would be short-term and would end when construction is complete.

For the construction of the diversion channel, pile driving would not occur. However, equipment such as a hoe ram (breaker) excavator would be used to break up concrete in reaches that are concrete trapezoidal being replaced with open rectangular concrete channels. In addition, a hoe ram (breaker) excavator would be used to break up crossings that are being replaced as part of the proposed project. The use of the hoe ram (breaker) excavator has the same or greatest potential to impact near-by residences due to excessive vibration levels when compared to other equipment that will be used during construction (refer to Table 75).

The closest sensitive receptors to the diversion channel within 30 to 50 feet of the proposed location. Typical hoe ram (breaker) excavators produce a PPV of 0.089 in/sec at a reference distance of 25 feet (Table 75). The vibration levels produced by the hoe ram (breaker) excavator would attenuate to approximately 0.068 to 0.031 in/sec for residences located within 30 to 50 feet, respectively, of the diversion channel. Both of these values are under the thresholds for structural damage listed in Table 73 for continuous/frequent intermittent sources. In addition, these values are just slightly above and below the distinctly perceptible threshold for human annoyance listed in Table 74 for continuous/frequent intermittent sources.

Overall, groundborne vibration and noise would be under the thresholds for structural damage and slightly above and below the distinctly perceptible threshold for human annoyance, therefore, a less than significant impact to nearby sensitive receptors would occur.

Indirect Impacts

Indirect groundborne vibration or groundborne noise would likely be generated from movement of construction vehicles from staging areas to the project site, dump truck hauling trips, and delivery of materials. The level of groundborne vibration or noise generated from the movement of construction associated vehicles would most likely not be discernable from the ambient groundborne vibration or noise occurring along the nearby roadways. Therefore, there would be no indirect impacts due to generation of groundborne vibration or groundborne noise due to project implementation.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the diversion channel would be no different than maintenance activities that are undertaken currently for the existing drainage channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Typical maintenance activities can entail the operation of support vehicles and equipment. During long-term operation and maintenance activities, there would be substantially less truck hauling and mobilization and demobilization of heavy construction equipment that could generate groundborne vibration or noise. A majority of the vehicle trips associated with maintenance activities would involve the use of light to medium trucks that would generate minimal groundborne vibration or noise. Therefore, there would be no long-term operation or maintenance impacts due to generation of groundborne vibration or noise.

Level of Impact for the LPP

Less than Significant Impact with Mitigation Incorporated. Where pile driving is occurring, mitigation measure MM-NV-4 would be implemented to reduce potentially significant adverse impacts to less than significant during construction of the proposed project. All other construction activities generate groundborne vibration that is under the thresholds for structural damage and at or below the thresholds for human annoyance without the implementation of mitigation measures. No long-term groundborne vibration or groundborne noise levels would be generated by operation of the proposed project.

5.7.4.3 IMPACT NV-3: For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Plan, the demolition and construction activities associated with the various alternatives would not occur. Therefore, no direct noise impacts would result from the No Action Plan. The C02/C04 and C05/C06 systems are generally not located within 2 miles of a private or public airstrip, and due to the built out nature of the area this scenario is not expected to change in the future. People residing and working within the vicinity of the C02/C04 and C05/C06 systems would continue to experience temporary noise impacts due to channel repair work that may be required in the future. These impacts would be considered temporary and nature and not significant.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The Los Alamitos Air Force Base private airstrip is located approximately 4.71 miles north of Warner Avenue Bridge. The Long Beach public airport is located approximately 7.84 miles northwest of the bridge. The John Wayne public airport is located approximately 9.85 miles southeast of the bridge. Based on the above information, Warner Avenue Bridge is not located within a 2-mile radius of a public or private airstrip. Additionally, the project does not involve placing sensitive receptors within the vicinity of the private airstrip. Therefore, the project would not expose people residing or working in the project area to excessive noise levels due to airport operations and there would be no direct, indirect, or long-term impact.

Tide Gates

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The Los Alamitos Air Force Base private airstrip is located approximately 5.18 miles north of the tide gates. The Long Beach public airport is located approximately 8.45 miles northwest of the tide gates. The John Wayne public airport is located approximately 9.39 miles southeast of the tide gates. Based on the above information, the tide gates are not located within a 2-mile radius of a public or private airstrip. Additionally, the project does not involve placing sensitive receptors within the vicinity of the private or public airstrips. Therefore, the project would not expose people residing or working in the project area to excessive noise levels due to airport operations and there would be no direct, indirect, or long-term impact.

C02/C04 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The channels within the C02/C04 drainage system are varying distances away from the region's private and public airports. For this analysis, the channel reach that is closest to an airport within the region is identified as well as the distance the channel is located from that particular airport. The Los Alamitos Air Force Base private airstrip is located approximately 3.11 miles north of C04 Reach 20. The Long Beach public airport is located approximately 7.54 miles northwest of C02 Reach 23. The John Wayne public airport is located approximately 6.53 miles southeast of C04 Reach 22. The Fullerton Municipal public airport is located approximately 6.63 miles north of C04 Reach 22. Based on the above information, none of the reaches within the C02/C04 drainage channel system are located within a 2-mileradius of a public or private airstrip. Additionally, the project does not involve placing sensitive receptors within the vicinity of the private or public airstrips. Therefore, the project would not expose people residing or working in the project area to excessive noise levels due to airport operations and there would be no direct, indirect, or long-term impact.

C05/C06 Channels

Direct, Indirect, Long-Term Operation and Maintenance Impacts

The channels within the C05/C06 drainage system are varying distances away from the region's private and public airports. For this analysis, the channel reach that is closest to an airport within the region is identified as well as the distance the channel is located from that particular airport. The Los Alamitos Air

Force Base private airstrip is located approximately 4.57 miles north of C05 Reach 1. The Long Beach public airport is located approximately 8.74 miles northwest of C05 Reach 1. The John Wayne public airport is located approximately 4.19 miles southeast of C06 Reach 19. The Fullerton Municipal public airport is located approximately 8.21 miles north of C05 Reach 5. Based on the above information, none of the reaches within the C05/C06 drainage channel system are located within a 2-mile radius of a public or private airstrip. Additionally, the project does not involve placing sensitive receptors within the vicinity of the private or public airstrips. Therefore, the project would not expose people residing or working in the project area to excessive noise levels due to airport operations and there would be no direct, indirect, or long-term impact.

Level of Impact for the NED Plan

No Impact. There are no public or private airstrips within a 2-mile radius of the proposed project, therefore, the project would not expose people residing or working in the project area to excessive noise levels due to airport operations.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct, Indirect, Long-Term Operation and Maintenance Impacts

The channels within the C02/C04 drainage system are varying distances away from the region's private and public airports. For this analysis, the channel reach that is closest to an airport within the region is identified as well as the distance the channel is located from that particular airport. The Los Alamitos Air Force Base private airstrip is located approximately 3.11 miles north of C04 Reach 20. The Long Beach public airport is located approximately 7.54 miles northwest of C02 Reach 23. The John Wayne public airport is located approximately 6.53 miles southeast of C04 Reach 22. The Fullerton Municipal public airport is located approximately 6.63 miles north of C04 Reach 22. Based on the above information, none of the reaches within the C02/C04 drainage channel system are located within a 2-mile radius of a public or private airstrip. Additionally, the project does not involve placing sensitive receptors within the vicinity of the private or public airstrips. Therefore, the project would not expose people residing or working in the project area to excessive noise levels due to airport operations and there would be no direct, indirect, or long-term impact.

C05/C06 Channels

Direct, Indirect, Long-Term Operation and Maintenance Impacts

The channels within the C05/C06 drainage system are varying distances away from the region's private and public airports. For this analysis, the channel reach that is closest to an airport within the region is identified as well as the distance the channel is located from that particular airport. The Los Alamitos Air Force Base private airstrip is located approximately 4.57 miles north of C05 Reach 1. The Long Beach public airport is located approximately 8.74 miles northwest of C05 Reach 1. The John Wayne public airport is located approximately 4.19 miles southeast of C06 Reach 19. The Fullerton Municipal public airport is located approximately 8.21 miles north of C05 Reach 5. Based on the above information, none of the reaches within the C05/C06 drainage channel system are located within a 2-mile radius of a public or private airstrip. Additionally, the project does not involve placing sensitive receptors within the vicinity of the private or public airstrips. Therefore, the project would not expose people residing or working in the project area to excessive noise levels due to airport operations and there would be no direct, indirect, or long-term impact.

Diversion Channel

Direct, Indirect, Long-Term Operation and Maintenance Impacts

The Los Alamitos Air Force Base private airstrip is located approximately 2.97 miles north of the proposed location for the diversion channel within the C04 system. The Long Beach public airport is located approximately 7.9 miles northwest of the proposed location for the diversion channel within the C04 system. The John Wayne public airport is located approximately 8.65 miles southeast of the proposed location for the diversion channel within the C04 system. The Fullerton Municipal public airport is located approximately 7.47 miles north of the proposed location for the diversion channel within the C04 system. Based on the above information, the diversion channel would not be located within a 2-mile radius of a public or private airstrip. Additionally, the project does not involve placing sensitive receptors within the vicinity of the private or public airstrips. Therefore, the project would not expose people residing or working in the project area to excessive noise levels due to airport operations and there would be no direct, indirect, or long-term impact.

Level of Impact for the LPP

No Impact. There are no public or private airstrips within a 2-mile radius of the proposed project, therefore, the project would not expose people residing or working in the project area to excessive noise levels due to airport operations.

5.8 Biological Resources

5.8.1 Regulatory Framework

5.8.1.1 Federal

Federal Endangered Species Act: The FESA designates threatened and endangered animals and plants and provides measures for their protection and recovery. The 'take' of listed animal and plant species in areas under the federal jurisdiction is prohibited without obtaining a federal permit. A 'take' is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or attempt to engage in any such conduct. Harm includes any act which kills or injures fish or wildlife, including significant habitat

modification or degradation that significantly impairs essential behavioral patterns of fish or wildlife. Activities that damage the habitat of listed species require approval from USFWS for terrestrial species or from National Marine Fisheries Service (NMFS) for marine species.

Under Section 7 of FESA, a federal agency that authorizes, funds or carries out a project that may affect a listed species or its critical habitat must consult with USFWS or NMFS to ensure that their actions do not jeopardize the continued existence of endangered or threatened species or result in the destruction or modification of the critical habitat of these species. As part of consultation the USFWS or NMFS prepare a Biological Opinion (BO) to determine if the activity would jeopardize the continued existence of the listed species. If the BO determines that the activity would not threaten the existence of the listed species and a no jeopardy opinion is provided, then the project may proceed. If the BO finds that the project would result in jeopardy to the listed species (jeopardy opinion), then reasonable and prudent measures would need to be incorporated into the project to reduce potential effects to a level that would not be likely to jeopardize the continued existence of the species.

Federal Clean Water Act: The CWA has provisions for protecting biological resources within the aquatic environment through identification of beneficial uses and prohibitions on fill of wetlands or other Waters of the U.S. The primary functions of the CWA in protecting biological resources in this instance are to ensure that impacts to wetlands or Waters of the U.S. are avoided, minimized, and mitigation if necessary, and to provide a framework for ensuring that water quality it maintained or improved.

Migratory Bird Treaty Act: The Migratory Bird Treaty Act implements international treaties between the United States and other nations that protect migratory birds, including their nests and eggs, from killing, hunting, pursuing, capturing, selling, and shipping unless expressly authorized or permitted.

5.8.1.2 State

California Environmental Quality Act: The CEQA was enacted in 1970 to provide for full disclosure of environmental impacts before issuance of a permit by a state or local public agency. In addition to state and federally listed species, sensitive plants and animals receive consideration under CEQA. Sensitive species include Wildlife Species of Special Concern listed by CDFW and plant species on the California Native Plant Society List 1A, 1B, or 2.

California Endangered Species Act: The CESA provides protection and prohibits the take of plant, fish, and wildlife species listed by the State of California. Unlike FESA, state-listed plants have the same degree of protection as wildlife. A ‘take’ is defined similarly to FESA and it is prohibited for both listed and candidate species. Take authorization could be obtained from the CDFW under Section 2091 and 2081 of CESA. Section 2091 of CESA, similar to Section 7 of FESA, provides for consultation between a state lead agency under the CEQA and CDFW, with issuance of take authorization if the project does not jeopardize the listed species.

California Fish and Game Code Section 1600: The State of California defines Waters of the State as any surface water or groundwater, including saline waters within the boundaries of the State. In accordance with Section 1600 of the Fish and Game Code, CDFW must be notified prior to beginning any activity that would obstruct or divert the natural flow of, use material from or deposit of material into a river, stream, or lake, whether permanent, intermittent or ephemeral water bodies. The notification occurs through the issuance of a Streambed Alteration Agreement.

California Fish and Game Code Fully Protected Species: The legislature of the State of California designated species as fully protected prior to the creation of the CESA. Most fully protected species have

since been listed as threatened or endangered under CESA and/or the FESA. These species would not be taken or possessed at any time, with the only exception being permits issued for limited scientific study.

California Fish and Game Code Sections 3503, 2505, 3513, 3800, 3801: These California Fish and Game Code Sections protect all birds, birds of prey and all non-game birds, as well as their eggs and nests, for species that are not already listed as fully protected and that occur naturally within the State. Specifically, it is unlawful to take any raptors or their nests and eggs.

5.8.2 Impact Significance Criteria

The impact criteria below were taken from Appendix G of the CEQA guidelines and are also being adopted for NEPA. For purposes of this analysis, the No Action Plan, NED Plan, and LPP would have a significant impact related to Biological Resources if it would:

IMPACT BIO-1: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, of by the CDFW or the U.S. Fish and Wildlife Service.

IMPACT BIO-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by CDFW or U.S. Fish and Wildlife Service.

IMPACT BIO-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

IMPACT BIO-4: Interfere substantially with movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

IMPACT BIO-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

IMPACT BIO-6: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state Habitat Conservation Plan.

5.8.3 Mitigation Measures

The following feasible mitigation measures would be implemented for both the NED Plan and LPP.

MM-BIO-1 USACE will implement all reasonable and prudent measures, and their associated terms and conditions, set forth in the Biological Opinion issued by the NMFS on March 27, 2020 (refer to *Appendix J – Coordination*).

MM-BIO-2 All demolition and construction activities and the operation of heavy construction equipment within OBB, C02 Reach 24 and C05 Reach 1 (including the tide gates at the downstream end of C05 Reach 1 and mitigation features) will be carried out between October 1 and February 28, outside of bird nesting season.

MM-BIO-3 To minimize impacts to wildlife species, a biologist that meets USFWS standard qualifications will conduct a biological resource sweep of the work area prior to any ground disturbing activities, dewatering activities, during project construction, and during

demobilization of construction equipment. The biological resource sweep will include the following activities:

- Inspect the work area, including along access roads, for any wildlife species and prepare a list of species observed and record their activity during construction of the project.
- Implement exclusionary or avoidance measures and/or relocate sensitive species if possible, and ensure that the quality of adjacent habitat outside of the construction zone is maintained.
- In the event that sensitive (protected) wildlife species are present, determine if the activity would cause adverse impacts that have not been previously considered and evaluated. If it is determined that the activity could have the potential to adversely affect wildlife species in a manner not authorized by Federal or State permits, the activity will cease until the species is no longer in harm's way or is relocated outside of the construction activity impact area.

MM-BIO-4 A qualified biologist(s) will:

- Prior to initiating construction activities, prepare a monitoring plan for minimizing and avoiding the impacts of project activities on sea turtles and marine mammals.
- Conduct flora and fauna surveys one week prior to the start of initial construction activities within a designated reach to identify the occurrence of any special status species within the project action area.
- During construction activities, will visually monitor for the presence of green turtle in reaches or areas where the species may be present. The biologist will record the presence and behavior of green turtles that are observed within and around the project area. To the extent possible, the biologist will attempt to photograph surfacing sea turtles observed in the project area and provide the images to NMFS. If a green turtle is observed within the project area where construction is occurring, construction activities in that area will immediately be halted until the turtle has moved from the area. Construction activities within areas of the project that green turtles are known to utilize will be staged to the extent possible to occur when the green turtle would not be expected to be present. The green turtle is typically present between late spring through fall, so construction activities within OBB, Reach 23 of C02, and Reach 1 of C05 may be staged to occur outside this window.
- Will be responsible for overseeing compliance with avoidance measures for the biological resources, including green turtle, during construction activities within designated areas.
- Prepare an annual report on observations of biological resources, including green turtle, and effectiveness of monitoring and avoidance measures. This report will be provided to NMFS and USFWS for review.

MM-BIO-5 An employee education program will be developed. Each employee (including temporary, contractors, and subcontractors) will participate in a training/awareness program prior to working on the proposed project. Prior to the onset of construction activities, the Contractor will provide all personnel who will be present on work areas within or adjacent to the project area the following information:

- A detailed description of all listed species including color photographs;
- The protection listed species receive under the Endangered Species Act and possible legal action that may be incurred for violation of the Act;

- The avoidance measures being implemented to conserve all listed species during construction activities associated with the proposed project; and
- A point of contact if listed species are observed.
- Provisions of water quality BMPs and provisions of the SWPPP will be provided along with consequences for violations incurred by non-compliance with BMP and SWPPP provisions.
- Issue identification cards to shift supervisors with photos, descriptions, and actions to be taken upon sighting for the listed species that may be encountered during construction.
- Discuss roles and responsibilities of Biologists hired to perform surveys and monitoring.

MM-BIO-6 A silent pile driver may be used instead of an impact or vibratory pile driver where sensitive ecological resources are nearby, especially within the vicinity of Warner Avenue Bridge, C02 Reach 23, and C05 Reach 1.

MM-BIO-7 To minimize noise impacts to biological resources the following measures will be implemented:

- During nesting season portable acoustic panels will be placed where heavy equipment is operating to minimize construction noise levels.
- If needed during the nesting season, portable acoustic panels will be placed along the perimeter of the channels where construction is occurring to reduce construction noise levels.
- All construction equipment will be equipped with noise reduction features, such as mufflers and engine shrouds.
- Onsite generators and booster pumps will be enclosed entirely.

MM-BIO-8 To minimize accidental hazardous material spill impacts to biological resources the following measures will be implemented:

- Prior to and during operation of heavy construction equipment, a spill prevention and contingency plan will be prepared and implemented. The plan will include measures to prevent or avoid incidental leaks or spills, including identification of materials necessary for containment and clean up. Oil-absorbing floating booms will also be kept onsite and the contractor will respond to any aquatic spills during construction.
- Vehicles and equipment will be kept in good repair, without leaks of hydraulic or lubricating fluids. If such leaks or drips do occur, they will be cleaned up immediately. Equipment maintenance and/or repair will be confined to one location. Runoff in this area will be controlled to prevent contamination of soils and water.
- Vehicles and other equipment will be fueled, cleaned, and maintained in designated areas away from OBB and the BCER to eliminate risk of pollution from spills and contamination.
- Standard BMPs accepted by the SARWQCB will be implemented to avoid degrading water quality. These BMPs include procedures to avoid leaks and spills and to contain and clean up contaminants in the unlikely event that a spill does occur. The project would employ dewatering or water routed around equipment to avoid and minimize release of contaminants during project activities.

MM-BIO-9 Construction personnel will utilize designated access roads or previously disturbed areas for vehicle access and staging of construction equipment.

MM-BIO-10 Speed limits of 15 miles per hour or less will be required at all times to avoid potential injury to wildlife in the area.

MM-BIO-11 Project-related vehicle travel and construction activities will be limited to daylight hours, as wildlife and some special-status species could be found on roadways primarily at dusk/night.

5.8.4 Biological Resource Impacts

5.8.4.1 IMPACT BIO-1: Have a substantial adverse effect either directly or through habitat modifications on any species as candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative, no project would be implemented. The drainage channels would remain as they are currently configured. No construction would be implemented as a result of this alternative and, therefore, there would be no construction-related impacts to biological resources.

Under the No Action Plan widespread overtopping within the project area would still occur between the 10% and 4% ACE events. The current level of risk would remain for flood waters to potentially overtop the levees protecting sensitive resources within the SBNWR and the BCER. The SBNWR experiences flooding at the 4% ACE (i.e., 25 year storm event). Flooding of the area could result in scouring of restored sensitive habitats, influx of debris, and influx of pollutants from runoff. The BCER experiences flooding in certain areas between the 4% ACE (i.e., 25 year storm event) and the 1% ACE (i.e., 50 year storm event). Currently, there is oil production operated by CalResources LLP at the west end of C05 Reach 1 (i.e., BCER area). There is a potential for the spread of contaminants in BCER resulting from large storm events that overtop C05 upstream of the reserve and inundate the oil fields within it. If C05 floodwaters inundate the oil fields, it could cause widespread distribution of oil-laden runoff that could be transported to the Full Tidal Basin and nearby shoreline at the ocean outlet channel as floodwaters re-enter the channel as flood levels recede. Chemicals transported in flood waters from oil fields could prove detrimental to sensitive natural areas and previously completed ecosystem restoration projects. The continued risk of flooding where the oil fields are located and the risk to the previously restored areas within BCER is a potentially significant adverse impact if no project is implemented.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

Marine Biological Resources: Thirteen federally-listed threatened, endangered, or candidate species are listed as occurring within the study area, of which four bird species (i.e., California least tern, light-footed Ridgway's rail, coastal California gnatcatcher, and western snowy plover) and the green turtle may occur at this Project site. The four bird species would not be directly impacted as the bridge footprint does not

provide suitable habitat. The modification of Warner Avenue Bridge would involve the removal of a portion of the existing earthen levee via land-side excavation; no water-side construction or dredging is proposed. In addition to the federally-listed species, an initial query of the CNDDB identified 42 state-listed species that could potentially occur within the study area. Of those 42 state-listed species, 20 are not expected to occur within the vicinity of the project due to suitable habitat for the species not being found within the project area (refer to *Appendix L – Environmental Considerations*). Species that have the potential to occur within the vicinity of the project area include: southern tarplant, California gull, Cooper's hawk, osprey, least bittern, western snowy plover, Belding's savannah sparrow, large-billed savannah sparrow, tricolored blackbird, California brown pelican, black skimmer, California least tern, elegant tern, American white pelican, double-crested cormorant, light-footed Ridgway's rail, long-billed curlew, burrowing owl, coastal California gnatcatcher, peregrine falcon, white-faced ibis, and two-striped garter snake. The Warner Avenue Bridge site does not provide suitable habitat for any of the above species, therefore, the modification of the bridge would not directly impact these state-listed species. Overall, no federal or state-listed candidate, sensitive, or special status species are expected in this area. The occasional sea lion (*Zalophus californiensis*), Pacific harbor seal (*Phoca vitulina richardii*), and bottlenose dolphin (*Tursiops truncatus*) are expected in Anaheim Bay and less frequently in Huntington Harbour. Wandering dolphins were found in Huntington Harbour in 2012 and 2013, but they are not a common nor expected occurrence. A rare sighting of a solitary sea otter (*Enhydra lutris nereis*) also was observed in Huntington Harbour in 2013, but is not expected to occur in the project area. Sound levels from project construction potentially could disturb marine mammals if any were in the immediate vicinity; however, marine mammals are not likely in the area and would be expected to move away from and/or avoid the construction area once construction began.

Based on results from a survey in July 2019, no evidence of eelgrass (*Zostera marina*) was present in the area; however, ditch grass (*Ruppia maritima*) and slender grasswort (*Salicornia maritima*) were observed (Anghera and Ecomarine 2019). There may be marine invertebrates and algae located in the area of sediment removal. The marine species likely to be removed are expected to be polychaetes, crustaceans, and mollusks, which are opportunistic species that are anticipated to start recolonizing in the resulting habitat after construction activities have ceased.

The green turtle is known to transit through the Warner Avenue Bridge area, moving between Huntington Harbour and the muted tidal pocket in the BCER. This species is likely most abundant and active in the action area in summer months when water temperatures are warmest (Crear et al. 2016). Potential direct impacts to green turtles from the proposed project include noise generated by construction activities and potential strikes from vessels. With regard to noise, sea turtles most likely use sound to detect nearby broadband, continuous environmental sounds, such as the sounds of waves crashing on the beach. Exposure to intense sound may result in hearing loss, typically quantified as threshold shift, which persists after cessation of the noise exposure. Traditional hammering or pile driving to install new support piles has the potential to produce loud noises. Although pile driving is included as part of this measure, a silent pile machine would be utilized for the insertion of the piles. The silent pile machine pushes the pile into the ground without an impact hammer or vibration. The operation, with the exception of a crane engine (to hold the sheet) and the generator to power the silent pile machine, is almost silent. The use of the silent pile machine eliminates the need of an impact hammer to drive piles. Impulses from the impact hammer are the primary concern when pile driving and could affect the behavior of sea turtles in the area with typical behavioral responses being 1) increase swim speed, 2) change of position in the water column, and 3) avoidance of the sound. Since the silent pile machine would not use an impact hammer, and the only noise associated with the machine would be that of the crane required to hold the piles and a generator to operate the machine, minimal direct noise impacts to green turtle are anticipated. With regard to vessel strikes, sea turtles are vulnerable to vessel collisions because they regularly surface to breathe

and often nest at or near the surface. Vessel strikes resulting in sea turtle injury or mortality may potentially occur in the action area from construction-related vessel operations and barges that would be required for the modification of the Warner Avenue Bridge. However, the probability that construction-related vessels will encounter turtles in the action area is low as it is presumed turtles generally only transit through the area and spend a majority of their time in the BCER. In addition to vessel collisions, turtle injury and mortality may also occur from excavation activities and fill activities (i.e., including placement of sediment and riprap). However, as turtles only transit through the action area to the BCER where they spend a majority of their time (Crear et al. 2016, Crear et al. 2017) the likelihood of turtle encounters during excavation and fill activities associated with the modification of the Warner Avenue Bridge is low.

Overall, due to the localized area of impact, temporary timeframe, and the available quality of resources that surround the affected area, impacts would be less than significant.

Non-Marine Biological Resources: As mentioned above, there are thirteen federally-listed threatened, endangered, or candidate species listed as potentially occurring within the study area (refer to *Section 2.7.4 – Federal Listed Species and Species of Special Concern*). In addition, there are 22 California state-listed special status species that have the potential to occur within the study area (refer to *Section 2.7.5 – State Listed Species and Species of Special Concern*). No candidate, sensitive, or special status wildlife species are expected within the vicinity of Warner Avenue Bridge. Based on results from a survey in July 2019, no special status species were observed.

Indirect Impacts

Marine Biological Resources: The California gull, Cooper's hawk, osprey, least bittern, western snowy plover, Belding's savannah sparrow, large-billed savannah sparrow, tricolored blackbird, California brown pelican, black skimmer, California least tern, elegant tern, American white pelican, double-crested cormorant, light-footed Ridgway's rail, long-billed curlew, burrowing owl, coastal California gnatcatcher, peregrine falcon, white-faced ibis, and two-striped garter snake are state and/or federally-listed species that may be affected indirectly by Project construction activities at Warner Avenue Bridge; however, these species are expected only to forage in the area and not nest in the area (for those species that are birds) and would be expected to temporarily forage predominantly in the adjacent areas of BCER, Huntington Harbour, Anaheim Bay, and the Pacific Ocean. Impacts would be temporary and may be adverse, but would be considered less than significant with incorporation of mitigation measures.

In addition, the modification of Warner Avenue Bridge may temporarily generate turbidity and noise or underwater vibrations greater than existing conditions during construction. The increase in open water under the Warner Avenue Bridge also would modify the habitat currently present at the site. Motile species (e.g., fish, crabs) would be expected to temporarily leave the area when materials are placed; however, they would be expected to return once construction activities cease. The green turtle (*Chelonia mydas*), federally listed as threatened, also may avoid the area during construction. Traditional hammering or pile driving to install new support piles has the potential to produce loud noises. As previously stated, although pile driving is included as part of this measure, a silent pile machine would be utilized for the insertion of piles. Although not as loud as traditional pile driving equipment, the noise and activity of construction, including any riprap placement, may alter the behavior of fishes in the vicinity or cause them to avoid the construction area temporarily. Based on studies by Ford and Platter-Reiger (1986) on the reaction of schooling fishes to pile driving, there is no apparent effect on the behavior of some fish while the noise agitates others. The sounds associated with excavation and pile driving during construction would be temporary and would not be expected to approach levels that would injure fishes, as identified by Popper et al. 2006.

The Project site also supports foraging seabirds (e.g., gulls), shorebirds (e.g., willet, whimbrel), and wading birds (e.g., heron, egret); some of which are sensitive species (e.g., brown pelican, black skimmer). Foraging shorebirds may decrease in presence due to the decrease in available prey resources immediately following construction; however, they are expected to utilize other nearby areas within BCER and the adjacent bays until prey species recolonize. Impacts would be temporary and may be adverse, but would be considered less than significant with incorporation of mitigation measures MM-BIO-1 through MM-BIO-11. In addition, the USACE will implement the reasonable and prudent measures, and their associated terms and conditions, set forth in the Biological Opinion issued by the NMFS on March 27, 2020 (refer to *Appendix J – Coordination*). The implementation of these mitigation measures and reasonable and prudent measures set forth in the Biological Opinion issued by NMFS would ensure that a biologist is present to inspect the area for sensitive species prior to construction activities commencing, that construction activities are halted if a sensitive species enters the work area, and that BMPs are used in terms of reducing noise generated by equipment, minimizing impacts to species due to accidental fuel spills, and vehicle use near sensitive species. In addition, construction activities associated with the tide gates would occur only between October 1 and February 28, which is outside of bird nesting season to further minimize impacts to sensitive bird species located in the adjacent BCER and SBNWR. The combination of these mitigation measures would reduce temporary significant adverse impacts to special status species to less than significant.

Non-Marine Biological Resources: Similar to Marine Biological Resources, state and/or federally-listed species may be affected indirectly by construction activities associated with the modification of the Warner Avenue Bridge; however, these species are expected only to forage and not reside within the area since suitable habitat is not present. Species indirectly impacted would be expected to temporarily forage predominantly in the adjacent areas of BCER, Huntington Harbour, Anaheim Bay, and the Pacific Ocean. Impacts would be temporary and may be adverse, but would be considered less than significant with incorporation of mitigation measures MM-BIO-1 through MM-BIO-11. In addition, the USACE will implement the reasonable and prudent measures, and their associated terms and conditions, set forth in the Biological Opinion issued by the NMFS on March 27, 2020 (refer to *Appendix J – Coordination*). The implementation of these mitigation measures and reasonable and prudent measures set forth in the Biological Opinion issued by NMFS would ensure that a biologist is present to inspect the area for sensitive species prior to construction activities commencing, that construction activities are halted if a sensitive species enters the work area, and that BMPs are used in terms of reducing noise generated by equipment, minimizing impacts to species due to accidental fuel spills, and vehicle use near sensitive species. In addition, construction activities associated with the tide gates would occur only between October 1 and February 28, which is outside of bird nesting season to further minimize impacts to sensitive bird species located in the adjacent BCER and SBNWR. The combination of these mitigation measures would reduce temporary significant adverse impacts to special status species to less than significant.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Maintenance activities and long-term operation of the bridge would not result in long-term change in the diversity, density, or species composition of the marine habitat composition and communities at Warner Avenue Bridge. Impacts would be less than significant.

Non-Marine Biological Resources: Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Maintenance activities and long-term operation of the bridge would not result in long-term change in the diversity, density, or species composition of the non-marine habitat composition and communities at Warner Avenue Bridge. Impacts would be less than significant.

Tide Gates

Direct Impact

Marine Biological Resources: Similar to the Warner Avenue Bridge, removal of the tide gates at the downstream end of C05 would result in the removal of any invertebrates attached to the structure and immediate vicinity; however, these opportunistic species are expected to recolonize the resulting habitat as soon as construction activities cease. No candidate, sensitive, or special status species invertebrate or fish species are expected in this area. Based on results from a survey in August 2019, no evidence of eelgrass was present in the area; however, slender grasswort was observed (Anghera and Ecomarine 2019). In addition, the replacement of the tide gates with an access bridge maintains hard substrate in the area and, therefore, would not be expected to change the habitat for or composition of the invertebrate community in the area.

The green turtle is known to utilize the BCER which is adjacent to where the tide gates are located on C05. Potential direct impacts to green turtles from the proposed project include noise generated by construction activities. With regard to noise, sea turtles most likely use sound to detect nearby broadband, continuous environmental sounds, such as the sounds of waves crashing on the beach. Exposure to intense sound may result in hearing loss, typically quantified as threshold shift, which persists after cessation of the noise exposure. Traditional hammering or pile driving to install new support piles has the potential to produce loud noises. Although pile driving is included as part of this measure, a silent pile machine would be utilized for the insertion of the piles. The silent pile machine pushes the pile into the ground without an impact hammer or vibration. The operation, with the exception of a crane engine (to hold the sheet) and the generator to power the silent pile machine, is almost silent. The use of the silent pile machine eliminates the need of an impact hammer to drive piles. Impulses from the impact hammer are the primary concern when pile driving and could affect the behavior of sea turtles in the area with typical behavioral responses being 1) increase swim speed, 2) change of position in the water column, and 3) avoidance of the sound. Since the Giken pile machine would not use an impact hammer, and the only noise associated with the machine would be that of the crane required to hold the piles and a generator to operate the machine, minimal direct noise impacts to green turtle are anticipated. With regard to vessel strikes, sea turtles are vulnerable to vessel collisions because they regularly surface to breathe and often nest at or near the surface.

In addition, turtle injury and mortality may occur from demolition activities and fill activities (i.e., including placement of riprap). However, as turtles appear to spend a majority of their time within the BCER which is adjacent to the project site (Crear et al. 2016, Crear et al. 2017) the likelihood of turtle encounters during demolition and fill activities associated with the removal of the tide gates and construction of an access crossing is low.

The California least tern is known to nest within the adjacent BCER (Sevrens 2018), but no nesting occurs within the vicinity of the tide gates (Figure 41). Construction activities would create airborne noise

that has the potential to directly affect foraging behavior of California least terns. Although pile driving is included as part of the project, a silent pile machine would be used for the insertion of piles associated with the new crossing. The operation, with the exception of a crane engine (to hold the sheet) and the generator to power the silent pile machine, is almost silent.

The coastal California gnatcatcher is closely aligned with coastal sage scrub (USFWS 2010d). Coastal sage scrub habitat is not present within the action area; however, marginal coastal sage scrub habitat is present on the Bolsa Chica Mesa which is located just north of the tide gates. Due to the location of coastal sage scrub habitat, foraging habitat used by coastal California gnatcatcher, construction noises generated during construction of the proposed project could cause behavioral disturbance to resting or foraging gnatcatchers. Pile driving, which is included as part of the proposed project, has the greatest potential to create airborne noise that would potentially disturb this species. However, the project would use a silent pile machine for the insertion of piles along reaches that are adjacent to BCER. Therefore, use of the silent pile machine would reduce airborne noise levels typically associated with pile driving. Use of the silent pile machine would require a crane and generator which typically produce noise levels of 87 dBA and 81 dBA respectively, at a distance of 50 feet from the source. As the distance from the construction operation increases the level of disturbance from the noise quickly decreases, therefore, it is likely that this species would not be affected by noise as it would be similar to existing noise levels.

The western snowy plover would potentially be directly affected by removal of the tide gates and replacement with an access crossing in the same way as described for the California least tern. Noise generated during construction activities could cause behavioral disturbances to nesting or foraging plovers (Figure 41 and Figure 42). With regard to overwintering habitat, beaches used for nesting are also often used for wintering, however, birds will also winter at several beaches where nesting does not occur (76 FR 16048). Western snowy plovers also visit or nest at other non-beach habitats such as human-made salt ponds, and estuarine sand and mud flats (76 FR 16048). Western snowy plovers are known to overwinter at BCER and likely use the same areas in winter that are used for breeding (Collier and Powell 2000). The BCER supported an average wintering flock of 14 western snowy plovers from 2003 through 2010 (76 FR 16078). Due to the location of nesting sites from previous years, it is unlikely that construction activities and construction noises would affect the species.

Similar to the above federal-listed bird species, the Belding's savannah sparrow—state-listed endangered species—nests within the BCER which is adjacent to the proposed project footprint. Figure 43 shows where territories for Belding's savannah sparrow were located within the BCER in 2011 in relation to C05 Reach 1. Territories on Rabbit Island (labeled 68 on Figure 43), within the muted tidal pocket (labeled PM on Figure 43), and Cell 60 are within 500 feet or less of where the tide gates are located. Similar to the federal-listed bird species, the Belding's savannah sparrow would be directly affected by noise generated during construction activities which could cause behavioral disturbances to nesting or foraging birds.

Overall, due to the localized area of impact, temporary timeframe, and the available quality of resources that surround the affected area, impacts to the species discussed above would be less than significant. Mitigation measures MM-BIO-1 through MM-BIO-11 would be implemented. In addition, the USACE will implement the reasonable and prudent measures, and their associated terms and conditions, set forth in the Biological Opinion issued by the NMFS on March 27, 2020 (refer to *Appendix J – Coordination*). The implementation of these mitigation measures and reasonable and prudent measures set forth in the Biological Opinion issued by NMFS would ensure that a biologist is present to inspect the area for sensitive species prior to construction activities commencing, that construction activities are halted if a sensitive species enters the work area, and that BMPs are used in terms of reducing noise generated by

equipment, minimizing impacts to species due to accidental fuel spills, and vehicle use near sensitive species. In addition, construction activities associated with the tide gates would occur only between October 1 and February 28, which is outside of bird nesting season to further minimize impacts to sensitive bird species located in the adjacent BCER and SBNWR. The combination of these mitigation measures would reduce temporary significant adverse impacts to special status species to less than significant.

Page intentionally left blank
for double-sided printing

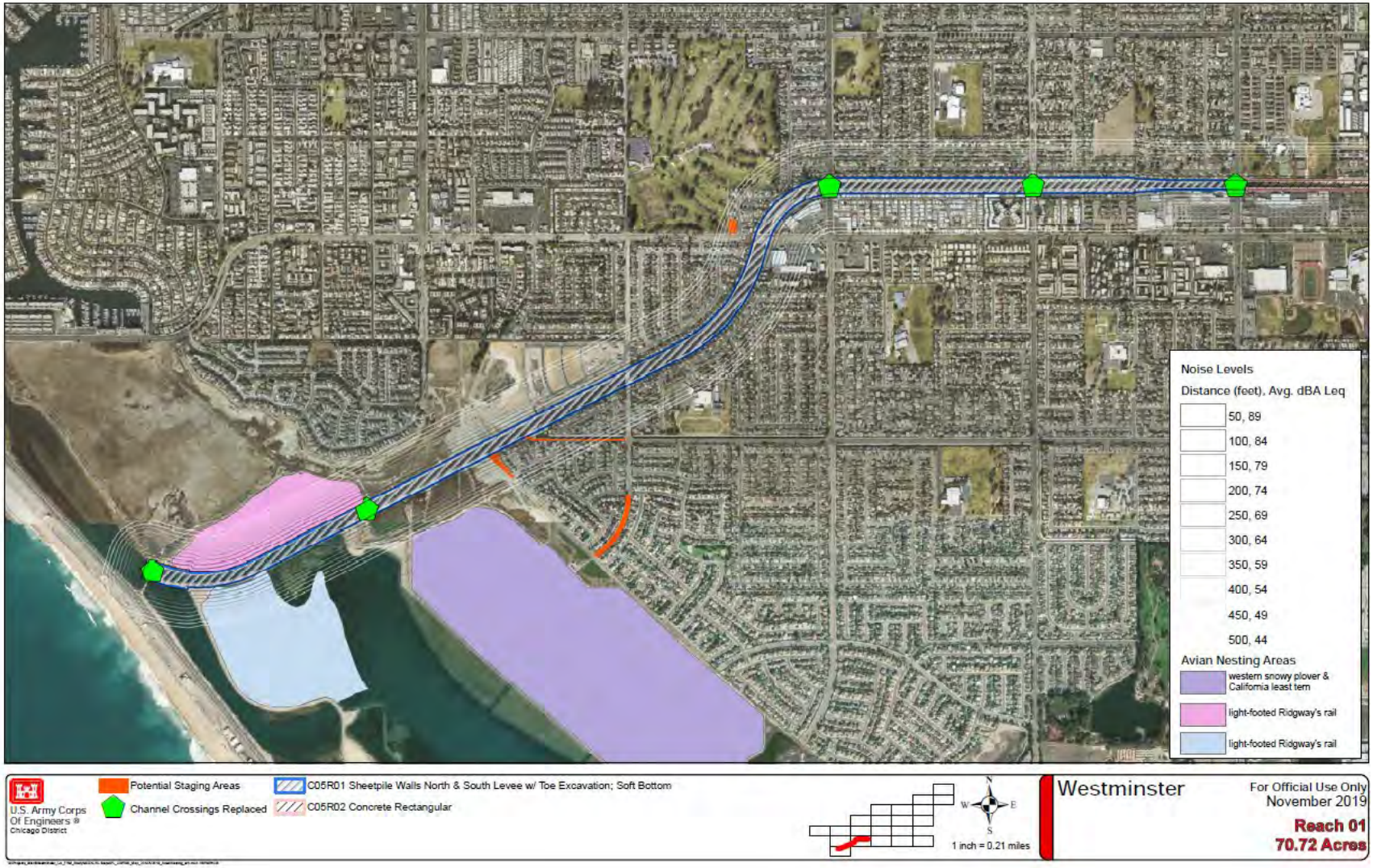


Figure 41: Location of Special Status Bird Species Nesting Habitat Within the Bolsa Chica Ecological Reserve.

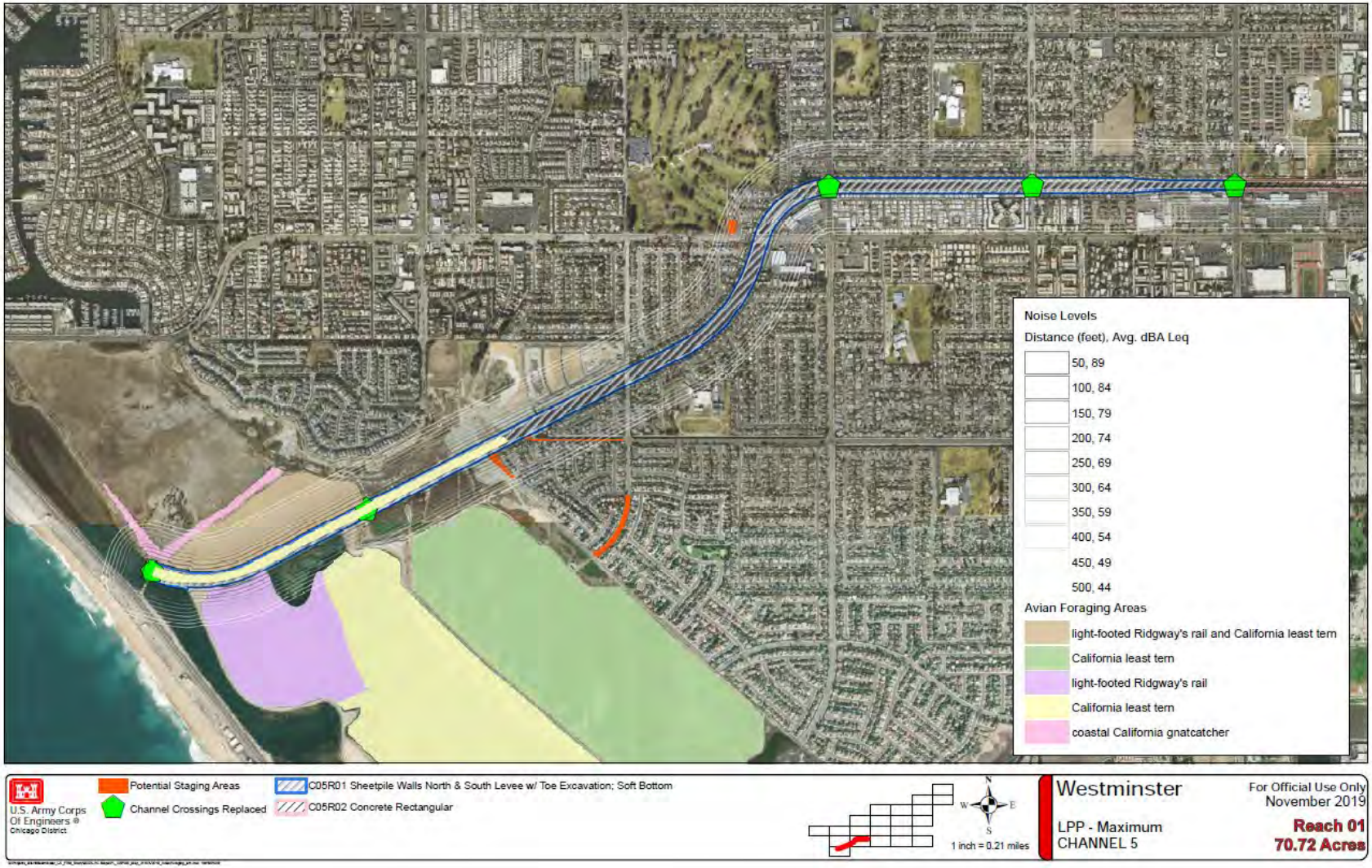


Figure 42: Location of Special Status Bird Foraging Areas within the Bolsa Chica Ecological Reserve.

Figure 43: Location of Belding's Savannah Sparrow Territories Surveyed in 2011 by Merkel & Associates.

Non-Marine Biological Resources No candidate, sensitive, or special status wildlife species are expected within the vicinity of the tide gates. Based on results from a survey in July 2019, no special status species were observed.

Indirect Impact

Marine Biological Resources: Similar to Warner Avenue Bridge, California least tern, western snowy plover, light-footed Ridgway's rail, coastal California gnatcatcher, and Belding's savannah sparrow are state and/or federally-listed species that may be affected indirectly by Project construction activities at the tide gates; however, these species are expected only to forage and not nest in the action area and would be expected to temporarily forage predominantly in the adjacent areas of BCER, Huntington Harbour, Anaheim Bay, and the Pacific Ocean. Impacts would be temporary and may be adverse, but would be considered less than significant with incorporation of mitigation measures.

Similar to the Warner Avenue Bridge, removal of the tide gates and placement of the access bridge may temporarily generate turbidity greater than existing conditions during construction. In addition, the construction of the hard structure is anticipated to generate more noise than existing conditions. Motile species (e.g., fish, crabs) would be expected to temporarily leave the area when materials are placed; however, they would be expected to return once construction activities cease. The green turtle (*Chelonia mydas*), federally listed as threatened, also may avoid the area during construction. Traditional hammering or pile driving to install new support piles has the potential to produce loud noises. As previously stated, although pile driving is included as part of this m easure, a silent pile machinge would be utilized for the insertion of the piles. Although not as loud as traditional pile driving equipment, the noise and activity of construction, including any riprap placement, may alter the behavior of fishes in the vicinity or cause them to avoid the construction area temporarily. Based on studies by Ford and Platter Reiger (1986) on the reaction of schooling fishes to pile driving, there is no apparent effect on the behavior of some fish while the noise agitates others. The sounds associated with excavation and pile driving during construction would be temporary and would not be expected to approach levels that would injure fishes, as identified by Popper et al. 2006.

In addition, the Project site supports foraging seabirds (e.g., gulls) and shorebirds (e.g., willet, whimbrel) and wading birds (e.g., heron, egret). Foraging shorebirds may decrease in presence due to the decrease in available prey resources immediately following construction; however, they are expected to utilize other nearby areas within BCER and the adjacent bays until prey species recolonize. Impacts would be less than significant.

Non-Marine Biological Resources: Similar to Marine Biological Resources, state and/or federally-listed species may be affected indirectly by construction activities associated with the removal of the tide gates and replacement with an access crossing; however, these species are expected only to forage and not reside within the area since suitable habitat is not present. Species indirectly impacted would be expected to temporarily forage predominantly in the adjacent areas of BCER, Huntington Harbour, Anaheim Bay, and the Pacific Ocean. Impacts would be temporary and may be adverse, but would be considered less than significant with incorporation of mitigation measures MM-BIO-1 through MM-BIO-11. In addition, the USACE will implement the reasonable and prudent measures, and their associated terms and conditions, set forth in the Biological Opinion issued by the NMFS on March 27, 2020 (refer to *Appendix J – Coordination*). The implementation of these mitigation measures and reasonable and prudent measures set forth in the Biological Opinion issued by NMFS would ensure that a biologist is present to inspect the area for sensitive species prior to construction activities commencing, that construction activities are halted if a sensitive species enters the work area, and that BMPs are used in terms of reducing noise generated by equipment, minimizing impacts to species due to accidental fuel spills, and

vehicle use near sensitive species. In addition, construction activities associated with the tide gates would occur only between October 1 and February 28, which is outside of bird nesting season to further minimize impacts to sensitive bird species located in the adjacent BCER and SBNWR. The combination of these mitigation measures would reduce temporary significant adverse impacts to special status species to less than significant.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: Maintenance activities associated with the new access crossing would be no different than maintenance activities that are undertaken currently for other crossings. Typical maintenance activities that occur on crossings include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Maintenance activities and long-term operation of the crossing would not result in long-term change in the diversity, density, or species composition of the marine habitat composition and communities at the downstream end of C05 Reach 1 where the crossing would be located. Impacts would be less than significant.

Non-Marine Biological Resources: Maintenance activities associated with the new access crossing would be no different than maintenance activities that are undertaken currently for other crossings. Typical maintenance activities that occur on crossings include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Maintenance activities and long-term operation of the crossing would not result in long-term change in the diversity, density, or species composition of the marine habitat composition and communities at the downstream end of C05 Reach 1 where the crossing would be located. Impacts would be less than significant.

C02/C04 Channels

Direct Impacts

Marine Biological Resources: Structural measures that are part of this alternative would pave earthen or riprap lined channels with concrete to increase conveyance efficiency. No substantial change to the tidal influence within the channels will occur. No substantial change of species composition or important habitat would result once construction is completed. Construction activities associated with channel modifications, specifically C02 Reach 23 could potentially affect nesting activities by special status bird species that reside within the adjacent SBNWR. Construction activities along C02 Reach 23 are expected to disturb potential nesting special status bird species located within approximately 500 feet of the proposed project's action area; however, this would be a temporary disturbance lasting only the duration of construction. The presence of construction equipment, construction personnel, and construction activities and their associated noises have the potential to disturb nesting and foraging bird species as discussed for Warner Avenue Bridge and the tide gates.

The green turtle is known to be within the general vicinity of C02 Reach 23, transiting between Huntington Harbour, SBNWR, and BCER. Potential direct impacts to green turtles from the proposed project are the same as those discussed for Warner Avenue Bridge and the tide gates. Similar to Warner Avenue Bridge and the tide gates, a Giken silent pile machine would be used to drive the sheet pile along C02 Reach 23. Overall, no adverse impacts to listed species movement or EFH are anticipated. Impacts would be less than significant with the implementation of mitigation measures MM-BIO-1 through MM-BIO-11. In addition, the USACE will implement the reasonable and prudent measures, and their

associated terms and conditions, set forth in the Biological Opinion issued by the NMFS on March 27, 2020 (refer to *Appendix J – Coordination*). The implementation of these mitigation measures and reasonable and prudent measures set forth in the Biological Opinion issued by NMFS would ensure that a biologist is present to inspect the area for sensitive species prior to construction activities commencing, that construction activities are halted if a sensitive species enters the work area, and that BMPs are used in terms of reducing noise generated by equipment, minimizing impacts to species due to accidental fuel spills, and vehicle use near sensitive species. In addition, construction activities specifically associated with the C02 Reach 23 (i.e., reach that is adjacent to SBNWR) would occur only between October 1 and February 28, which is outside of bird nesting season to further minimize impacts to sensitive bird species located in the adjacent BCER and SBNWR. The combination of these mitigation measures would reduce temporary significant adverse impacts to special status species to less than significant.

Non-Marine Biological Resources: No candidate, sensitive, or special status wildlife species are expected within the vicinity of the C02/C04 flood control channels. The flood control channels lack suitable habitats for sensitive or listed species owing to substantial past and ongoing disturbance, periodic vegetation maintenance within the channels, and existing structures. Based on results from a survey in July 2019, no special status species were observed.

Indirect Impacts

Marine Biological Resources: Thirteen federally-listed threatened, endangered, or candidate species are listed as occurring within the study area, of which four bird species and the green turtle may be affected indirectly through habitat modifications, such as removal of vegetation, sediment, and other debris that can accumulate in the channel. The green turtle is an infrequent visitor to the area and would not be expected to occur beyond the downstream end of C02. The bird species that forage in the area may be temporarily disturbed by construction noise and/or project-related activities and would forage in other nearby areas and/or return when construction ceases. The listed species' foraging and movement also may be improved once modifications are completed. No adverse impacts to listed species movement or EFH are anticipated. Impacts may be adverse, but temporary, and would be considered less than significant.

A potential substantial adverse impact to EFH would be in the event an accident occurred from equipment working in one of these concrete channel reaches, and that accident led to a major fuel spill that polluted quality EFH habitat downstream of these reaches. In addition, lining the existing earthen and riprap trapezoidal channels with concrete would increase the flowrate within the channels, which may indirectly affect the use of the channels in the future by existing organisms. Since a majority of the channels (about 75 percent) have already been lined with riprap or concrete, the Project would not be expected to have a significant effect on habitat or habitat use. Standard BMPs accepted by the Santa Ana RWQCB would be implemented to avoid degrading water quality. These BMPs include procedures to avoid leaks and spills and to contain and clean up contaminants in the unlikely event that a spill does occur. Impacts to EFH also would be minimized because the channel would be dewatered during maintenance activities or water would be routed around equipment. Because the equipment will not be working in the wet, the chances of contaminants from a spill or leak entering channel waters is remote. During dewatering, a biologist shall monitor activities to avoid and/or minimize impacts to any native fish that may occur on site during construction by relocating native fish, as practicable. With implementation of standard BMPs and biological monitoring, impacts to fish and degradation of higher quality EFH downstream of the concrete channels will be avoided and/or minimized. Indirect impacts may be adverse, but would be considered less than significant with incorporation of mitigation measure MM-BIO-8. In addition, the USACE will implement the EFH Conservation Recommendations, set forth in the Magnuson-Stevens Fishery Conservation and Management Act EFH Response issued by the NMFS on March 27, 2020 (refer to

Appendix J – Coordination). The implementation of mitigation measures and EFH Conservation Recommendations would reduce any temporary adverse indirect impact to EFH to less than significant.

Non-Marine Biological Resources: No candidate, sensitive, or special status wildlife species are expected within the vicinity of the C02/C04 flood control channels. The flood control channels lack suitable habitats for sensitive or listed species owing to substantial past and ongoing disturbance, periodic vegetation maintenance within the channels, and existing structures. Based on results from a survey in July 2019, no special status species were observed. Therefore, no adverse indirect impacts are expected to federal or state listed special status non-marine biological resources.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The impact of operation and maintenance would be similar to existing conditions since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. No impacts are expected.

Non-Marine Biological Resources: The impact of operation and maintenance would be similar to existing conditions since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. No impacts are expected.

C05/C06 Channels

Direct Impacts

Marine Biological Resources: Under the NED Plan, earthen or riprap lined channels would be lined with concrete to increase conveyance efficiency. In addition, the tide gates at the downstream end of C05 would be replaced with an access bridge. No change to the tidal influence within the channels will occur. No change of species composition or important habitat would result during the modification construction. Thirteen federally-listed threatened, endangered, or candidate species are listed as occurring within the study area, of which four bird species and the green turtle may be present at this Project site, but are not expected to be affected directly. Impacts would be considered less than significant.

A variety of nearshore fishes are known to swim into Bolsa Chica wetlands and are expected in the lower reaches of the C05 channel. Existing channel reaches that are concrete lined are considered low quality habitat and the proposed project would not result in a substantial, adverse impact to EFH in these reaches. Modifications of the concrete-lined reaches of the tidal portions of the channels would have minimal impact to EFH. Because the subject channel reaches have concrete sides and bottoms, they typically do not support wetlands habitat to provide substantial sources of food and/or cover for marine fishes. Only marine species that are tolerant of freshwater would be expected in areas at the farther upstream reach of the tidal influence. Channel reaches beyond the tidal influence in these channels would not be expected to support marine fishes at all. The concrete-lined reaches are expected to experience fluctuating salinity, provide no shelter and few food resources, and a low-quality habitat.

No Pacific Salmon EFH, Habitat Areas of Particular Concern (HAPC), or EFHA were identified within the vicinity of the Proposed Project area. Additionally, EFH for PHMS is located approximately 1 mile off the coast; therefore, these species are not anticipated to be within the vicinity of the Proposed Project area and would not be impacted by this alternative.

Non-Marine Biological Resources: No candidate, sensitive, or special status wildlife species are expected within the vicinity of the C05/C06 flood control channels. The flood control channels lack suitable habitats for sensitive or listed species owing to substantial past and ongoing disturbance, periodic vegetation maintenance within the channels, and existing structures. Based on results from a survey in July 2019, no special status species were observed. Therefore, no adverse direct impacts are expected to federal or state listed special status non-marine biological resources.

Indirect Impacts

Marine Biological Resources: Thirteen federally-listed threatened, endangered, or candidate species are listed as occurring within the study area, of which six bird species and the green turtle may be present at this Project site, and may be affected indirectly through habitat modifications, such as removal of vegetation, sediment, and other debris that can accumulate in the channel. The green turtle is an infrequent visitor to the area and would not be expected to occur beyond the downstream end of C05. The sensitive bird species may forage in the area and may be temporarily disturbed by construction noise and/or project-related activities and would forage in other nearby areas and/or return when construction ceases. The listed species' foraging and movement also may be improved. No adverse impacts to listed species movement or EFH are anticipated. Impacts may be adverse, but temporary, and would be considered less than significant.

Similar to C02/C04, the only potential substantial adverse impact to EFH would be in the event an accident occurred from equipment working in one of these concrete channel reaches, and that accident led to a major fuel spill that polluted quality EFH habitat downstream of these reaches. Standard BMPs accepted by the Santa Ana RWQCB would be implemented to avoid degrading water quality. These BMPs include procedures to avoid leaks and spills and to contain and clean up contaminants in the unlikely event that a spill does occur. Impacts to EFH also would be minimized because the channel would be dewatered during maintenance activities or water would be routed around equipment. Because the equipment will not be working in the wet, the chances of contaminants from a spill or leak entering channel waters is remote. During dewatering, a biologist shall monitor activities to avoid and/or minimize impacts to any fish that may occur on site during construction by relocating native fish, as practicable. With implementation of standard BMPs and biological monitoring, impacts to fish and degradation of higher quality EFH downstream of the concrete channels will be avoided and/or minimized. Impacts may be adverse, but would be considered less than significant with incorporation of mitigation measure MM-BIO-8. In addition, the USACE will implement the EFH Conservation Recommendations, set forth in the Magnuson-Stevens Fishery Conservation and Management Act EFH Response issued by the NMFS on March 27, 2020 (refer to *Appendix J – Coordination*). The implementation of mitigation measures and EFH Conservation Recommendations would reduce any temporary adverse indirect impact to EFH to less than significant.

Non-Marine Biological Resources: No candidate, sensitive, or special status wildlife species are expected within the vicinity of the C05/C06 flood control channels. The flood control channels lack suitable habitats for sensitive or listed species owing to substantial past and ongoing disturbance, periodic vegetation maintenance within the channels, and existing structures. Based on results from a survey in July 2019, no special status species were observed. Therefore, no adverse indirect impacts are expected to federal or state listed special status non-marine biological resources.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The impact of operation and maintenance would be similar to existing conditions since the channels already exist. Current channel maintenance, such as repairing channel

linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. No impacts are expected.

Non-Marine Biological Resources: The impact of operation and maintenance would be similar to existing conditions since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. No impacts are expected.

Level of Impact for the NED Plan

Less than Significant with Mitigation Incorporated. Construction activities associated with the NED Plan would potentially have temporary adverse impacts to federal and state-listed species status species; however, these impacts would be reduced to less than significant with the implementation of mitigation measures MM-BIO-1 through MM-BIO-11. In addition, the USACE will implement the reasonable and prudent measures, and their associated terms and conditions, set forth in the Biological Opinion issued by the NMFS on March 27, 2020 (refer to *Appendix J – Coordination*). The implementation of these mitigation measures and reasonable and prudent measures set forth in the Biological Opinion issued by NMFS would ensure that a biologist is present to inspect the area for sensitive species prior to construction activities commencing, that construction activities are halted if a sensitive species enters the work area, and that BMPs are used in terms of reducing noise generated by equipment, minimizing impacts to species due to accidental fuel spills, and vehicle use near sensitive species. The combination of these mitigation measures would reduce temporary significant adverse impacts to special status species to less than significant.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

Marine Biological Resources: Channel modification impacts would involve an increase in sediment to be removed, loss of habitat and shelter from conversion of rip rap lining to concrete lining, and increased temporal impacts from a longer duration of construction activities from the conversion of trapezoidal channels to a rectangular cross-sectional geometry. For reaches that do not contain the 0.01 ACE event after conversion to a concrete rectangular channel, there is potential for further habitat loss with the added floodwalls. Similar to the NED Plan, construction activities along C02 Reach 23 are expected to disturb potential nesting special status bird species located within approximately 500 feet of the proposed project’s action area as well as the green turtle; however, this would be a temporary disturbance lasting only the duration of construction. The conversion of rip rap lining to concrete lining would not have a significant impact on loss of habitat within the channels. Approximately 53% of the channels have

already been lined with concrete. The remaining 47% of the channels are either earthen bottom or riprap lined. Modification of the channels would result in 54% of the channels being earthen bottom and 46% of the channels being concrete lined. In summary, the project would actually be increasing earthen (soft-bottom habitat) channels that would continue to provide habitat for species that may use the drainage channels. To minimize temporary impacts during construction activities associated with modification of the channels, mitigation measures MM-BIO-1 through MM-BIO-11. In addition, the USACE will implement the reasonable and prudent measures, and their associated terms and conditions, set forth in the Biological Opinion issued by the NMFS on March 27, 2020 (refer to *Appendix J – Coordination*). The implementation of these mitigation measures and reasonable and prudent measures set forth in the Biological Opinion issued by NMFS would ensure that a biologist is present to inspect the area for sensitive species prior to construction activities commencing, that construction activities are halted if a sensitive species enters the work area, and that BMPs are used in terms of reducing noise generated by equipment, minimizing impacts to species due to accidental fuel spills, and vehicle use near sensitive species. In addition, construction activities associated with the tide gates would occur only between October 1 and February 28, which is outside of bird nesting season to further minimize impacts to sensitive bird species located in the adjacent BCER and SBNWR. The combination of these mitigation measures would reduce temporary significant adverse impacts to special status species to less than significant.

Non-Marine Biological Resources: No candidate, sensitive, or special status wildlife species are expected within the vicinity of the C05/C06 flood control channels. The flood control channels lack suitable habitats for sensitive or listed species owing to substantial past and ongoing disturbance, periodic vegetation maintenance within the channels, and existing structures. Based on results from a survey in July 2019, no special status species were observed. Therefore, no adverse direct impacts are expected to federal or state listed special status non-marine biological resources.

Indirect Impacts

Marine Biological Resources: Thirteen federal and 22 state listed special status species may be affected indirectly through habitat modifications, such as removal of vegetation, sediment, and other debris that can accumulate in the channel. With regard to the green turtle, this species is an infrequent visitor to the area and would not be expected to occur beyond the downstream end of C02. With regard to the special status bird species, species that forage in the area may be temporarily disturbed by construction noise and/or project-related activities and would forage in other nearby areas and/or return when construction ceases. The special status species' foraging and movement also may be improved once modifications are completed. No adverse impacts to listed species movement or EFH are anticipated. Impacts may be adverse, but temporary, and would be considered less than significant.

A potential substantial adverse impact to EFH would be in the event an accident occurred from equipment working in one of these concrete channel reaches, and that accident led to a major fuel spill that polluted quality EFH habitat downstream of these reaches. In addition, lining the existing earthen and riprap trapezoidal channels with concrete would increase the flowrate within the channels, which may indirectly affect the use of the channels in the future by existing organisms. Since a majority of the channels (about 75 percent) have already been lined with riprap or concrete, the Project would not be expected to have a significant effect on habitat or habitat use. Standard BMPs accepted by the Santa Ana RWQCB would be implemented to avoid degrading water quality. These BMPs include procedures to avoid leaks and spills and to contain and clean up contaminants in the unlikely event that a spill does occur. Impacts to EFH also would be minimized because the channel would be dewatered during maintenance activities or water would be routed around equipment. Because the equipment will not be working in the wet, the chances of contaminants from a spill or leak entering channel waters is remote. During dewatering, a biologist shall

monitor activities to avoid and/or minimize impacts to any native fish that may occur on site during construction by relocating native fish, as practicable. With implementation of standard BMPs and biological monitoring, impacts to fish and degradation of higher quality EFH downstream of the concrete channels will be avoided and/or minimized. Indirect impacts may be adverse, but would be considered less than significant with incorporation of mitigation measure MM-BIO-8. In addition, the USACE will implement the EFH Conservation Recommendations, set forth in the Magnuson-Stevens Fishery Conservation and Management Act EFH Response issued by the NMFS on March 27, 2020 (refer to *Appendix J – Coordination*). The implementation of mitigation measures and EFH Conservation Recommendations would reduce any temporary adverse indirect impact to EFH to less than significant.

Non-Marine Biological Resources: No candidate, sensitive, or special status wildlife species are expected within the vicinity of the C02/C04 flood control channels. The flood control channels lack suitable habitats for sensitive or listed species owing to substantial past and ongoing disturbance, periodic vegetation maintenance within the channels, and existing structures. Based on results from a survey in July 2019, no special status species were observed. Therefore, no adverse indirect impacts are expected to federal or state listed special status non-marine biological resources.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. No impacts are expected.

Non-Marine Biological Resources: The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. No impacts are expected.

C05/C06 Channels

Direct Impacts

Marine Biological Impacts: Under the LPP, earthen/riprap/concrete lined trapezoidal channels would be replaced with open rectangular concrete lined channels to increase channel conveyance efficiency and capacity. In addition, the tide gates at the downstream end of C05 would be replaced with an access bridge. No change to the tidal influence within the channels will occur. No change of species composition or important habitat would result during the modification construction. Thirteen federal and 22 state-listed special status species potentially occur within the study area, but are not expected to be affected directly. Impacts would be considered less than significant. Under existing conditions, approximately 53% of the channels have already been lined with concrete. The remaining 47% of the channels are either earthen bottom or riprap lined. Modification of the channels would result in 54% of the channels being earthen bottom and 46% of the channels being concrete lined. In summary, the project would actually be increasing earthen (soft-bottom habitat) channels that would continue to provide habitat for species that may use the drainage channels. To minimize temporary impacts during construction activities associated with modification of the channels, mitigation measures MM-BIO-1 through MM-BIO-11. In addition, the USACE will implement the reasonable and prudent measures, and their associated terms and conditions, set forth in the Biological Opinion issued by the NMFS on March 27, 2020 (refer to *Appendix J – Coordination*).

A variety of nearshore fishes are known to swim into Bolsa Chica wetlands and are expected in the lower reaches of the C05 channel. Existing channel reaches that are concrete lined are considered low quality habitat and the proposed project would not result in a substantial, adverse impact to EFH in these reaches. Modifications of the concrete-lined reaches of the tidal portions of the channels would have minimal impact to EFH. Because the subject channel reaches have concrete sides and bottoms, they typically do not support wetlands habitat to provide substantial sources of food and/or cover for marine fishes. Only marine species that are tolerant of freshwater would be expected in areas at the farther upstream reach of the tidal influence. Channel reaches beyond the tidal influence in these channels would not be expected to support marine fishes at all. The concrete-lined reaches are expected to experience fluctuating salinity, provide no shelter and few food resources, and a low-quality habitat.

No Pacific Salmon EFH, HAPC, or EFHA were identified within the vicinity of the Proposed Project area. Additionally, EFH for PHMS is located approximately 1 mile off the coast; therefore, these species are not anticipated to be within the vicinity of the Proposed Project area and would not be impacted by this alternative.

Non-Marine Biological Resources: No candidate, sensitive, or special status wildlife species are expected within the vicinity of the C05/C06 flood control channels. The flood control channels lack suitable habitats for sensitive or listed species owing to substantial past and ongoing disturbance, periodic vegetation maintenance within the channels, and existing structures. Based on results from a survey in July 2019, no special status species were observed. Therefore, no adverse direct impacts are expected to federal or state listed special status non-marine biological resources.

Indirect Impacts

Marine Biological Impacts: Thirteen federal and 22 state-listed special status species could potentially occur the study area, and may be affected indirectly through habitat modifications, such as removal of vegetation, sediment, and other debris that can accumulate in the channel. With regard to the green turtle, this species is an infrequent visitor to the area and would not be expected to occur beyond the downstream end of C05. With regard to special status bird species, these species may forage in the area and may be temporarily disturbed by construction noise and/or project-related activities and would forage in other nearby areas and/or return when construction ceases. The special status species' foraging and movement also may be improved. No adverse impacts to listed species movement or EFH are anticipated. Impacts may be adverse, but temporary, and would be considered less than significant.

Similar to C02/C04, the only potential substantial adverse impact to EFH would be in the event an accident occurred from equipment working in one of these concrete channel reaches, and that accident led to a major fuel spill that polluted quality EFH habitat downstream of these reaches. Standard BMPs accepted by the Santa Ana RWQCB would be implemented to avoid degrading water quality. These BMPs include procedures to avoid leaks and spills and to contain and clean up contaminants in the unlikely event that a spill does occur. Impacts to EFH also would be minimized because the channel would be dewatered during maintenance activities or water would be routed around equipment. Because the equipment will not be working in the wet, the chances of contaminants from a spill or leak entering channel waters is remote. During dewatering, a biologist shall monitor activities to avoid and/or minimize impacts to any fish that may occur on site during construction by relocating native fish, as practicable. With implementation of standard BMPs and biological monitoring, impacts to fish and degradation of higher quality EFH downstream of the concrete channels will be avoided and/or minimized. Impacts may be adverse, but would be considered less than significant with incorporation of mitigation measure MM-BIO-8. In addition, the USACE will implement the EFH Conservation Recommendations, set forth in the Magnuson-Stevens Fishery Conservation and Management Act EFH Response issued by the NMFS on

March 27, 2020 (refer to *Appendix J – Coordination*). The implementation of mitigation measures and EFH Conservation Recommendations would reduce any temporary adverse indirect impact to EFH to less than significant.

Non-Marine Biological Resources: No candidate, sensitive, or special status wildlife species are expected within the vicinity of the C05/C06 flood control channels. The flood control channels lack suitable habitats for sensitive or listed species owing to substantial past and ongoing disturbance, periodic vegetation maintenance within the channels, and existing structures. Based on results from a survey in July 2019, no special status species were observed. Therefore, no adverse indirect impacts are expected to federal or state listed special status non-marine biological resources.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The impact of operation and maintenance would be similar to existing conditions since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. No impacts are expected.

Non-Marine Biological Resources: The impact of operation and maintenance would be similar to existing conditions since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. No impacts are expected.

Diversion Channel

Direct Impacts

Marine Biological Resources: A combination of open channel and reinforced concrete box (RCB) bypass channel would be constructed for C04 to direct flows around a long reach of covered conduit that runs under I-405 and the Westminster Mall. This segment does not have any tidal influence and, therefore, would have no effect on any marine biological resources.

Non-Marine Biological Resources: A combination of open channel and reinforced concrete box (RCB) bypass channel would be constructed for C04 to direct flows around a long reach of covered conduit that runs under I-405 and the Westminster Mall. This segment is devoid of habitat, consisting primarily of crushed gravel and turf grass. Therefore, construction activities would have no effect on any non-marine biological resources.

Indirect Impacts

Marine Biological Resources: The bypass channel to be constructed at C04 at I-405 and the Westminster Mall would redirect flows around an existing bottleneck in the current system and would address flooding concerns. This flow improvement may contribute to a shorter timeframe of freshwater input from C04 to the tidally influenced areas of C02. Based on comparisons of existing to proposed velocities, no substantial changes of freshwater input velocity would occur and marine resources would not experience any substantial difference from existing conditions. Impacts would be less than significant.

Non-Marine Biological Resources: The bypass channel to be constructed at C04 at I-405 and the Westminster Mall would redirect flows around an existing bottleneck in the current system and would address flooding concerns. This segment is devoid of habitat, consisting primarily of crushed gravel and

turf grass. Therefore, construction activities would have no indirect effect on any non-marine biological resources.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar to existing conditions since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. No impacts are expected.

Non-Marine Biological Resources: The impact of operation and maintenance would be similar to existing conditions since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. No impacts are expected.

Level of Impact for the LPP

Less than Significant with Mitigation Incorporated. Construction activities associated with the LPP would potentially have temporary adverse impacts to federal and state-listed species status species; however, these impacts would be reduced to less than significant with the implementation of mitigation measures MM-BIO-1 through MM-BIO-11. In addition, the USACE will implement the reasonable and prudent measures, and their associated terms and conditions, set forth in the Biological Opinion issued by the NMFS on March 27, 2020 (refer to *Appendix J – Coordination*). The implementation of these mitigation measures and reasonable and prudent measures set forth in the Biological Opinion issued by NMFS would ensure that a biologist is present to inspect the area for sensitive species prior to construction activities commencing, that construction activities are halted if a sensitive species enters the work area, and that BMPs are used in terms of reducing noise generated by equipment, minimizing impacts to species due to accidental fuel spills, and vehicle use near sensitive species. The combination of these mitigation measures would reduce temporary significant adverse impacts to special status species to less than significant.

5.8.4.2 IMPACT BIO-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative, no project would be implemented. The drainage channels would remain as they are currently configured. No construction would be implemented as a result of this alternative and, therefore, there would be no construction-related impacts to biological resources.

Under the No Action Plan widespread overtopping within the project area would still occur between the 10% and 4% ACE events. The current level of risk would remain for flood waters to potentially overtop the levees protecting sensitive resources within the SBNWR and the BCER. The SBNWR experiences flooding at the 4% ACE (i.e., 25 year storm event). Flooding of the area could result in scouring of restored sensitive habitats, influx of debris, and influx of pollutants from runoff. The BCER experiences flooding in certain areas between the 4% ACE (i.e., 25 year storm event) and the 1% ACE (i.e., 50 year storm event). Currently, there is oil production operated by CalResources LLP at the west end of C05 Reach 1 (i.e., BCER area). There is a potential for the spread of contaminants in BCER resulting from large storm events that overtop C05 upstream of the reserve and inundate the oil fields within it. If C05

floodwaters inundate the oil fields, it could cause widespread distribution of oil-laden runoff that could be transported to the Full Tidal Basin and nearby shoreline at the ocean outlet channel as floodwaters re-enter the channel as flood levels recede. Chemicals transported in flood waters from oil fields could prove detrimental to sensitive natural areas and previously completed ecosystem restoration projects. The continued risk of flooding where the oil fields are located and the risk to the previously restored areas within BCER is a potentially significant adverse impact if no project is implemented.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

Marine Biological Resources: The Warner Avenue Bridge bisects OBB from Huntington Harbour. OBB (or the Bolsa Bay State Marine Conservation Area (SMCA)) is a Marine Protected Area (MPA) managed by the CDFW. The modification of Warner Avenue Bridge would involve the removal of a portion of the existing earthen levee that occurs within the Bolsa Bay SMCA via land-side excavation; however, the project proposes to contour the resultant banks to provide more suitable habitat than the currently eroded cut banks. No water-side construction or dredging is proposed. Immediately adjacent to the Bolsa Bay SMCA is the Bolsa Chica Basin SMCA (no take); the NED Plan does not propose any direct action at Bolsa Bay SMCA. Impacts would be temporary and may be adverse, but would be considered less than significant with incorporation of mitigation measures MM-BIO-1 through MM-BIO-11. Implementation of these mitigation measures would ensure that a biologist is present to inspect the area for sensitive species, including plant species, prior to construction activities commencing, as well as minimizing impacts to species due to accidental fuel spills. The combination of these mitigation measures would reduce temporary significant adverse impacts to special status species to less than significant.

Non-Marine Biological Resources: There are four sensitive vegetation communities—southern coastal marsh, southern dune scrub, southern foredunes, and southern cottonwood willow riparian forest—that could occur within the vicinity of the proposed project. None of these sensitive vegetation communities are present within the area where construction would occur, therefore, there would be no direct impacts to sensitive vegetation communities.

Indirect Impacts

Marine Biological Resources: A potential substantial adverse impact to EFH would occur in the event an accident occurred from equipment working in one of these concrete channel reaches, and that accident led to a major fuel spill that polluted quality EFH habitat downstream of these reaches. Project construction activities at Warner Avenue Bridge would modify the earthen levee at Warner Avenue Bridge; however, the modifications would be designed to improve habitat function. Impacts would be temporary and may be adverse, but would be considered less than significant with incorporation of mitigation measure MM-BIO-8. In addition, the USACE will implement the EFH Conservation Recommendations, set forth in the Magnuson-Stevens Fishery Conservation and Management Act EFH Response issued by the NMFS on March 27, 2020 (refer to *Appendix J – Coordination*). The implementation of mitigation measures and EFH Conservation Recommendations would ensure impacts to sensitive habitats are minimized, thereby reducing the temporary adverse indirect impact to less than significant.

Non-Marine Biological Resources: There are four sensitive vegetation communities—southern coastal marsh, southern dune scrub, southern foredunes, and southern cottonwood willow riparian forest—that could occur within the vicinity of the proposed project. None of these sensitive vegetation communities are present within the area where construction would occur, therefore, there would be no indirect impacts to sensitive vegetation communities.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The Project would not result in long-term change in the marine habitat composition at Warner Avenue Bridge and potentially may improve function with the proposed design. Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Impacts would be less than significant.

Non-Marine Biological Resources: The Project would not result in long-term change in the non-marine habitat composition at Warner Avenue Bridge. Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Impacts would be less than significant.

Tide Gates

Direct Impacts

Marine Biological Resources: The tide gates at the downstream end of C05 connect to OBB (or the Bolsa Bay SMCA) managed by the CDFW. The modification of the tide gates would involve the replacement of the existing tide gates with an access bridge. The replacement of the existing hard substrate structure with another hard substrate structure would not affect the habitat use of the area immediately surrounding the current tide gates. Immediately adjacent to the Bolsa Bay SMCA is the Bolsa Chica Basin SMCA (no take); the Project does not propose any direct action within the Bolsa Bay or Bolsa Chica Basin SMCAs. Impacts would be temporary and would be considered less than significant.

Non-Marine Biological Resources: There are four sensitive vegetation communities—southern coastal marsh, southern dune scrub, southern foredunes, and southern cottonwood willow riparian forest—that could occur within the vicinity of the proposed project. None of these sensitive vegetation communities are present within the area where construction would occur, therefore, there would be no direct impacts to sensitive vegetation communities.

Indirect Impacts

Marine Biological Resources: The replacement of the existing tide gates with the proposed access bridge would not directly change the habitat type present, but the recolonization of the hard structure community may involve a temporal impact, which would indirectly affect the invertebrate community and a prey source available to other species in the area. Impacts would be temporary and would be considered less than significant.

Non-Marine Biological Resources: There are four sensitive vegetation communities—southern coastal marsh, southern dune scrub, southern foredunes, and southern cottonwood willow riparian forest—that could occur within the vicinity of the proposed project. None of these sensitive vegetation communities are present within the area where construction would occur, therefore, there would be no indirect impacts to sensitive vegetation communities.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The Project would not result in a long-term change in the marine habitat composition at the existing tide gates and potentially may improve function with the proposed access bridge. Maintenance activities associated with the new access crossing would be no different than maintenance activities that are undertaken currently for other crossings. Typical maintenance activities that occur on crossings include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Impacts would be less than significant.

Non-Marine Biological Resources: The Project would not result in a long-term change in the non-marine habitat composition near the existing tide gates. Maintenance activities associated with the new access crossing would be no different than maintenance activities that are undertaken currently for other crossings. Typical maintenance activities that occur on crossings include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Impacts would be less than significant.

C02/C04 Channels

Direct Impacts

Marine Biological Resources: The furthest coastal extent of C02 Reach 23 is at the Edinger Avenue/Sunset Bay East bridge. This reach will remain soft bottom with a sheet pile wall installed along the crest of the south levee where there is currently an earthen wall. Tidal influence in C02 extends approximately 2 miles upstream from Huntington Harbour. The project proposes to dewater sections of the subject channels by having the sectioned work areas temporarily cut off from water flow, cleared, and then water would be pumped around in a pipe for all reaches that will be lined with concrete. For C02 Reach 23, water will be allowed to flow through the reaches during construction. In this reach, coffer dams will block off water flow to one side of the channel at a time and water would continue to flow through on the other side of the channel. Impacts to the habitat within the C02 and C04 channels would be considered less than significant.

Although construction will occur within EFH, the quality of fish habitat is not consistent along the entire channel. The construction would be temporary and would create channels with a greater capacity, which would improve water circulation and water quality and provide a benefit to fish. Once completed and in operation, the biotic character of the immediate vicinity would be similar to the existing conditions.

A variety of nearshore fishes are known to swim into Bolsa Chica wetlands and are expected in the lower reaches of the C02 channel. Existing channel reaches that are concrete lined are considered low quality habitat and the proposed project would not result in a substantial, adverse impact to EFH in these reaches. Modifications of the concrete-lined reaches of the tidal portions of the channels would have minimal impact to EFH. Because the subject channel reaches have concrete sides and bottoms, they typically do not support wetlands habitat to provide substantial sources of food and/or cover for marine fishes. Only

marine species that are tolerant of freshwater would be expected in areas at the farther upstream reach of the tidal influence. Channel reaches beyond the tidal influence in these channels would not be expected to support marine fishes at all. The concrete-lined reaches are expected to experience fluctuating salinity, provide no shelter and few food resources, and a low-quality habitat.

No Pacific Salmon EFH, HAPC, or EFHA were identified within the vicinity of the Proposed Project area. Additionally, EFH for PHMS is located approximately 1 mile (1.6 kilometer) off the coast; therefore, these species are not anticipated to be within the vicinity of the Proposed Project area and would not be impacted by this alternative.

Non-Marine Biological Resources: There are four sensitive vegetation communities—southern coastal marsh, southern dune scrub, southern foredunes, and southern cottonwood willow riparian forest—that could occur within the vicinity of C02 Reach 23, but not within the construction action area. C04 is surrounded by urban structures and industrial development resulting in a lack of suitable habitat for the above sensitive vegetation communities. In addition, based on results from a survey in July 2019, no sensitive vegetation communities were observed. Therefore, no adverse direct impacts are expected to sensitive vegetation communities.

Indirect Impacts

Marine Biological Resources: A potential substantial adverse impact to EFH would be in the event an accident occurred from equipment working in one of these concrete channel reaches, and that accident led to a major fuel spill that polluted quality EFH habitat downstream of these reaches. In addition, lining the existing earthen and riprap trapezoidal channels with concrete would increase the flowrate within the channels, which may indirectly affect the habitat within the channels. Since a majority of the channels (about 75 percent) have already been lined with riprap or concrete, the Project would not be expected to have a significant effect on habitat or habitat use. Standard BMPs accepted by the Santa Ana RWQCB would be implemented to avoid degrading water quality. These BMPs include procedures to avoid leaks and spills and to contain and clean up contaminants in the unlikely event that a spill does occur. Impacts to EFH also would be minimized because the channel would be dewatered during maintenance activities or water would be routed around equipment. Because the equipment will not be working in the wet, the chances of contaminants from a spill or leak entering channel waters is remote. With implementation of standard BMPs and biological monitoring, impacts to higher quality EFH downstream of the concrete channels will be avoided and/or minimized. Indirect impacts may be adverse, but would be considered less than significant with incorporation of mitigation measure MM-BIO-8. In addition, the USACE will implement the EFH Conservation Recommendations, set forth in the Magnuson-Stevens Fishery Conservation and Management Act EFH Response issued by the NMFS on March 27, 2020 (refer to *Appendix J – Coordination*). The implementation of mitigation measures and EFH Conservation Recommendations would ensure impacts to sensitive habitats are minimized, thereby reducing the temporary adverse indirect impact to less than significant.

Non-Marine Biological Resources: There are four sensitive vegetation communities—southern coastal marsh, southern dune scrub, southern foredunes, and southern cottonwood willow riparian forest—that could occur within the vicinity of C02 Reach 23, but not within the construction action area. C04 is surrounded by urban structures and industrial development resulting in a lack of suitable habitat for the above sensitive vegetation communities. In addition, based on results from a survey in July 2019, no sensitive vegetation communities were observed. Therefore, no adverse indirect impacts are expected to sensitive vegetation communities.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The Project would not result in a long-term change in the marine habitat composition within the C02/C04 channels. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. Impacts would be less than significant.

Non-Marine Biological Resources: The Project would not result in a long-term change in the non-marine habitat composition within the C02/C04 channels. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. Impacts would be less than significant.

C05/C06 Channels

Direct Impacts

Marine Biological Resources: The furthest coastal extent of Reach 1 of C05 is at the Outer Harbor at Bolsa Chica wetlands and is connected to the Pacific Ocean. This reach will remain soft bottom with sheet pile walls installed on either side of the channel where there are currently earthen walls. Tidal influence in C05 extends approximately 1.2 miles upstream from OBB within the coastal zone and the tidal influence continues upstream and gradually diminishes for approximately 1.5 miles. The project proposes to dewater sections of the subject channels by having the sectioned work areas temporarily cut off from water flow, cleared, and then water would be pumped around in a pipe for all reaches that will be lined with concrete. For Reach 1 of C05, water will be allowed to flow through the reaches during construction. In these two reaches, coffer dams will block off water flow to one side of the channel at a time and water would continue to flow through on the other side of the channel.

Although construction will occur within EFH, the quality of fish habitat is not consistent along the entire channel. The construction would be temporary and would create channels with a greater capacity, which would improve water circulation and water quality and provide a benefit to fish. Once completed and in operation, the biotic character of the immediate vicinity would be similar to the existing conditions.

Non-Marine Biological Resources: There are four sensitive vegetation communities—southern coastal marsh, southern dune scrub, southern foredunes, and southern cottonwood willow riparian forest—that could occur within the vicinity of C05 Reach 1, but not within the construction action area. The remaining reaches of C05 and C06 are surrounded by urban structures and industrial development resulting in a lack of suitable habitat for the above sensitive vegetation communities. In addition, based on results from a survey in July 2019, no sensitive vegetation communities were observed. Therefore, no adverse direct impacts are expected to sensitive vegetation communities.

Indirect Impacts

Marine Biological Resources: A potential substantial adverse impact to EFH would be in the event an accident occurred from equipment working in one of these concrete channel reaches, and that accident led to a major fuel spill that polluted quality EFH habitat downstream of these reaches. In addition, the increase in flowrate within the channels would be short-term and is expected to be similar to existing rates at the downstream ends of C02 and C05, but also may indirectly affect the habitat within the channel downstream. Based on models of the velocities at MHHW and MLW at the downstream ends of each of

the channels, velocities are not substantially different under Project conditions. Impacts would be less than significant.

Non-Marine Biological Resources: There are four sensitive vegetation communities—southern coastal marsh, southern dune scrub, southern foredunes, and southern cottonwood willow riparian forest—that could occur within the vicinity of C05 Reach 1, but not within the construction action area. The remaining reaches of C05 and C06 are surrounded by urban structures and industrial development resulting in a lack of suitable habitat for the above sensitive vegetation communities. In addition, based on results from a survey in July 2019, no sensitive vegetation communities were observed. Therefore, no adverse indirect impacts are expected to sensitive vegetation communities.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The Project would not result in a long-term change in the marine habitat composition within the C05/C06 channels. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. Impacts would be less than significant.

Non-Marine Biological Resources: The Project would not result in a long-term change in the non-marine habitat composition within the C05/C06 channels. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. Impacts would be less than significant.

Level of Impact for the NED Plan
Less than Significant with Mitigation Incorporated. A potential substantial adverse impact to EFH would occur in the event an accident occurred from equipment working in one of the channel reaches and that accident led to a major fuel spill that polluted quality EFH downstream. Implementation of mitigation measure MM-BIO-8, along with standard BMPs accepted by the Santa Ana RWQCB and EFH Conservation Recommendations (refer to *Appendix J – Coordination*) would minimize potential temporary degradation of water quality which in turn could impact sensitive natural communities in the area. Implementation of the above would reduce this significant adverse impact to less than significant.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

Marine Biological Resources: The furthest coastal extent of C02 Reach 23 is at the Edinger Avenue/Sunset Bay East Bridge. This reach will remain soft bottom with sheet pile walls installed along the crest of the south levee and grading with vegetated confined cells along the north levee where there are currently earthen walls. Tidal influence in C02 extends approximately 2 miles upstream from Huntington Harbour. The project proposes to dewater sections of the subject channels by having the sectioned work areas temporarily cut off from water flow, cleared, and then water would be pumped around in a pipe for all reaches that will be lined with concrete. For C02 Reach 23, water will be allowed to flow through the reaches during construction. In this reach, coffer dams will block off water flow to one side of the channel at a time and water would continue to flow through on the other side of the channel. Impacts to the habitat within the C02 and C04 channels would be considered less than significant.

Although construction will occur within EFH, the quality of fish habitat is not consistent along the entire channel. The construction would be temporary and would create channels with a greater capacity, which would improve water circulation and water quality and provide a benefit to fish. Once completed and in operation, the biotic character of the immediate vicinity would be similar to the existing conditions.

A variety of nearshore fishes are known to swim into Bolsa Chica wetlands and are expected in the lower reaches of the C02 channel. Existing channel reaches that are concrete lined are considered low quality habitat and the proposed project would not result in a substantial, adverse impact to EFH in these reaches. Modifications of the concrete-lined reaches of the tidal portions of the channels would have minimal impact to EFH. Because the subject channel reaches have concrete sides and bottoms, they typically do not support wetlands habitat to provide substantial sources of food and/or cover for marine fishes. Only marine species that are tolerant of freshwater would be expected in areas at the farther upstream reach of the tidal influence. Channel reaches beyond the tidal influence in these channels would not be expected to support marine fishes at all. The concrete-lined reaches are expected to experience fluctuating salinity, provide no shelter and few food resources, and a low-quality habitat.

No Pacific Salmon EFH, HAPC, or EFHA were identified within the vicinity of the Proposed Project area. Additionally, EFH for PHMS is located approximately 1 mile (1.6 kilometer) off the coast; therefore, these species are not anticipated to be within the vicinity of the Proposed Project area and would not be impacted by this alternative.

Non-Marine Biological Resources: There are four sensitive vegetation communities—southern coastal marsh, southern dune scrub, southern foredunes, and southern cottonwood willow riparian forest—that could occur within the vicinity of C02 Reach 23, but not within the construction action area. C04 is surrounded by urban structures and industrial development resulting in a lack of suitable habitat for the above sensitive vegetation communities. In addition, based on results from a survey in July 2019, no sensitive vegetation communities were observed. Therefore, no adverse direct impacts are expected to sensitive vegetation communities.

Indirect Impacts

Marine Biological Resources: A potential substantial adverse impact to EFH would be in the event an accident occurred from equipment working in one of these concrete channel reaches, and that accident led to a major fuel spill that polluted quality EFH habitat downstream of these reaches. In addition, lining the existing earthen and riprap trapezoidal channels with concrete would increase the flowrate within the

channels, which may indirectly affect the habitat within the channels. Since a majority of the channels (about 75 percent) have already been lined with riprap or concrete, the Project would not be expected to have a significant effect on habitat or habitat use. Standard BMPs accepted by the Santa Ana RWQCB would be implemented to avoid degrading water quality. These BMPs include procedures to avoid leaks and spills and to contain and clean up contaminants in the unlikely event that a spill does occur. Impacts to EFH also would be minimized because the channel would be dewatered during maintenance activities or water would be routed around equipment. Because the equipment will not be working in the wet, the chances of contaminants from a spill or leak entering channel waters is remote. With implementation of standard BMPs and biological monitoring, impacts to higher quality EFH downstream of the concrete channels will be avoided and/or minimized. Indirect impacts may be adverse, but would be considered less than significant with incorporation of mitigation measure MM-BIO-8. In addition, the USACE will implement the EFH Conservation Recommendations, set forth in the Magnuson-Stevens Fishery Conservation and Management Act EFH Response issued by the NMFS on March 27, 2020 (refer to *Appendix J – Coordination*). The implementation of mitigation measures and EFH Conservation Recommendations would ensure impacts to sensitive habitats are minimized, thereby reducing the temporary adverse indirect impact to less than significant.

Non-Marine Biological Resources: There are four sensitive vegetation communities—southern coastal marsh, southern dune scrub, southern foredunes, and southern cottonwood willow riparian forest—that could occur within the vicinity of C02 Reach 23, but not within the construction action area. C04 is surrounded by urban structures and industrial development resulting in a lack of suitable habitat for the above sensitive vegetation communities. In addition, based on results from a survey in July 2019, no sensitive vegetation communities were observed. Therefore, no adverse indirect impacts are expected to sensitive vegetation communities.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The Project would not result in a long-term change in the marine habitat composition within the C02/C04 channels. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. Impacts would be less than significant.

Non-Marine Biological Resources: The Project would not result in a long-term change in the non-marine habitat composition within the C02/C04 channels. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. Impacts would be less than significant.

C05/C06 Channels

Direct Impacts

Marine Biological Resources: The furthest coastal extent of Reach 1 of C05 is at the Outer Harbor at Bolsa Chica wetlands and is connected to the Pacific Ocean. This reach will remain soft bottom with sheet pile walls installed on either side of the channel where there are currently earthen walls. Tidal influence in C05 extends approximately 1.2 miles upstream from OBB within the coastal zone and the tidal influence continues upstream and gradually diminishes for approximately 1.5 miles. The project proposes to dewater sections of the subject channels by having the sectioned work areas temporarily cut off from water flow, cleared, and then water would be pumped around in a pipe for all reaches that will be lined with concrete. For Reach 1 of C05, water will be allowed to flow through the reaches during

construction. In these two reaches, coffer dams will block off water flow to one side of the channel at a time and water would continue to flow through on the other side of the channel.

Although construction will occur within EFH, the quality of fish habitat is not consistent along the entire channel. The construction would be temporary and would create channels with a greater capacity, which would improve water circulation and water quality and provide a benefit to fish. Once completed and in operation, the biotic character of the immediate vicinity would be similar to the existing conditions.

Non-Marine Biological Resources: There are four sensitive vegetation communities—southern coastal marsh, southern dune scrub, southern foredunes, and southern cottonwood willow riparian forest—that could occur within the vicinity of C05 Reach 1, but not within the construction action area. The remaining reaches of C05 and C06 are surrounded by urban structures and industrial development resulting in a lack of suitable habitat for the above sensitive vegetation communities. In addition, based on results from a survey in July 2019, no sensitive vegetation communities were observed. Therefore, no adverse direct impacts are expected to sensitive vegetation communities.

Indirect Impacts

Marine Biological Resources: A potential substantial adverse impact to EFH would be in the event an accident occurred from equipment working in one of these concrete channel reaches, and that accident led to a major fuel spill that polluted quality EFH habitat downstream of these reaches. In addition, the increase in flowrate within the channels would be short-term and is expected to be similar to existing rates at the downstream ends of C02 and C05, but also may indirectly affect the habitat within the channel downstream. Based on models of the velocities at MHHW and MLW at the downstream ends of each of the channels, velocities are not substantially different under Project conditions. Impacts would be less than significant.

Non-Marine Biological Resources: There are four sensitive vegetation communities—southern coastal marsh, southern dune scrub, southern foredunes, and southern cottonwood willow riparian forest—that could occur within the vicinity of C05 Reach 1, but not within the construction action area. The remaining reaches of C05 and C06 are surrounded by urban structures and industrial development resulting in a lack of suitable habitat for the above sensitive vegetation communities. In addition, based on results from a survey in July 2019, no sensitive vegetation communities were observed. Therefore, no adverse indirect impacts are expected to sensitive vegetation communities.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The Project would not result in a long-term change in the marine habitat composition within the C05/C06 channels. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. Impacts would be less than significant.

Non-Marine Biological Resources: The Project would not result in a long-term change in the non-marine habitat composition within the C05/C06 channels. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. Impacts would be less than significant.

Diversion Channel

Direct Impacts

Marine Biological Resources: A combination of open channel and reinforced concrete box (RCB) bypass channel would be constructed for C04 to direct flows around a long reach of covered conduit that runs under I-405 and the Westminster Mall. This segment does not have any tidal influence and, therefore, would have no effect on any marine sensitive vegetation communities.

Non-Marine Biological Resources: A combination of open channel and reinforced concrete box (RCB) bypass channel would be constructed for C04 to direct flows around a long reach of covered conduit that runs under I-405 and the Westminster Mall. This segment is devoid of habitat, consisting primarily of crushed gravel and turf grass. Therefore, construction activities would have no effect on any non-marine sensitive vegetation communities.

Indirect Impacts

Marine Biological Resources: The bypass channel to be constructed at C04 at I-405 and the Westminster Mall would redirect flows around an existing bottleneck in the current system and would address flooding concerns. This flow improvement may contribute to a shorter timeframe of freshwater input from C04 to the tidally influenced areas of C02. Based on comparisons of existing to proposed velocities, no substantial changes of freshwater input velocity would occur and marine sensitive vegetation communities would not experience any substantial difference from existing conditions. Impacts would be less than significant.

Non-Marine Biological Resources: The bypass channel to be constructed at C04 at I-405 and the Westminster Mall would redirect flows around an existing bottleneck in the current system and would address flooding concerns. This segment is devoid of habitat, consisting primarily of crushed gravel and turf grass. Therefore, construction activities would have no indirect effect on any non-marine sensitive vegetation communities.

Long-Term Operation and Maintenance Impacts

The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. No impacts are expected.

Non-Marine Biological Resources: The impact of operation and maintenance would be similar since the channels already exist. Current channel maintenance, such as repairing channel linings, removing vegetation, and removing garbage or debris, would continue as currently implemented. No impacts are expected.

Level of Impact for the LPP

Less than Significant with Mitigation Incorporated. A potential substantial adverse impact to EFH would occur in the event an accident occurred from equipment working in one of the channel reaches and that accident led to a major fuel spill that polluted quality EFH habitat downstream. Implemenation of mitigation measure MM-BIO-8, along with standard BMPs accepted by the Santa Ana RWQCB and EFH Conservation Recommendations (refer to *Appendix J – Coordination*) would minimize potential temporary degradation of water quality which in turn could impact sensitive natural communities in the area. Implementation of the above would reduce this significant adverse impact to less than significant.

5.8.4.3 IMPACT BIO-3: Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative, no project would be implemented. The drainage channels would remain as they are currently configured. No construction would be implemented as a result of this alternative and, therefore, there would be no construction-related impacts to biological resources.

Under the No Action Plan widespread overtopping within the project area would still occur between the 10% and 4% ACE events. The current level of risk would remain for flood waters to potentially overtop the levees protecting sensitive resources within the SBNWR and the BCER. The SBNWR experiences flooding at the 4% ACE (i.e., 25 year storm event). Flooding of the area could result in scouring of restored sensitive habitats, influx of debris, and influx of pollutants from runoff. The BCER experiences flooding in certain areas between the 4% ACE (i.e., 25 year storm event) and the 1% ACE (i.e., 50 year storm event). Currently, there is oil production operated by CalResources LLP at the west end of C05 Reach 1 (i.e., BCER area). There is a potential for the spread of contaminants in BCER resulting from large storm events that overtop C05 upstream of the reserve and inundate the oil fields within it. If C05 floodwaters inundate the oil fields, it could cause widespread distribution of oil-laden runoff that could be transported to the Full Tidal Basin and nearby shoreline at the ocean outlet channel as floodwaters re-enter the channel as flood levels recede. Chemicals transported in flood waters from oil fields could prove detrimental to state and federally protected wetlands within the BCER. The continued risk of flooding where the oil fields are located and the risk to the previously restored areas within BCER is a potentially significant adverse impact if no project is implemented.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

Marine Biological Resources: In April 2019, a jurisdictional determination for the study area was completed by the USACE Los Angeles District Regulatory Branch (refer to *Appendix L – Environmental Considerations*). The determination identified approximately 0.15 total acres of estuarine wetland habitat adjacent to the Warner Avenue Bridge that would be directly impacted by excavation of the upland constriction located just south of the bridge. A conceptual mitigation strategy (refer to *Appendix M – Conceptual Mitigation Strategy*) has been prepared to replace the acreage of the affected resources by enhancing the muted tidal pocket in the BCER. Impacts may be adverse, but would be considered less than significant with incorporation of mitigation.

Non-Marine Biological Resources: The jurisdictional determination completed by the USACE Los Angeles District Regulatory Branch for the study area (refer to *Appendix L – Environmental Considerations*) did not identify any non-marine wetlands (i.e., non-estaurine wetlands) withint he vicinity of the Warner Avenue Bridge. Therefore, the modification of the bridge will not result in permanent, direct impacts to non-marine wetlands. There would be no impact to state or federally protected non-marine wetlands through direct removal, filling, hydrological interruption, or other means.

Indirect Impacts

Marine Biological Resources: Project construction activities at Warner Avenue Bridge would be designed to improve habitat function, but the resulting wetland habitat may require time to re-establish in function. Impacts would be temporary and may be adverse, but would be considered less than significant with incorporation of mitigation (refer to *Appendix M – Conceptual Mitigation Strategy*).

Non-Marine Biological Resources: The Warner Avenue Bridge modification will not result in permanent, indirect impacts to non-marine wetlands. Therefore, there would be no indirect impact to state or federally protected non-marine wetlands through direct removal, filling, hydrological interruption, or other means.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The NED Plan would not result in long-term change in the marine habitat composition at Warner Avenue Bridge and potentially may improve function with the proposed design. Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Impacts would be less than significant.

Non-Marine Biological Resources: The NED Plan would not result in long-term change in the non-marine habitat composition at Warner Avenue Bridge. Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Impacts would be less than significant.

Tide Gates

Direct Impacts

Marine Biological Resources: The jurisdictional determination completed by the USACE Los Angeles Regulatory Branch for the study area did not specifically identify any marine wetlands near the tide gates, however, slender glasswort (*Salicornia maritima*), an obligate wetland plant, was observed in the immediate vicinity of the tide gates during a reconnaissance level survey of the Project area (Anghera and Ecomarine 2019, refer to *Appendix L – Environmental Considerations*). A conceptual mitigation strategy (refer to *Appendix M – Conceptual Mitigation Strategy*) has been prepared to replace the acreage of the affected resources by enhancing the muted tidal pocket in the BCER. Impacts may be adverse, but would be considered less than significant with incorporation of mitigation.

Non-Marine Biological Resources: The jurisdictional determination completed by the USACE Los Angeles Regulatory Branch for the study area did not specifically identify any non-marine wetlands within the vicinity of the tide gates. Therefore, the permanent removal of the tide gates and replacement with an access bridge is not expected to have an effect on any non-marine aquatic habitat or wetlands. Therefore, there would be no direct impacts.

Indirect Impacts

Marine Biological Resources: The flowrate within the channels would experience a larger volume of freshwater in a shorter period than existing conditions and is expected to be similar to existing rates at the downstream end of C05 at the tide gates. Based on models of the velocities at MHHW and MLW at the downstream ends of the channel, velocities are not substantially different under Project conditions. Impacts would be less than significant.

Non-Marine Biological Resources: The permanent removal of the tide gates and replacement with an access bridge is not expected to have an effect on any non-marine aquatic habitat or wetlands. Therefore, there would be no indirect impacts.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The NED Plan would not result in long-term change in the marine habitat composition at the tide gates. Maintenance activities associated with the new access crossing would be no different than maintenance activities that are undertaken currently for other crossings. Typical maintenance activities that occur on crossings include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Impacts would be less than significant.

Non-Marine Biological Resources: The NED Plan would not result in long-term change in the non-marine habitat composition at the tide gates. Maintenance activities associated with the new access crossing would be no different than maintenance activities that are undertaken currently for other crossings. Typical maintenance activities that occur on crossings include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Impacts would be less than significant.

C02/C04 Channels

Direct Impacts

Marine Biological Resources: C02 is the primary channel with marine influence. Under the NED Plan, C02 Reach 23 would have a single sheet pile wall driven along the south levee with no excavation. No modification of the north levee would occur. In 2019, C02 Reach 23 was surveyed for the presence of eelgrass that could potentially be impacted by the addition of the sheet pile wall along the south levee. No eelgrass was observed within C02 Reach 23. In addition, a jurisdictional determination in 2019 (*Appendix L – Environmental Considerations*) did not find any jurisdictional wetlands present. Therefore, no impacts to marine biological resources would occur.

Non-Marine Biological Resources: With the conversion of earthen and riprap lined trapezoidal channels to concrete lined trapezoidal channels, vegetation within the channels would be impacted. Where present, channel vegetation is dominated by annual, weedy, and ruderal species. Correspondingly, native as well as non-native and invasive vegetation types are found here. While the vegetation within the flood control channels provides some habitat value, the value provided is considered minimal. Ongoing vegetation maintenance activities are taking place throughout the channels, which has had some impacts on extant biological communities. In some areas, for example C04 Reach 22, it appears that habitat is being altered via vegetation management activities. In addition, the County of Orange has a vegetation maintenance program which includes pesticide applications to manage, reduce, and control the growth of vegetation

within the flood control channels. In 2019, a jurisdictional determination of the channels was conducted by the USACE Los Angeles Regulatory Branch (*Appendix L – Environmental Considerations*) and no jurisdictional wetlands were found within the C02/C04 channels. Therefore, no impacts to non-marine wetlands would occur. Impacts would be less than significant.

Indirect Impacts

Marine Biological Resources: Lining the existing earthen and riprap trapezoidal channels with concrete would increase the flowrate within the channels, which may indirectly affect the ability for wetland habitats to fully develop within the channels. In addition, eelgrass located at the downstream end of C02 Reach 23 in Huntington Harbour could be indirectly impacted by the modification of the channels. Construction activities within the channels could temporarily increase downstream turbidity which could adversely impact eelgrass in Huntington Harbour. Once construction is complete, however, turbidity would be expected to decrease since the channels would be lined with concrete, subsequently reducing erosion and sediment transport within the channel downstream to Huntington Harbour. In addition, modification of the channels could increase storm-flow velocities at the downstream end of C02. These velocities could be greater than eelgrass is able to withstand, thereby resulting in an indirect impact to eelgrass. The estimated acreage of eelgrass that could be indirectly impacted by the project is 1.7 acres. The Conceptual Mitigation Strategy (*Appendix M*) provides a methodology for conducting in-kind and out-of-kind mitigation to offset the possible mortality of eelgrass at the downstream end of C02 in Huntington Harbour.

Non-Marine Biological Resources: Lining the existing earthen and riprap trapezoidal channels with concrete would increase the flowrate within the channels, which may indirectly affect the ability for wetland habitat to fully develop within the channels. This could indirectly impact the foraging ability of non-marine biological resources that utilize the channels as foraging habitat. However, the flood control channels are maintained for flood control, so any vegetation that does develop is periodically eradicated through maintenance. In addition, vegetation that is present within the channels is considered seasonal, often being eradicated by stormflows. Due to the vegetation within the channels being of low quality, seasonally present, and removed by periodic maintenance activities, this impact is less than significant.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The NED Plan would not result in a long-term change in the net wetland habitat composition within the Project area. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance activities include repairing channel linings, removing vegetation, and removing garbage or debris. Impacts would be less than significant.

Non-Marine Biological Resources: The NED Plan would not result in a long-term change in the net wetland habitat composition within the Project area. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance activities include repairing channel linings, removing vegetation, and removing garbage or debris. Impacts would be less than significant.

C05/C06 Channels

Direct Impacts

Marine Biological Resources: C05 Reach 1 is the primary channel reach with marine influence. Under the NED Plan, C05 Reach 1 would have double sheet pile walls driven along the north and south levees

with some excavation. In 2019, C05 Reach 1 was surveyed for the presence of eelgrass that could potentially be impacted by this conversion of the channel walls. No eelgrass was observed within C05 Reach 1. In addition, a jurisdictional determination in 2019 (*Appendix L – Environmental Considerations*) did not find any jurisdictional wetlands present. Therefore, no impacts to marine biological resources would occur.

Non-Marine Biological Resources: With the conversion of earthen and riprap lined trapezoidal channels to concrete lined trapezoidal channels, vegetation within the channels would be impacted. Where present, channel vegetation is dominated by annual, weedy, and ruderal species. Correspondingly, native as well as non-native and invasive vegetation types are found here. While the vegetation within the flood control channels provides some habitat value, the value provided is considered minimal. Ongoing vegetation maintenance activities are taking place throughout the channels, which has had some impacts on extant biological communities. In some areas, for example C06 Reach 18, it appears that vegetation management is maintaining the existing habitat conditions. In addition, the County of Orange has a vegetation maintenance program which includes pesticide applications to manage, reduce, and control the growth of vegetation within the flood control channels. In 2019, a jurisdictional determination of the channels was conducted by the USACE Los Angeles Regulatory Branch (*Appendix L – Environmental Considerations*) and no jurisdictional wetlands were found within the C05/C06 channels. Therefore, no impacts to non-marine wetlands would occur. Impacts would be less than significant.

Indirect Impacts

Marine Biological Resources: As with the C02/C04 channels, lining the existing earthen and riprap trapezoidal channels within C05/C06 with concrete would increase the flowrate within the channels, which may indirectly affect the ability for wetland habitats to fully develop within the channels. Since the project would be designed to result in no net loss of wetlands; impacts may be adverse, but would be considered less than significant with incorporation of mitigation (refer to *Appendix M – Conceptual Mitigation Strategy*).

Non-Marine Biological Resources: Lining the existing earthen and riprap trapezoidal channels within C05/C06 with concrete would increase the flowrate within the channels, which may indirectly affect the ability for wetland habitat to fully develop within the channels. This could indirectly impact the foraging ability of non-marine biological resources that utilize the channels as foraging habitat. However, the flood control channels are maintained for flood control, so any vegetation that does develop is periodically eradicated through maintenance. In addition, vegetation that is present within the channels is considered seasonal, often being eradicated by stormflows. Due to the vegetation within the channels being of low quality, seasonally present, and removed by periodic maintenance activities, this impact is less than significant.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The NED Plan would not result in a long-term change in the net wetland habitat composition within the Project area. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance activities include repairing channel linings, removing vegetation, and removing garbage or debris. Impacts would be less than significant.

Non-Marine Biological Resources: he NED Plan would not result in a long-term change in the net wetland habitat composition within the Project area. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance

activities include repairing channel linings, removing vegetation, and removing garbage or debris. Impacts would be less than significant.

Level of Impact for the NED Plan

Less than Significant with Incorporation of Mitigation. Construction activities would have significant adverse impacts to state and federally protected wetlands. These impacts would be reduce to less than significant with the incorporation of mitigation which includes enhancing the muted tidal pocket and increasing the resiliency of the tern islands to sea level rise at the BCER. Refer to *Appendix M – Conceptual Mitigation Strategy* for a discussion of the mitigation plan.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

Marine Biological Resources: C02 is the primary channel with marine influence. Under the LPP, C02 Reach 23 would have a single sheet pile wall driven along the south levee with excavation of the levee toe. In addition, the north levee would be graded and covered with geocells and plantings. In 2019, C02 Reach 23 was surveyed for the presence of eelgrass that could potentially be impacted by the addition of the sheet pile wall along the south levee. No eelgrass was observed within C02 Reach 23. In addition, a jurisdictional determination in 2019 (*Appendix L – Environmental Considerations*) did not find any jurisdictional wetlands present in C02/C04. Therefore, no impacts to marine biological resources would occur.

Non-Marine Biological Resources: With the conversion of earthen/riprap/concrete lined trapezoidal channels to concrete lined open rectangular channels, vegetation within the channels would be impacted. Where present, channel vegetation is dominated by annual, weedy, and ruderal species. Correspondingly, native as well as non-native and invasive vegetation types are found here. While the vegetation within the flood control channels provides some habitat value, the value provided is considered minimal. Ongoing vegetation maintenance activities are taking place throughout the channels, which has had some impacts on extant biological communities. In some areas, for example C04 Reach 22, it appears that habitat is being altered via vegetation management activities. In addition, the County of Orange has a vegetation maintenance program which includes pesticide applications to manage, reduce, and control the growth of vegetation within the flood control channels. In 2019, a jurisdictional determination of the channels was conducted by the USACE Los Angeles Regulatory Branch (*Appendix L – Environmental Considerations*) and no jurisdictional wetlands were found within the C02/C04 channels. Therefore, no impacts to non-marine wetlands would occur. Impacts would be less than significant.

Indirect Impacts

Marine Biological Resources: Converting the existing earthen/riprap/concrete lined trapezoidal channels to open rectangular concrete lined channels would increase the flowrate within the channels, which may indirectly affect the ability for wetland habitats to fully develop within the channels. In addition, eelgrass located at the downstream end of C02 Reach 23 in Huntington Harbour could be indirectly impacted by the modification of the channels. Construction activities within the channels could temporarily increase downstream turbidity which could adversely impact eelgrass in Huntington Harbour. Once construction is complete, however, turbidity would be expected to decrease since the channels would be lined with concrete, subsequently reducing erosion and sediment transport within the channel downstream to Huntington Harbour. In addition, modification of the channels could increase storm-flow velocities at the downstream end of C02. These velocities could be greater than eelgrass is able to withstand, thereby resulting in an indirect impact to eelgrass. The estimated acreage of eelgrass that could be indirectly impacted by the project is 1.7 acres. The Conceptual Mitigation Strategy (*Appendix M*) provides a methodology for conducting in-kind and out-of-kind mitigation to offset the possible mortality of eelgrass at the downstream end of C02 in Huntington Harbour.

Non-Marine Biological Resources: Converting the existing earthen/riprap/concrete lined trapezoidal channels to open rectangular concrete lined channels would increase the flowrate within the channels, which may indirectly affect the ability for wetland habitat to fully develop within the channels. This could indirectly impact the foraging ability of non-marine biological resources that utilize the channels as foraging habitat. However, the flood control channels are maintained for flood control, so any vegetation that does develop is periodically eradicated through maintenance. In addition, vegetation that is present within the channels is considered seasonal, often being eradicated by stormflows. Due to the vegetation within the channels being of low quality, seasonally present, and removed by periodic maintenance activities, this impact is less than significant.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The LPP would not result in a long-term change in the net wetland habitat composition within the Project area. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance activities include repairing channel linings, removing vegetation, and removing garbage or debris. Impacts would be less than significant.

Non-Marine Biological Resources: The LPP would not result in a long-term change in the net wetland habitat composition within the Project area. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance activities include repairing channel linings, removing vegetation, and removing garbage or debris. Impacts would be less than significant.

C05/C06 Channels

Direct Impacts

Marine Biological Resources: C05 Reach 1 is the primary channel reach with marine influence. Under the LPP, C05 Reach 1 would have double sheet pile walls driven along the north and south levees with some excavation. In 2019, C05 Reach 1 was surveyed for the presence of eelgrass that could potentially be impacted by this conversion of the channel walls. No eelgrass was observed within C05 Reach 1. In addition, a jurisdictional determination in 2019 (*Appendix L – Environmental Considerations*) did not

find any jurisdictional wetlands present. Therefore, no impacts to marine biological resources would occur.

Non-Marine Biological Resources: With the conversion of earthen and riprap lined trapezoidal channels to concrete lined trapezoidal channels, vegetation within the channels would be impacted. Where present, channel vegetation is dominated by annual, weedy, and ruderal species. Correspondingly, native as well as non-native and invasive vegetation types are found here. While the vegetation within the flood control channels provides some habitat value, the value provided is considered minimal. Ongoing vegetation maintenance activities are taking place throughout the channels, which has had some impacts on extant biological communities. In some areas, for example C06 Reach 18, it appears that vegetation management is maintaining the existing habitat conditions. In addition, the County of Orange has a vegetation maintenance program which includes pesticide applications to manage, reduce, and control the growth of vegetation within the flood control channels. In 2019, a jurisdictional determination of the channels was conducted by the USACE Los Angeles Regulatory Branch (*Appendix L – Environmental Considerations*) and no jurisdictional wetlands were found within the C05/C06 channels. Therefore, no impacts to non-marine wetlands would occur. Impacts would be less than significant.

Indirect Impacts

Marine Biological Resources: As with the C02/C04 channels, converting the existing earthen/riprap/concrete lined trapezoidal channels to open rectangular concrete lined channels would increase the flowrate within the C05/C06 channels, which may indirectly affect the ability for wetland habitats to fully develop within the channels. Since the project would be designed to result in no net loss of wetlands; impacts may be adverse, but would be considered less than significant with incorporation of mitigation (refer to *Appendix M – Conceptual Mitigation Strategy*).

Non-Marine Biological Resources: Converting the existing earthen/riprap/concrete lined trapezoidal channels to open rectangular concrete lined channels would increase the flowrate within the channels, which may indirectly affect the ability for wetland habitat to fully develop within the channels. This could indirectly impact the foraging ability of non-marine biological resources that utilize the channels as foraging habitat. However, the flood control channels are maintained for flood control, so any vegetation that does develop is periodically eradicated through maintenance. In addition, vegetation that is present within the channels is considered seasonal, often being eradicated by stormflows. Due to the vegetation within the channels being of low quality, seasonally present, and removed by periodic maintenance activities, this impact is less than significant.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The LPP would not result in a long-term change in the net wetland habitat composition within the Project area. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance activities include repairing channel linings, removing vegetation, and removing garbage or debris. Impacts would be less than significant.

Non-Marine Biological Resources: The LPP would not result in a long-term change in the net wetland habitat composition within the Project area. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance activities include repairing channel linings, removing vegetation, and removing garbage or debris. Impacts would be less than significant.

Diversion Channel

Direct Impacts

Marine Biological Resources: This segment does not have any tidal influence and, therefore, would have no effect on any marine biological resources.

Non-Marine Biological Resources: This segment is currently an abandoned railway route and upland covered with turf grass. There is no channel that currently exists, therefore, there are no wetlands present that would be impacted by the proposed project.

Indirect Impacts

Marine Biological Resources: Based on comparisons of existing to proposed velocities, no substantial changes of freshwater input velocity would occur and marine resources would not experience any substantial difference from existing conditions. Impacts would be less than significant.

Non-Marine Biological Resources: This segment is currently an abandoned railway route and upland covered with turf grass. There is no channel that currently exists, therefore, there are no wetlands present that would be indirectly impacted by the proposed project.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The diversion channel would involve long-term operation and maintenance activities similar to what occurs for the existing channels. Current channel maintenance activities include repairing channel linings, removing vegetation, and removing garbage or debris. Impacts would be less than significant.

Non-Marine Biological Resources: The diversion channel would involve long-term operation and maintenance activities similar to what occurs for the existing channels. Current channel maintenance activities include repairing channel linings, removing vegetation, and removing garbage or debris. Impacts would be less than significant.

Level of Impact for the LPP

Less than Significant with Incorporation of Mitigation. Construction activities would have significant adverse impacts to state and federally protected wetlands. These impacts would be reduce to less than significant with the incorporation of mitigation which includes enhancing the muted tidal pocket and increasing the resiliency of the tern islands to sea level rise at the BCER. Refer to *Appendix M – Conceptual Mitigation Strategy* for a discussion of the mitigation plan.

5.8.4.4 IMPACT BIO-4: Interfere substantially with movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative, no project would be implemented. The drainage channels would remain as they are currently configured. No construction would be implemented as a result of this alternative and, therefore, there would be no construction-related impacts to biological resources. Continued flooding of

the Westminster watershed would have no impact on the movement of any native resident or migratory fish or wildlife species.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

Marine Biological Resources: The modification of the Warner Avenue Bridge would not interfere substantially with movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites. Based on the project design at the Warner Avenue Bridge, access within the Project area may be improved with the larger span of open water at the bridge. Although construction may temporarily affect the project area, due to the localized area of impact, temporary timeframe, and the available quality of resources that surround the affected area, impacts would be less than significant.

Non-Marine Biological Resources: The modification of the Warner Avenue Bridge would not interfere substantially with movement of any non-marine wildlife species or with established native resident or migratory non-marine wildlife corridors. Although construction may temporarily affect the project area, due to the localized area of impact, temporary timeframe, and the available quality of resources that surround the affected area, impacts would be less than significant.

Indirect Impacts

Marine Biological Resources: The modification of Warner Avenue Bridge may temporarily generate turbidity and noise or underwater vibrations greater than existing conditions during construction. The increase in open water under the Warner Avenue Bridge also would modify the habitat currently present at the site. Motile species (e.g., fish, crabs) would be expected to temporarily leave the area when materials are placed; however, they would be expected to return once construction activities cease. Impacts would be temporary and may be adverse, but would be considered less than significant with incorporation of mitigation measures MM-BIO-7 and MM-BIO-8. The implementation of these mitigation measures would reduce noise impacts to biological resources due to construction equipment and reduce potential impacts due to degradation of water quality during construction; thereby, minimizing adverse impacts to species movement during construction.

Non-Marine Biological Resources: The modification of the Warner Avenue Bridge would not indirectly interfere substantially with movement of any non-marine wildlife species or with established native resident or migratory non-marine wildlife corridors. Although construction may temporarily affect the project area, due to the localized area of impact, temporary timeframe, and the available quality of resources that surround the affected area, impacts would be less than significant.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The NED Plan would not result in long-term change in the diversity, density, or species composition of the marine habitat at Warner Avenue Bridge. Modification of the bridge would involve long-term operation and maintenance activities similar to current conditions. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Impacts would be less than significant.

Non-Marine Biological Resources: The NED Plan would not result in long-term change in the diversity, density, or species composition of the non-marine habitat at Warner Avenue Bridge. Modification of the bridge would involve long-term operation and maintenance activities similar to current conditions. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Impacts would be less than significant.

Tide Gates

Direct Impacts

Marine Biological Resources: The Project would not interfere substantially with movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites. In addition, the replacement of the tide gates with an access bridge may improve fish access in the Project area. Although construction may temporarily affect the project area, due to the localized area of impact, temporary timeframe, and the available quality of resources that surround the affected area, impacts would be less than significant.

Non-Marine Biological Resources: The permanent removal of the tide gates and replacement with an access crossing would not interfere substantially with movement of any non-marine wildlife species or with established native resident or migratory non-marine wildlife corridors. Although construction may temporarily affect the project area, due to the localized area of impact, temporary timeframe, and the available quality of resources that surround the affected area, impacts would be less than significant.

Indirect Impacts

Marine Biological Resources: Similar to the Warner Avenue Bridge, the replacement of the tide gates with an access bridge may temporarily generate turbidity and noise or underwater vibrations greater than existing conditions during construction. Motile species (e.g., fish, crabs) would be expected to temporarily leave the area when materials are placed; however, they would be expected to return once construction activities cease. Impacts would be temporary and may be adverse, but would be considered less than significant with incorporation of mitigation measures MM-BIO-7 and MM-BIO-8. The implementation of these mitigation measures would reduce noise impacts to biological resources due to construction equipment and reduce potential impacts due to degradation of water quality during construction; thereby, minimizing adverse impacts to species movement during construction.

Non-Marine Biological Resources: The permanent removal of the tide gates and replacement with an access crossing would not indirectly interfere substantially with movement of any non-marine wildlife species or with established native resident or migratory non-marine wildlife corridors. Although construction may temporarily affect the project area, due to the localized area of impact, temporary timeframe, and the available quality of resources that surround the affected area, impacts would be less than significant.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: Replacement of the tide gates with an access bridge would result in long-term operation and maintenance activities similar to or less than current conditions. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Impacts would be less than significant.

Non-Marine Biological Resources: Replacement of the tide gates with an access bridge would result in long-term operation and maintenance activities similar to or less than current conditions. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Impacts would be less than significant.

C02/C04 Channels

Direct Impacts

Marine Biological Resources: A variety of nearshore fishes are known to swim into Bolsa Chica wetlands and are expected in the lower reaches of the C02 channel. Existing channel reaches that are concrete lined are considered low quality habitat and the proposed project would not result in a substantial, adverse impact to EFH in these reaches. Modifications of the concrete-lined reaches of the tidal portions of the channels would have minimal impact to EFH.

The NED Plan would convert earthen/riprap trapezoidal channels to concrete lined trapezoidal channels to increase conveyance efficiency. No substantial change to the tidal influence within the channels will occur. No substantial change of species composition or important habitat would result once construction is completed. No adverse impacts to listed species movement or EFH are anticipated. Impacts would be less than significant.

Non-Marine Biological Resources: Non-marine wildlife movement within the drainage channels is minimal due to the surrounding urban environment and the low quality of habitat within the channels. Species that primarily use the channels as movement corridors are common species such as raccoon, Virginia opossum, and striped skunk that are typically associated with urban areas. In addition, fox and coyote may also use the channels periodically. The channels also provide foraging habitat for resident and migratory birds that nest at SBNWR and BCER. Movements by the above species and use of the channels as wildlife corridors could be temporarily affected during construction activities, however, they would not be affected substantially. Construction activities would not be occurring on all reaches of the flood control channels simultaneously, therefore, the impact would be limited to the reach that is being modified.

In regards to non-marine fish, the portions of the channels where these species could exist are the upstream reaches of C02/C04 that do not experience tidal influence; however, these reaches would not be expected to support native fish populations due to the limited volume of water, occasional weirs altering the in-stream elevation of the channels and creating barriers to upstream movement, and the generally ephemeral or low-volume perennial urban runoff flow. In addition, due to the limited volume of water upstream, lack of connection between perennial water bodies, and the barriers to upstream movement, these reaches would not be considered to provide any substantial movement corridors for non-marine fish species.

Overall, although construction may temporarily affect the project area, due to the localized area of impact, temporary timeframe, and the available quality of resources that surround the affected area, impacts would be less than significant.

Indirect Impacts

Marine Biological Resources: A potential substantial adverse impact to fish would be in the event an accident occurred from equipment working in one of these concrete channel reaches, and that accident led to a major fuel spill that polluted quality EFH habitat downstream of these reaches. In addition, lining the existing earthen and riprap trapezoidal channels with concrete would increase the flowrate within the

channels, which may indirectly affect the use of the channels in the future by existing organisms. Since a majority of the channels (about 75 percent) have already been lined with riprap or concrete, the Project would not be expected to have a significant effect on habitat or habitat use. Standard BMPs accepted by the Santa Ana RWQCB would be implemented to avoid degrading water quality. These BMPs include procedures to avoid leaks and spills and to contain and clean up contaminants in the unlikely event that a spill does occur. Impacts to EFH also would be minimized because the channel would be dewatered during maintenance activities or water would be routed around equipment. Because the equipment will not be working in the wet, the chances of contaminants from a spill or leak entering channel waters is remote. During dewatering, a biologist shall monitor activities to avoid and/or minimize impacts to any fish that may occur on site during construction by relocating native fish, as practicable. With implementation of standard BMPs and biological monitoring, impacts to fish and degradation of higher quality EFH downstream of the concrete channels will be avoided and/or minimized. Indirect impacts may be adverse, but would be considered less than significant with incorporation of mitigation measure MM-BIO-8. In addition, the USACE will implement the EFH Conservation Recommendations, set forth in the Magnuson-Stevens Fishery Conservation and Management Act EFH Response issued by the NMFS on March 27, 2020 (refer to *Appendix J – Coordination*). The implementation of mitigation measures and EFH Conservation Recommendations would reduce any temporary adverse indirect impact to EFH to less than significant.

Non-Marine Biological Resources: Non-marine wildlife movement within the drainage channels is minimal due to the surrounding urban environment and the low quality of habitat within the channels. Species that primarily use the channels as movement corridors are common. The channels also provide foraging habitat for resident and migratory birds that nest at SBNWR and BCER. Movements by the above species and use of the channels as foraging habitat could be temporarily affected during construction activities, however, they would not be affected substantially. Construction activities would not be occurring on all reaches of the flood control channels simultaneously, therefore, the impact would be limited to the reach that is being modified.

No non-marine fish are expected to occur within the channels due to the limited volume of water upstream, lack of connection between perennial water bodies, and the barriers to upstream movement. Overall, although construction may temporarily affect the project area, due to the localized area of impact, temporary timeframe, and the available quality of resources that surround the affected area, indirect impacts would be less than significant.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The NED Plan would not result in a long-term change in the marine habitat composition and fish within the C02/C04 channels. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance activities include repairing channel linings, removing vegetation, and removing garbage or debris. Impacts would be less than significant.

Non-Marine Biological Resources: The NED Plan would not result in a long-term change in the non-marine habitat composition and non-marine wildlife within the C02/C04 channels. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance activities include repairing channel linings, removing vegetation, and removing garbage or debris. Impacts would be less than significant.

C05/C06 Channels

Direct Impacts

Marine Biological Resources: A variety of nearshore fishes are known to swim into Bolsa Chica wetlands and are expected in the lower reaches of the C05 channel. Existing channel reaches that are concrete lined are considered low quality habitat and the proposed project would not result in a substantial, adverse impact to EFH in these reaches. Modifications of the concrete-lined reaches of the tidal portions of the channels would have minimal impact to EFH.

The NED Plan would convert earthen/riprap trapezoidal channels to concrete lined trapezoidal channels to increase conveyance efficiency. No substantial change to the tidal influence within the channels will occur. No substantial change of species composition or important habitat would result once construction is completed. No adverse impacts to listed species movement or EFH are anticipated. Impacts would be less than significant.

Non-Marine Biological Resources: Non-marine wildlife movement within the drainage channels is minimal due to the surrounding urban environment and the low quality of habitat within the channels. Species that primarily use the channels as movement corridors are common species such as raccoon, Virginia opossum, and striped skunk that are typically associated with urban areas. In addition, fox and coyote may also use the channels periodically. The channels also provide foraging habitat for resident and migratory birds that nest at SBNWR and BCER. Movements by the above species and use of the channels as wildlife corridors could be temporarily affected during construction activities, however, they would not be affected substantially. Construction activities would not be occurring on all reaches of the flood control channels simultaneously, therefore, the impact would be limited to the reach that is being modified.

In regards to non-marine fish, the portions of the channels where these species could exist are the upstream reaches of C05/C06 that do not experience tidal influence; however, these reaches would not be expected to support native fish populations due to the limited volume of water, occasional weirs altering the in-stream elevation of the channels and creating barriers to upstream movement, and the generally ephemeral or low-volume perennial urban runoff flow. In addition, due to the limited volume of water upstream, lack of connection between perennial water bodies, and the barriers to upstream movement, these reaches would not be considered to provide any substantial movement corridors for non-marine fish species.

Overall, although construction may temporarily affect the project area, due to the localized area of impact, temporary timeframe, and the available quality of resources that surround the affected area, impacts would be less than significant.

Indirect Impacts

Marine Biological Resources: A potential substantial adverse impact to fish would be in the event an accident occurred from equipment working in one of these concrete channel reaches, and that accident led to a major fuel spill that polluted quality EFH habitat downstream of these reaches. In addition, lining the existing earthen and riprap trapezoidal channels with concrete would increase the flowrate within the channels, which may indirectly affect the use of the channels in the future by existing organisms. Since a majority of the channels (about 75 percent) have already been lined with riprap or concrete, the Project would not be expected to have a significant effect on habitat or habitat use. Standard BMPs accepted by the Santa Ana RWQCB would be implemented to avoid degrading water quality. These BMPs include procedures to avoid leaks and spills and to contain and clean up contaminants in the unlikely event that a spill does occur. Impacts to EFH also would be minimized because the channel would be dewatered

during maintenance activities or water would be routed around equipment. Because the equipment will not be working in the wet, the chances of contaminants from a spill or leak entering channel waters is remote. During dewatering, a biologist shall monitor activities to avoid and/or minimize impacts to any fish that may occur on site during construction by relocating native fish, as practicable. With implementation of standard BMPs and biological monitoring, impacts to fish and degradation of higher quality EFH downstream of the concrete channels will be avoided and/or minimized. Indirect impacts may be adverse, but would be considered less than significant with incorporation of mitigation measure MM-BIO-8. In addition, the USACE will implement the EFH Conservation Recommendations, set forth in the Magnuson-Stevens Fishery Conservation and Management Act EFH Response issued by the NMFS on March 27, 2020 (refer to *Appendix J – Coordination*). The implementation of mitigation measures and EFH Conservation Recommendations would reduce any temporary adverse indirect impact to EFH to less than significant.

Non-Marine Biological Resources: Non-marine wildlife movement within the drainage channels is minimal due to the surrounding urban environment and the low quality of habitat within the channels. Species that primarily use the channels as movement corridors are common. The channels also provide foraging habitat for resident and migratory birds that nest at SBNWR and BCER. Movements by the above species and use of the channels as foraging habitat could be temporarily affected during construction activities, however, they would not be affected substantially. Construction activities would not be occurring on all reaches of the flood control channels simultaneously, therefore, the impact would be limited to the reach that is being modified.

No non-marine fish are expected to occur within the channels due to the limited volume of water upstream, lack of connection between perennial water bodies, and the barriers to upstream movement. Overall, although construction may temporarily affect the project area, due to the localized area of impact, temporary timeframe, and the available quality of resources that surround the affected area, indirect impacts would be less than significant.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The NED Plan would not result in a long-term change in the marine habitat composition and fish within the C05/C06 channels. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance activities include repairing channel linings, removing vegetation, and removing garbage or debris. Impacts would be less than significant.

Non-Marine Biological Resources: The NED Plan would not result in a long-term change in the non-marine habitat composition and non-marine wildlife within the C05/C06 channels. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance activities include repairing channel linings, removing vegetation, and removing garbage or debris. Impacts would be less than significant.

Level of Impact for the NED Plan

Less than Significant with Mitigation Incorporated. Construction activities could potentially have temporary indirect adverse impacts to the movement of native or migratory fish and wildlife due to noise generated during construction as well as the potential for accidental fuel spills. Mitigation measures MM-BIO-6 and MM-BIO-7 would be implemented during construction to reduce noise impacts to biological resources due to construction equipment and reduce potential impacts due to degradation of water quality during construction; thereby, minimizing adverse impacts to species movement during construction. With

the incorporation of these mitigation measures the potential temporary adverse indirect impacts would be reduced to less than significant.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

Marine Biological Resources: A variety of nearshore fishes are known to swim into Bolsa Chica wetlands and are expected in the lower reaches of the C02 channel. Existing channel reaches that are concrete lined are considered low quality habitat and the proposed project would not result in a substantial, adverse impact to EFH in these reaches. Modifications of the concrete-lined reaches of the tidal portions of the channels would have minimal impact to EFH.

The LPP would convert earthen/riprap/concrete lined trapezoidal channels to open rectangular concrete lined channels to increase conveyance efficiency and capacity. No substantial change to the tidal influence within the channels will occur. No substantial change of species composition or important habitat would result once construction is completed. No adverse impacts to listed species movement or EFH are anticipated. Impacts would be less than significant.

Non-Marine Biological Resources: Non-marine wildlife movement within the drainage channels is minimal due to the surrounding urban environment and the low quality of habitat within the channels. Species that primarily use the channels as movement corridors are common species such as raccoon, Virginia opossum, and striped skunk that are typically associated with urban areas. In addition, fox and coyote may also use the channels periodically. The channels also provide foraging habitat for resident and migratory birds that nest at SBNWR and BCER. Movements by the above species and use of the channels as wildlife corridors could be temporarily affected during construction activities, however, they would not be affected substantially. Construction activities would not be occurring on all reaches of the flood control channels simultaneously, therefore, the impact would be limited to the reach that is being modified.

With regard to non-marine fish, the portions of the channels where these species could exist are the upstream reaches of C02/C04 that do not experience tidal influence; however, these reaches would not be expected to support native fish populations due to the limited volume of water, occasional weirs altering the in-stream elevation of the channels and creating barriers to upstream movement, and the generally ephemeral or low-volume perennial urban runoff flow. In addition, due to the limited volume of water upstream, lack of connection between perennial water bodies, and the barriers to upstream movement,

these reaches would not be considered to provide any substantial movement corridors for non-marine fish species.

Overall, although construction may temporarily affect the project area, due to the localized area of impact, temporary timeframe, and the available quality of resources that surround the affected area, impacts would be less than significant.

Indirect Impacts

Marine Biological Resources: A potential substantial adverse impact to fish would be in the event an accident occurred from equipment working in one of these concrete channel reaches, and that accident led to a major fuel spill that polluted quality EFH habitat downstream of these reaches. In addition, converting the existing earthen/riprap/concrete lined trapezoidal channels to open rectangular concrete lined channels would increase the flowrate within the channels, which may indirectly affect the use of the channels in the future by existing organisms. Since a majority of the channels (about 75 percent) have already been lined with riprap or concrete, the Project would not be expected to have a significant effect on habitat or habitat use. Standard BMPs accepted by the Santa Ana RWQCB would be implemented to avoid degrading water quality. These BMPs include procedures to avoid leaks and spills and to contain and clean up contaminants in the unlikely event that a spill does occur. Impacts to EFH also would be minimized because the channel would be dewatered during maintenance activities or water would be routed around equipment. Because the equipment will not be working in the wet, the chances of contaminants from a spill or leak entering channel waters is remote. During dewatering, a biologist shall monitor activities to avoid and/or minimize impacts to any fish that may occur on site during construction by relocating native fish, as practicable. With implementation of standard BMPs and biological monitoring, impacts to fish and degradation of higher quality EFH downstream of the concrete channels will be avoided and/or minimized. Indirect impacts may be adverse, but would be considered less than significant with incorporation of mitigation measure MM-BIO-8. In addition, the USACE will implement the EFH Conservation Recommendations, set forth in the Magnuson-Stevens Fishery Conservation and Management Act EFH Response issued by the NMFS on March 27, 2020 (refer to *Appendix J – Coordination*). The implementation of mitigation measures and EFH Conservation Recommendations would reduce any temporary adverse indirect impact to EFH to less than significant.

Non-Marine Biological Resources: Non-marine wildlife movement within the drainage channels is minimal due to the surrounding urban environment and the low quality of habitat within the channels. Species that primarily use the channels as movement corridors are common. The channels also provide foraging habitat for resident and migratory birds that nest at SBNWR and BCER. Movements by the above species and use of the channels as foraging habitat could be temporarily affected during construction activities, however, they would not be affected substantially. Construction activities would not be occurring on all reaches of the flood control channels simultaneously, therefore, the impact would be limited to the reach that is being modified.

No non-marine fish are expected to occur within the channels due to the limited volume of water upstream, lack of connection between perennial water bodies, and the barriers to upstream movement. Overall, although construction may temporarily affect the project area, due to the localized area of impact, temporary timeframe, and the available quality of resources that surround the affected area, indirect impacts would be less than significant.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The LPP would not result in a long-term change in the marine habitat composition and fish within the C02/C04 channels. Modification of the channels would involve long-term

operation and maintenance activities similar to current conditions. Current channel maintenance activities include repairing channel linings, removing vegetation, and removing garbage or debris. Impacts would be less than significant.

Non-Marine Biological Resources: The LPP would not result in a long-term change in the non-marine habitat composition and non-marine wildlife within the C02/C04 channels. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance activities include repairing channel linings, removing vegetation, and removing garbage or debris. Impacts would be less than significant.

C05/C06 Channels

Direct Impacts

Marine Biological Resources: A variety of nearshore fishes are known to swim into Bolsa Chica wetlands and are expected in the lower reaches of the C05 channel. Existing channel reaches that are concrete lined are considered low quality habitat and the proposed project would not result in a substantial, adverse impact to EFH in these reaches. Modifications of the concrete-lined reaches of the tidal portions of the channels would have minimal impact to EFH.

The LPP would convert earthen/riprap/concrete lined trapezoidal channels to open rectangular concrete lined channels within C05/C06 to increase conveyance efficiency and capacity. No substantial change to the tidal influence within the channels will occur. No substantial change of species composition or important habitat would result once construction is completed. No adverse impacts to listed species movement or EFH are anticipated. Impacts would be less than significant.

Non-Marine Biological Resources: Non-marine wildlife movement within the drainage channels is minimal due to the surrounding urban environment and the low quality of habitat within the channels. Species that primarily use the channels as movement corridors are common species such as raccoon, Virginia opossum, and striped skunk that are typically associated with urban areas. In addition, fox and coyote may also use the channels periodically. The channels also provide foraging habitat for resident and migratory birds that nest at SBNWR and BCER. Movements by the above species and use of the channels as wildlife corridors could be temporarily affected during construction activities, however, they would not be affected substantially. Construction activities would not be occurring on all reaches of the flood control channels simultaneously, therefore, the impact would be limited to the reach that is being modified.

With regard to non-marine fish, the portions of the channels where these species could exist are the upstream reaches of C05/C06 that do not experience tidal influence; however, these reaches would not be expected to support native fish populations due to the limited volume of water, occasional weirs altering the in-stream elevation of the channels and creating barriers to upstream movement, and the generally ephemeral or low-volume perennial urban runoff flow. In addition, due to the limited volume of water upstream, lack of connection between perennial water bodies, and the barriers to upstream movement, these reaches would not be considered to provide any substantial movement corridors for non-marine fish species.

Overall, although construction may temporarily affect the project area, due to the localized area of impact, temporary timeframe, and the available quality of resources that surround the affected area, impacts would be less than significant.

Indirect Impacts

Marine Biological Resources: A potential substantial adverse impact to fish would be in the event an accident occurred from equipment working in one of these concrete channel reaches, and that accident led to a major fuel spill that polluted quality EFH habitat downstream of these reaches. In addition, lining the existing earthen and riprap trapezoidal channels with concrete would increase the flowrate within the channels, which may indirectly affect the use of the channels in the future by existing organisms. Since a majority of the channels (about 75 percent) have already been lined with riprap or concrete, the Project would not be expected to have a significant effect on habitat or habitat use. Standard BMPs accepted by the Santa Ana RWQCB would be implemented to avoid degrading water quality. These BMPs include procedures to avoid leaks and spills and to contain and clean up contaminants in the unlikely event that a spill does occur. Impacts to EFH also would be minimized because the channel would be dewatered during maintenance activities or water would be routed around equipment. Because the equipment will not be working in the wet, the chances of contaminants from a spill or leak entering channel waters is remote. During dewatering, a biologist shall monitor activities to avoid and/or minimize impacts to any fish that may occur on site during construction by relocating native fish, as practicable. With implementation of standard BMPs and biological monitoring, impacts to fish and degradation of higher quality EFH downstream of the concrete channels will be avoided and/or minimized. Indirect impacts may be adverse, but would be considered less than significant with incorporation of mitigation measure MM-BIO-8. In addition, the USACE will implement the EFH Conservation Recommendations, set forth in the Magnuson-Stevens Fishery Conservation and Management Act EFH Response issued by the NMFS on March 27, 2020 (refer to *Appendix J – Coordination*). The implementation of mitigation measures and EFH Conservation Recommendations would reduce any temporary adverse indirect impact to EFH to less than significant.

Non-Marine Biological Resources: Non-marine wildlife movement within the drainage channels is minimal due to the surrounding urban environment and the low quality of habitat within the channels. Species that primarily use the channels as movement corridors are common. The channels also provide foraging habitat for resident and migratory birds that nest at SBNWR and BCER. Movements by the above species and use of the channels as foraging habitat could be temporarily affected during construction activities, however, they would not be affected substantially. Construction activities would not be occurring on all reaches of the flood control channels simultaneously, therefore, the impact would be limited to the reach that is being modified.

No non-marine fish are expected to occur within the channels due to the limited volume of water upstream, lack of connection between perennial water bodies, and the barriers to upstream movement. Overall, although construction may temporarily affect the project area, due to the localized area of impact, temporary timeframe, and the available quality of resources that surround the affected area, indirect impacts would be less than significant.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The LPP would not result in a long-term change in the marine habitat composition and fish within the C05/C06 channels. Modification of the channels would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance activities include repairing channel linings, removing vegetation, and removing garbage or debris. Impacts would be less than significant.

Non-Marine Biological Resources: The LPP would not result in a long-term change in the non-marine habitat composition and non-marine wildlife within the C05/C06 channels. Modification of the channels

would involve long-term operation and maintenance activities similar to current conditions. Current channel maintenance activities include repairing channel linings, removing vegetation, and removing garbage or debris. Impacts would be less than significant.

Diversion Channel

Direct Impacts

Marine Biological Resources: This segment does not have any tidal influence and, therefore, would have no effect on any marine biological resources.

Non-Marine Biological Resources: This segment is currently an abandoned railway route and upland covered with turf grass. Due to the surrounding urban environment on all sides of where the drainage channel would be constructed, this area is not considered a wildlife corridor. Construction of the diversion channel, therefore, would have no impact on non-marine wildlife movement or corridors.

Indirect Impacts

Marine Biological Resources: Based on comparisons of existing to proposed flow velocities, no substantial changes of freshwater input velocity would occur and marine resources would not experience any substantial difference from existing conditions. Impacts would be less than significant.

Non-Marine Biological Resources: This segment is currently an abandoned railway route and upland covered with turf grass. Due to the surrounding urban environment on all sides of where the drainage channel would be constructed, this area is not considered a wildlife corridor. Construction of the diversion channel, therefore, would have no indirect impact on non-marine wildlife movement or corridors.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The diversion channel would involve long-term operation and maintenance activities similar to what occurs for the existing channels. Current channel maintenance activities include repairing channel linings, removing vegetation, and removing garbage or debris. Impacts would be less than significant.

Non-Marine Biological Resources: The diversion channel would involve long-term operation and maintenance activities similar to what occurs for the existing channels. Current channel maintenance activities include repairing channel linings, removing vegetation, and removing garbage or debris. Impacts would be less than significant.

Level of Impact for the LPP

Less than Significant with Mitigation Incorporated. Construction activities could potentially have temporary indirect adverse impacts to the movement of native or migratory fish and wildlife due to noise generated during construction as well as the potential for accidental fuel spills. Mitigation measures MM-BIO-7 and MM-BIO-8 would be implemented during construction to reduce noise impacts to biological resources due to construction equipment and reduce potential impacts due to degradation of water quality during construction; thereby, minimizing adverse impacts to species movement during construction. With the incorporation of these mitigation measures the potential temporary adverse indirect impacts would be reduced to less than significant.

5.8.4.5 IMPACT BIO-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative, no project would be implemented. The drainage channels would remain as they are currently configured. No construction would be implemented as a result of this alternative and, therefore, there would be no construction-related impacts to biological resources. Continued flooding within the Westminster watershed would have no impact on any local policies or ordinances protecting biological resources.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

Marine Biological Resources: The modification of the Warner Avenue Bridge does not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no impact.

Non-Marine Biological Resources: The modification of the Warner Avenue Bridge does not conflict with any local policies or ordinance regarding non-marine biological species and, therefore, would have no impact.

Indirect Impacts

Marine Biological Resources: The modification of the Warner Avenue Bridge does not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no indirect impact.

Non-Marine Biological Resources: The modification of the Warner Avenue Bridge does not conflict with any local policies or ordinance regarding non-marine biological species and, therefore, would have no indirect impact.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The NED Plan does not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no long-term effect. Typical maintenance activities that occur currently for the bridge would continue. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings.

Non-Marine Biological Resources: The modification of the Warner Avenue Bridge does not conflict with any local policies or ordinances regarding non-marine biological species and, therefore, would have no long-term effect. Typical maintenance activities that occur currently for the bridge would continue. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings.

Tide Gates

Direct Impacts

Marine Biological Resources: The removal of the tide gates and replacement with an access bridge does not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no impact.

Non-Marine Biological Resources: The removal of the tide gates and replacement with an access bridge does not conflict with any local policies or ordinances regarding non-marine biological species and, therefore, would have no impact.

Indirect Impacts

Marine Biological Resources: The removal of the tide gates and replacement with an access bridge does not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no indirect impact.

Non-Marine Biological Resources: The removal of the tide gates and replacement with an access bridge does not conflict with any local policies or ordinances regarding non-marine biological species and, therefore, would have no indirect impact.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The long-term operation and maintenance activities associated with the new access bridge would not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no long-term effect. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings.

Non-Marine Biological Resources: The long-term operation and maintenance activities associated with the new access bridge would not conflict with any local policies or ordinance regarding non-marine biological species and, therefore, would have no long-term effect. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings.

C02/C04 Channels

Direct Impacts

Marine Biological Resources: The conversion of earthen/riprap trapezoidal channels to concrete lined channels within the C02/C04 system does not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no impact.

Non-Marine Biological Resources: Minor ornamental tree-trimming may be required along the channel access ramps and maintenance roads in order for construction equipment to safely pass, but no native trees would be removed. Thus, the modification of the channels within the C02/C04 system does not conflict with any local policies or ordinances regarding non-marine biological species and, therefore, would have no impact.

Indirect Impacts

Marine Biological Resources: The conversion of earthen/riprap trapezoidal channels to concrete lined channels within the C02/C04 system does not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no indirect impact.

Non-Marine Biological Resources: Minor ornamental tree-trimming may be required along the channel access ramps and maintenance roads in order for construction equipment to safely pass, but no native trees would be removed. Thus, the modification of the channels within the C02/C04 system does not conflict with any local policies or ordinances regarding non-marine biological species and, therefore, would have no indirect impact.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The long-term operation and maintenance of the flood control channels does not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no long-term impact.

Non-Marine Biological Resources: The long-term operation and maintenance of the flood control channels does not conflict with any local policies or ordinances regarding non-marine biological species and, therefore, would have no long-term impact.

C05/C06 Channels

Direct Impacts

Marine Biological Resources: The conversion of earthen/riprap trapezoidal channels to concrete lined channels within the C05/C06 system does not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no impact.

Non-Marine Biological Resources: Minor ornamental tree-trimming may be required along the channel access ramps and maintenance roads in order for construction equipment to safely pass, but no native trees would be removed. Thus, the modification of the channels within the C05/C06 system does not conflict with any local policies or ordinances regarding non-marine biological species and, therefore, would have no impact.

Indirect Impacts

Marine Biological Resources: The conversion of earthen/riprap trapezoidal channels to concrete lined channels within the C05/C06 system does not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no indirect impact.

Non-Marine Biological Resources: Minor ornamental tree-trimming may be required along the channel access ramps and maintenance roads in order for construction equipment to safely pass, but no native trees would be removed. Thus, the modification of the channels within the C05/C06 system does not conflict with any local policies or ordinances regarding non-marine biological species and, therefore, would have no indirect impact.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The long-term operation and maintenance of the flood control channels does not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no long-term impact.

Non-Marine Biological Resources: The long-term operation and maintenance of the flood control channels does not conflict with any local policies or ordinances regarding non-marine biological species and, therefore, would have no long-term impact.

Level of Impact for the NED Plan

No Impact. The NED Plan does not conflict with any local policies or ordinances regarding biological species.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

Marine Biological Resources: The conversion of earthen/riprap/concrete lined trapezoidal channels to open rectangular concrete lined channels within the C02/C04 system does not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no impact.

Non-Marine Biological Resources: Minor ornamental tree-trimming may be required along the channel access ramps and maintenance roads in order for construction equipment to safely pass, but no native trees would be removed. Thus, the modification of the channels within the C02/C04 system does not conflict with any local policies or ordinances regarding non-marine biological species and, therefore, would have no impact.

Indirect Impacts

Marine Biological Resources: The conversion of earthen/riprap/concrete lined trapezoidal channels to open rectangular concrete lined channels within the C02/C04 system does not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no indirect impact.

Non-Marine Biological Resources: Minor ornamental tree-trimming may be required along the channel access ramps and maintenance roads in order for construction equipment to safely pass, but no native trees would be removed. Thus, the modification of the channels within the C02/C04 system does not

conflict with any local policies or ordinances regarding non-marine biological species and, therefore, would have no indirect impact.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The long-term operation and maintenance of the flood control channels does not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no long-term impact.

Non-Marine Biological Resources: The long-term operation and maintenance of the flood control channels does not conflict with any local policies or ordinances regarding non-marine biological species and, therefore, would have no long-term impact.

C05/C06 Channels

Direct Impacts

Marine Biological Resources: The conversion of earthen/riprap/concrete lined trapezoidal channels to open rectangular concrete lined channels within the C05/C06 system does not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no impact.

Non-Marine Biological Resources: Minor ornamental tree-trimming may be required along the channel access ramps and maintenance roads in order for construction equipment to safely pass, but no native trees would be removed. Thus, the modification of the channels within the C05/C06 system does not conflict with any local policies or ordinances regarding non-marine biological species and, therefore, would have no impact.

Indirect Impacts

Marine Biological Resources: The conversion of earthen/riprap/concrete lined trapezoidal channels to open rectangular concrete lined channels within the C05/C06 system does not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no indirect impact.

Non-Marine Biological Resources: Minor ornamental tree-trimming may be required along the channel access ramps and maintenance roads in order for construction equipment to safely pass, but no native trees would be removed. Thus, the modification of the channels within the C05/C06 system does not conflict with any local policies or ordinances regarding non-marine biological species and, therefore, would have no indirect impact.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The long-term operation and maintenance of the flood control channels does not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no long-term impact.

Non-Marine Biological Resources: The long-term operation and maintenance of the flood control channels does not conflict with any local policies or ordinances regarding non-marine biological species and, therefore, would have no long-term impact.

Diversion Channel

Direct Impacts

Marine Biological Resources: The proposed project does not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no impact.

Non-Marine Biological Resources: Minor ornamental tree-trimming may be required along where the diversion channel will be constructed in order for construction equipment to safely access the site, but no native trees would be removed. Thus, the construction of the diversion channel does not conflict with any local policies or ordinances regarding non-marine biological species and, therefore, would have no impact.

Indirect Impacts

Marine Biological Resources: The proposed project does not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no indirect impact.

Non-Marine Biological Resources: Minor ornamental tree-trimming may be required along where the diversion channel will be constructed in order for construction equipment to safely access the site, but no native trees would be removed. Thus, the construction of the diversion channel does not conflict with any local policies or ordinances regarding non-marine biological species and, therefore, would have no indirect impact.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The long-term operation and maintenance of the diversion channel does not conflict with any local policies or ordinances regarding marine biological species and, therefore, would have no long-term impact.

Non-Marine Biological Resources: The long-term operation and maintenance of the diversion channel does not conflict with any local policies or ordinances regarding non-marine biological species and, therefore, would have no long-term impact.

Level of Impact for the LPP

No Impact. The proposed project does not conflict with any local policies or ordinances regarding biological species.

5.8.4.6 IMPACT BIO-6: Conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative, no project would be implemented. The drainage channels would remain as they are currently configured. No construction would be implemented as a result of this alternative and, therefore, there would be no construction-related impacts to biological resources. Continued flooding within the Westminster watershed would have no impact on the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

Marine Biological Resources: The modification of the Warner Avenue Bridge does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no direct impact.

Non-Marine Biological Resources: Warner Avenue Bridge is located within the jurisdiction of the OCTA NCCP/HCP (see Section 2.7.7), but modification of the bridge would not conflict with this HCP or NCCP. Therefore, there would be no direct impact.

Indirect Impacts

Marine Biological Resources: The modification of the Warner Avenue Bridge does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no indirect impact.

Non-Marine Biological Resources: Warner Avenue Bridge is located within the jurisdiction of the OCTA NCCP/HCP (see Section 2.7.7), but modification of the bridge would not conflict with this HCP or NCCP. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The long-term operation and maintenance of the Warner Avenue Bridge does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no long-term impact.

Non-Marine Biological Resources: Warner Avenue Bridge is located within the jurisdiction of the OCTA NCCP/HCP (see Section 2.7.7), but long-term operation of the bridge and maintenance of the bridge would not conflict with this HCP or NCCP. Therefore, there would be no long-term impact.

Tide Gates

Direct Impacts

Marine Biological Resources: The removal of the tide gates and replacement with a new access bridge does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no direct impact.

Non-Marine Biological Resources: Where the tide gates are located is within the jurisdiction of the OCTA NCCP/HCP (see Section 2.7.7), but the proposed project would not conflict with the provisions in the HCP or NCCP. Therefore, there would be no direct impact.

Indirect Impacts

Marine Biological Resources: The proposed project does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no indirect impact.

Non-Marine Biological Resources: Where the tide gates are located is within the jurisdiction of the OCTA NCCP/HCP (see Section 2.7.7), but the proposed project would not conflict with the provisions in the HCP or NCCP. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The long-term operation and maintenance of the new access bridge does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no long-term impact.

Non-Marine Biological Resources: The new access bridge is located within the jurisdiction of the OCTA NCCP/HCP (see Section 2.7.7), but long-term operation of the bridge and maintenance of the bridge would not conflict with this HCP or NCCP. Therefore, there would be no long-term impact.

C02/C04 Channels

Direct Impacts

Marine Biological Resources: The proposed project does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no direct impact.

Non-Marine Biological Resources: Channels within the C02/C04 system are located within the jurisdiction of the OCTA NCCP/HCP (see Section 2.7.7), but the proposed project would not conflict with the provisions in the HCP or NCCP. Therefore, there would be no direct impact.

Indirect Impacts

Marine Biological Resources

The proposed project does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no indirect impact.

Non-Marine Biological Resources: Channels within the C02/C04 system are located within the jurisdiction of the OCTA NCCP/HCP (see Section 2.7.7), but the proposed project would not conflict with the provisions in the HCP or NCCP. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The long-term operation and maintenance of the modified flood control channels does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no long-term impact.

Non-Marine Biological Resources: The long-term operation and maintenance of the modified flood control channels does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP. Therefore, there would be no long-term impact.

C05/C06 Channels

Direct Impacts

Marine Biological Resources: The proposed project does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no direct impact.

Non-Marine Biological Resources: Channels within the C05/C06 system are located within the jurisdiction of the OCTA NCCP/HCP (see Section 2.7.7), but the proposed project would not conflict with the provisions in the HCP or NCCP. Therefore, there would be no direct impact.

Indirect Impacts

Marine Biological Resources: The proposed project does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no indirect impact.

Non-Marine Biological Resources: Channels within the C05/C06 system are located within the jurisdiction of the OCTA NCCP/HCP (see Section 2.7.7), but the proposed project would not conflict with the provisions in the HCP or NCCP. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The long-term operation and maintenance of the modified flood control channels does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no long-term impact.

Non-Marine Biological Resources: The long-term operation and maintenance of the modified flood control channels does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP. Therefore, there would be no long-term impact.

Level of Impact for the NED Plan

No Impact. The proposed project does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

Marine Biological Resources: The proposed project does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no direct impact.

Non-Marine Biological Resources: Channels within the C02/C04 system are located within the jurisdiction of the OCTA NCCP/HCP (see Section 2.7.7), but the proposed project would not conflict with the provisions in the HCP or NCCP. Therefore, there would be no direct impact.

Indirect Impacts

Marine Biological Resources: The proposed project does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no indirect impact.

Non-Marine Biological Resources: Channels within the C02/C04 system are located within the jurisdiction of the OCTA NCCP/HCP (see Section 2.7.7), but the proposed project would not conflict with the provisions in the HCP or NCCP. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The long-term operation and maintenance of the modified control channels does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no long-term impact.

Non-Marine Biological Resources: The long-term operation and maintenance of the modified flood control channels does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP. Therefore, there would be no long-term impact.

C05/C06 Channels

Direct Impacts

Marine Biological Resources: The proposed project does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no direct impact.

Non-Marine Biological Resources: Channels within the C05/C06 system are located within the jurisdiction of the OCTA NCCP/HCP (see Section 2.7.7), but the proposed project would not conflict with the provisions in the HCP or NCCP. Therefore, there would be no direct impact.

Indirect Impacts

Marine Biological Resources: The proposed project does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no indirect impact.

Non-Marine Biological Resources: Channels within the C05/C06 system are located within the jurisdiction of the OCTA NCCP/HCP (see Section 2.7.7), but the proposed project would not conflict with the provisions in the HCP or NCCP. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The long-term operation and maintenance of the modified control channels does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no long-term impact.

Non-Marine Biological Resources: The long-term operation and maintenance of the modified flood control channels does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP. Therefore, there would be no long-term impact.

Diversion Channel

Direct Impacts

Marine Biological Resources: The proposed project does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no direct impact.

Non-Marine Biological Resources: The proposed project is located within the jurisdiction of the OCTA NCCP/HCP (see Section 2.7.7), but the proposed project would not conflict with the provisions in the HCP or NCCP. Therefore, there would be no direct impact.

Indirect Impacts

Marine Biological Resources: The proposed project does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no indirect impact.

Non-Marine Biological Resources: The proposed project is located within the jurisdiction of the OCTA NCCP/HCP (see Section 2.7.7), but the proposed project would not conflict with the provisions in the HCP or NCCP. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Marine Biological Resources: The long-term operation and maintenance of the diversion channel does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP since there are no provisions for marine biological resources. Therefore, there would be no long-term impact.

Non-Marine Biological Resources: The long-term operation and maintenance of the diversion channel does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP. Therefore, there would be no long-term impact.

Level of Impact for the LPP

No Impact. The proposed project does not conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP.

5.9 Cultural Resources

5.9.1 Regulatory Framework

5.9.1.1 Federal

National Historic Preservation Act: The goal of the NHPA is for federal agencies to act as responsible stewards of our national resources when their actions may affect historic properties. Section 106 applies when two thresholds are met: (1) there is a federal or federally licensed action, including grants, licenses, and permits; and (2) that action has the potential to affect properties listed in or eligible for listing in the NRHP. Section 106 requires each federal agency to identify and assess the effects of its actions on historic resources and afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. The agency must consult with appropriate state and local officials, Indian tribes, applicants for federal assistance, and members of the public, and consider their views and concerns about historic preservation issues when making final project decisions. Effects are resolved by mutual agreement, usually among the affected state's SHPO/Tribal Historic Preservation Officer (THPO), the federal agency, and any other involved parties. The ACHP may choose to participate in controversial or precedent-setting situations.

The agency first determines if it has an undertaking that is a type of activity that could affect historic properties, and if so, the agency determines the APE (the "geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist") and the scope of appropriate identification efforts. The agency then proceeds to identify historic properties in the APE through various methods, including consultation. If no historic properties are present or affected, the agency provides documentation to the SHPO and Tribes, and, barring any objection in 30 days, proceeds with its undertaking. If historic properties are present, the agency proceeds to assess possible adverse effects on the identified historic properties based on criteria found in the ACHP regulations, in consultation with the SHPO/THPO. If they agree that there will be "no adverse effect," the agency proceeds with the undertaking and any agreed-upon conditions. If they find that there is an "adverse effect," or if the parties cannot agree and ACHP determines within 15 days that

there is an adverse effect, the agency begins consultation to seek ways to avoid, minimize, or mitigate the adverse effects.

The historic significance of a cultural resource is established by applying the NRHP criteria for evaluation (36 C.F.R. 60.4) to determine if the resource is eligible for listing on the NRHP as a "historic property." If historic properties are found to exist within the APE, then the criteria of adverse effects are applied to determine the project's potential to alter those characteristics of a historic property which qualify it for inclusion in the NRHP in a manner which would diminish its integrity. Adverse effects may include direct, indirect or cumulative effects. Examples of adverse effects under 36 C.F.R. 800.5 include:

- Physical destruction of or damage to all or part of the property;
- Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the Secretary's Standard for the
- Treatment of Historic Properties (36 C.F.R. 68) and applicable guidelines;
- Removal of the property from its historic location;
- Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
- Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;
- Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and
- Transfer, lease, or sale of property out of Federal ownership of control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

Mitigation under Section 106 of the NHPA is defined as a measure to resolve specific adverse effects to historic properties. Resolution of adverse effects is referenced in the NEPA review and documented in a Memorandum of Agreement (MOA) or Programmatic Agreement (PA) developed in consultation with the Section 106 consulting parties, which includes the lead agency(ies) and SHPO, and may include the ACHP, tribes, and other interested parties.

Cultural resources that are listed or eligible for listing in the CRHR are defined as "historical resources" and are recognized as part of the environment and must be given consideration under CEQA. A project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant impact on the environment. Effects may be direct or indirect, but must be related to a change in the physical conditions of an affected resource. Substantial adverse change is defined in the CEQA guidelines (14 CCR 15064.5) as "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired." Material impairment of an historical resource is that which:

- Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for inclusion in, the California Register of Historical Resources, or

- Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to section 5020.1(k) of the Public Resources Code or its identification in an historical resources survey meeting the requirements of section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or
- Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register of Historical Resources as determined by a lead agency for purposes of CEQA.

Mitigation of significant impacts must lessen or eliminate the physical impact that the project will have on the historical resource. Similar to NEPA, the CEQA guidelines (14 CCR 15370) define mitigation to include consideration of measures to **avoid** impacts by not proceeding with all or parts of an action; **minimize** impacts by limiting the degree or magnitude of the action and its implementation; **rectify** impacts by repairing, rehabilitating, or restoring the impacted environment; **reduce or eliminate** impacts over time through preservation or maintenance operations during the life of an action; and **compensate** for impacts by replacing or providing substitute resources or environments. Additionally, the CEQA guidelines (14 CCR 15126.4(b)) provide for specific guidance on mitigation for impacts on historical resources as follows:

(1) Where maintenance, repair, stabilization, rehabilitation, restoration, preservation, conservation or reconstruction of the historical resource will be conducted in a manner consistent with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings* (Weeks and Grimmer 1995), the project's impact on the historical resource shall generally be considered mitigated below a level of significance and thus is not significant.

(2) In some circumstances, documentation of an historical resource, by way of historic narrative, photographs or architectural drawings, as mitigation for the effects of demolition of the resource will not mitigate the effects to a point where clearly no significant effect on the environment would occur.

(3) Public agencies should, whenever feasible, seek to avoid damaging effects on any historical resource of an archaeological nature. The following factors shall be considered and discussed in an EIR for a project involving such an archaeological site:

a) Preservation in place is the preferred manner of mitigating impacts to archaeological sites. Preservation in place maintains the relationship between artifacts and the archaeological context. Preservation may also avoid conflict with religious or cultural values of groups associated with the site.

b) Preservation in place may be accomplished by, but is not limited to, the following:

1. Planning construction to avoid archaeological sites;

2. Incorporation of sites within parks, greenspace, or other open space;

3. Covering the archaeological sites with a layer of chemically stable soil before building tennis courts, parking lots, or similar facilities on the site.

4. Deeding the site into a permanent conservation easement.

c) When data recovery through excavation is the only feasible mitigation, a data recovery plan, which makes provision for adequately recovering the scientifically consequential information from and about the historical resource, shall be prepared and adopted prior to any excavation being undertaken. Such studies shall be deposited with the California Historical Resources Regional Information Center. Archaeological sites known to contain human remains shall be treated in accordance with the provisions of Section 7050.5 Health and Safety Code. If an artifact must be removed during project excavation or testing, curation may be an appropriate mitigation.

d) Data recovery shall not be required for an historical resource if the lead agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the archaeological or historical resource, provided that the determination is documented in the EIR and that the studies are deposited with the California Historical Resources Regional Information Center.

Under Public Resources Code 6313, all abandoned shipwrecks, archaeological sites, and historic or cultural resources on or in the tide and submerged lands of California are vested in the State and under the jurisdiction of the State Lands Commission. Therefore, if any cultural resources are discovered on lands under the authority of the State Lands Commission, the discovery, handling, and final disposition of such resources must be approved by the Commission.

5.9.1.2 State

California Environmental Quality Act: The CEQA requires a lead agency to determine whether a project would have a significant effect on one or more historical resources. According to Section 15064.5(a) of the State CEQA Guidelines, a "historical resource" is defined as a resource listed in or determined to be eligible for listing in the CRHR (PRC Section 21084.1); a resource included in a local register of historical resources (14 CCR 15064.5[a][2]); or any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant (14 CCR 15064.5[a][3]). PRC 5024.1 requires evaluation of cultural resources to determine their eligibility for listing on the CRHR. The purpose of the CRHR is to maintain a list of the State's historical resources and to indicate which properties are to be protected from substantial adverse change. A resource is eligible for listing in the CRHR if the State Historical Resources Commission determines that it is a significant resource and that it meets any of the following National Register of Historic Places criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.

2. Is associated with the lives of persons important in our past.

3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.

4. Has yielded, or may be likely to yield, information important in prehistory or history.

Human Remains: Section 7050.5 of the California Health and Safety Code provides for the disposition of accidentally discovered human remains. Section 7050.5 states that, if human remains are found, no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent

remains shall occur until the County Coroner has determined the appropriate treatment and disposition of the human remains.

Section 5097.98 of the PRC states that if remains are determined by the Coroner to be of Native American origin, they must notify the Native American Heritage Commission (NAHC) within 24 hours which, in turn, must identify the person or persons it believes to be the most likely descended from the deceased Native American. The descendant(s) shall complete his/her inspection within 48 hours of being granted access to the site. The designated Native American representative would then determine, in consultation with the property owner, the disposition of the human remains.

5.9.2 Impact Significance Criteria

Under NEPA, significance is determined based on 'context' and 'intensity'. For cultural resources, context is often viewed in terms of how important the resource may or may not be, while intensity is viewed in terms of the severity of the impacts to the resource. While cultural resources that do not meet the definition of a historic property under NHPA or a historic resource under CEQA are still considered as part of the NEPA review, once that resource fails to meet the criteria for eligibility for inclusion on the NRHP or the CRHR its 'context' is found to be lacking.

Under the NHPA, impacts to cultural resources are typically examined in terms of how the project would affect the characteristics that make the property eligible for the NRHP, or in NEPA terms the intensity of the impact. For instance archaeological sites that are eligible under Criterion D may be impacted by ground disturbance. Meanwhile, a property that is eligible under Criterion A, such as a rural landscape or a traditional cultural property (TCP), may be impacted by the introduction of audible or visual intrusions because these intrusions would affect its integrity of location, setting, and feeling. Such impacts are referred to as adverse effects in the NHPA's implementing regulations (36 C.F.R. 800.5). A similar process is completed to evaluate whether a substantial adverse change in the significance of an historical resource would result under CEQA.

The terms 'historic property' (used in NHPA) and 'historical resources' (used in CEQA) are similar in concept and the evaluation process is analogous. For the purposes of this analysis properties that have been determined to be eligible for the NRHP are assumed to be eligible for the CRHR. Consequently, an adverse effect under NHPA would constitute a substantial adverse change under CEQA.

In light of the above, the following impact significance criterion is adopted for both NEPA and CEQA purposes. For purposes of this analysis, the No Action Plan, NED Plan, or LPP would have a significant impact on cultural resources if it would:

IMPACT CR-1: Cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5.

IMPACT CR-2: Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5.

IMPACT CR-3: Disturb any human remains, including those interred outside of dedicated cemeteries.

5.9.3 Mitigation Measures

Implementation of the mitigation measures provided below would reduce to the extent feasible, potential impacts to cultural resources associated with either the NED Plan or the LPP.

MM-CR-1 Preparing and implementing a monitoring and discovery plan; if previously undiscovered resources are identified during an undertaking, suspend work while the resource is evaluated and adverse effects are mitigated to avoid any further impact. Continue to consult with Native American groups to identify any traditional cultural properties or resource uses and address impacts.

MM-CR-2 In the event that previously unknown cultural resources are uncovered, work within a specified distance (generally 100 feet) of the find would cease until the requirements in 36 C.F.R. 800.13 are complied with. The on-site supervisor shall contact the Corps Project Manager, District Archaeologist, and an approved archaeological consultant immediately.

MM-CR-3 Protecting exposed archaeological sites from vandalism and erosion with fencing and re-vegetation, or capping sites in an approved manner with appropriate material.

MM-CR-4 If human remains are encountered during excavations associated with this Proposed Action, all work must halt, and the County Coroner must be notified (Section 7050.5 of the California Health and Safety Code). The coroner will determine whether the remains are of forensic interest. If the coroner, with the aid of the supervising archaeologist, determines that the remains are prehistoric, the coroner will contact the Native American Heritage Commission (NAHC). The NAHC will be responsible for designating the most likely descendant (MLD), who will be responsible for the ultimate disposition of the remains, as required by Section 5097.98 of the Public Resources Code. The MLD should make his/her recommendations within 48 hours of their notification by the NAHC. This recommendation may include A) the nondestructive removal and analysis of human remains and items associated with Native American human remains; (B) preservation of Native American human remains and associated items in place; (C) relinquishment of Native American human remains and associated items to the descendants for treatment; or (D) other culturally appropriate treatment.

5.9.4 Cultural Resources Impacts

5.9.4.1 IMPACT CR-1: Cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative, no project would be implemented. There would be no ground disturbance and no potential that historic-period structures or buildings within the study area would be adversely affected. Without the implementation of a project, the current level of risk would remain for flooding of communities. Currently, widespread overtopping within the project area would still occur between the 10% and 4% ACE events. The Bolsa Chica area, which is adjacent to the downstream reach of the C05 facility, is known to be archaeologically and culturally sensitive. Over the long-term, depending on the location, severity, and duration of the flooding, the location and extent of damage and impacts on culturally sensitive resources could range from minor to extensive.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

The Warner Avenue Bridge (Caltrans Bridge Number 55C0417) is not eligible for listing in the NRHP; therefore, the modification of the bridge would not cause a substantial direct adverse change to a structural historical resource.

Indirect Impacts

The Warner Avenue Bridge (Caltrans Bridge Number 55C0417) is not eligible for listing in the NRHP; therefore, the modification of the bridge would not cause a substantial indirect adverse change to a structural historical resource.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the Warner Avenue Bridge (Caltrans Bridge Number 55C0417) would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. None of these maintenance activities nor the long-term operation of the bridge would cause substantial adverse change to a structural historical resource, since the Warner Avenue Bridge is not eligible for listing in the NRHP.

Tide Gates

Direct Impacts

The tide gates, as an original component of Channel C05, are not eligible for listing in the NRHP; therefore, the removal of the tide gates and replacement with an access bridge would not cause a substantial direct adverse change to a structural historical resource.

Indirect Impacts

The tide gates, as an original component of Channel C05, are not eligible for listing in the NRHP; therefore, the removal of the tide gates and replacement with an access bridge would not cause a substantial indirect adverse change to astructural historical resource.

Long-Term Operation and Maintenance Impacts

The new access bridge would require maintenance activities that would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. None of the maintenance activities nor the long-term operation of the new access bridge would cause substantial adverse change to a structural historical resource, since the bridge would be new and therefore, ineligible for listing in the NRHP.

C02/C04 Channels

Direct Impacts

Modification of the flood control channels within the C02/C04 system would involve a resource fifty years of age, and therefore requires compliance with Section 106 of the National Historic Preservation Act, and the obligation to consider effects to properties eligible for listing in the NRHP.

In terms of its public benefit and economic infusion, the Westminster Flood Control Channels have been no less impactful than other regional water management systems such as the Los Angeles River, a property identified as eligible for listing in the NRHP. Existing evaluation guidelines in fact confirm the channels are a potentially eligible type of historic water conveyance infrastructure. Under the area of significance, Conservation, the series of canals embody the themes of flood control and water management supporting vital agricultural and industrial economies, as well as residential infrastructure. When completed by the Orange County Flood Control District, the channels were a successful government remedy that fully realized the county's public water service and conservation goals. Potential NRHP eligibility under Criterion A is therefore supported during the period of significance 1953-1963.

The Westminster Flood Control channels have not been shown to represent the important life work of a recognized individual and are therefore ineligible under NRHP Criterion B. From the perspective of engineering, the trapezoidal earthen and concrete lined ditches are ubiquitous and undistinguished structures, and are nearly as prevalent on the southern California landscape as highways and roads. Because the form and engineering design of channels have changed little throughout the past century, the Westminster system does not project an outward temporal association with a particular era and therefore lacks NRHP eligibility under Criterion C.

Notwithstanding clear historical association with the area of significance, Conservation, the system does not meet the majority of essential aspects of integrity. Although the general design (i.e., trapezoidal or rectangular profile) remains, materials and workmanship have been altered in places with the application of concrete to previously earthen ditches, and the installation of sheet pile fortifications. The heavily urbanized area through which the channels pass has also dramatically changed the channel's historic backdrop (i.e., setting, feeling, and association), as the majority of buildings and structures are contemporary and no longer evoke the period of significance.

This assessment of the C02/C04 channels as not NRHP eligible is consistent with the findings of a 2010 NRHP evaluation and determination of one of the Westminster Flood Control Channels, the C05 Channel. The determination of eligibility for which the California SHPO concurred found the C05 Channel not eligible for listing in the NRHP. Overall, due to the NRHP ineligibility of the C02/C04 channels, the NED Plan would have no direct impact to a structural historical resource.

Indirect Impacts

As detailed above, the C02/C04 channels were assessed to be ineligible for listing in the NRHP, therefore, the modification of the channels would have no indirect impact to a structural historical resource.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels.

Maintenance activities and long-term operation of the channels would have no impact to a structural historical resource since the C02/C04 channels were assessed to be ineligible for listing in the NRHP.

C05/C06 Channels

Direct Impacts

Modification of the flood control channels within the C05/C06 system would involve a resource fifty years of age, and therefore requires compliance with Section 106 of the National Historic Preservation Act, and the obligation to consider effects to properties eligible for listing in the NRHP.

In terms of its public benefit and economic infusion, the Westminster Flood Control Channels have been no less impactful than other regional water management systems such as the Los Angeles River, a property identified as eligible for listing in the NRHP. Existing evaluation guidelines in fact confirm the channels are a potentially eligible type of historic water conveyance infrastructure. Under the area of significance, Conservation, the series of canals embody the themes of flood control and water management supporting vital agricultural and industrial economies, as well as residential infrastructure. When completed by the Orange County Flood Control District, the channels were a successful government remedy that fully realized the county's public water service and conservation goals. Potential NRHP eligibility under Criterion A is therefore supported during the period of significance 1953-1963.

The Westminster Flood Control channels have not been shown to represent the important life work of a recognized individual and are therefore ineligible under this Criterion B. From the perspective of engineering, the trapezoidal earthen and concrete lined ditches are ubiquitous and undistinguished structures, and are nearly as prevalent on the southern California landscape as highways and roads. Because the form and engineering design of channels have changed little throughout the past century, the Westminster system does not project an outward temporal association with a particular era and therefore lacks NRHP eligibility under Criterion C.

Notwithstanding clear historical association with the area of significance, Conservation, the system does not meet the majority of essential aspects of integrity. Although the general design (i.e., trapezoidal or rectangular profile) remains, materials and workmanship have been altered in places with the application of concrete to previously earthen ditches, and the installation of sheet pile fortifications. The heavily urbanized area through which the channels pass has also dramatically changed the channel's historic backdrop (i.e., setting, feeling, and association), as the majority of buildings and structures are contemporary and no longer evoke the period of significance.

This assessment of the C05/C06 channels is consistent with the findings of a 2010 NRHP evaluation and determination of one of the Westminster Flood Control Channels, the C05 Channel. The determination of eligibility for which the California SHPO concurred found the C05 portion of the overall system not eligible for listing in the NRHP. Overall, due to the NRHP ineligibility of the C05/C06 channels, the LPP would have no direct impact to a structural historical resource.

Indirect Impacts

As detailed above, the C05/C06 channels were assessed to be ineligible for listing in the NRHP, therefore, the modification of the channels would have no indirect impact to a structural historical resource.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels. Maintenance activities and long-term operation of the channels would have no impact to a historical resource since the C05/C06 channels were assessed to be ineligible for listing in the NRHP.

Level of Impact for the NED Plan

No Impact. There would be no adverse impact to structural historical resources since the action area does not include any resources that are on the NRHP or eligible for listing on the NRHP.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

Modification of the flood control channels within the C02/C04 system would involve a resource fifty years of age, and therefore requires compliance with Section 106 of the National Historic Preservation Act, and the obligation to consider effects to properties eligible for listing in the NRHP.

In terms of its public benefit and economic infusion, the Westminster Flood Control Channels have been no less impactful than other regional water management systems such as the Los Angeles River, a property identified as eligible for listing in the NRHP. Existing evaluation guidelines in fact confirm the channels are a potentially eligible type of historic water conveyance infrastructure. Under the area of significance, Conservation, the series of canals embody the themes of flood control and water management supporting vital agricultural and industrial economies, as well as residential infrastructure. When completed by the Orange County Flood Control District, the channels were a successful government remedy that fully realized the county's public water service and conservation goals. Potential NRHP eligibility under Criterion A is therefore supported during the period of significance 1953-1963.

The Westminster Flood Control channels have not been shown to represent the important life work of a recognized individual and are therefore ineligible under Criterion B. From the perspective of engineering, the trapezoidal earthen and concrete lined ditches and associated bridge crossings are ubiquitous and undistinguished structures, and are nearly as prevalent on the southern California landscape as highways and roads. Because the form and engineering design of channels have changed little throughout the past century, the Westminster system does not project an outward temporal association with a particular era and therefore lacks NRHP eligibility under Criterion C.

Notwithstanding clear historical association with the area of significance, Conservation, the system does not meet the majority of essential aspects of integrity. Although the general design (i.e., trapezoidal or rectangular profile) remains, materials and workmanship have been altered in places with the application of concrete to previously earthen ditches, and the installation of sheet pile fortifications. The heavily urbanized area through which the channels pass has also dramatically changed the channel's historic backdrop (i.e., setting, feeling, and association), as the majority of buildings and structures are contemporary and no longer evoke the period of significance.

This assessment of the C02/C04 channels as not NRHP eligible is consistent with the findings of a 2010 NRHP evaluation and determination of one of the Westminster Flood Control Channels, the C05 Channel. The assessment for which the California SHPO concurred, found the C05 Channel not eligible for listing in the NRHP.

In addition to the channels, the bridges to be affected by the implementation of the NED Plan were primarily built prior to, or during the years of original project completion, 1956-1963. Orange County records show that most all of these have been "modified," mostly due to widening and/or seismic reinforcement. Nowithstanding existing alterations and those proposed by the project, a 2000 NRHP evaluation of bridges by Orange County and recorded by Caltrans concluded no structures in the Westminster system are eligible for listing in the NRHP (see Table 19 and *Appendix L – Environmental Considerations*). Overall, due to the NRHP ineligibility of the C02/C04 channels and associated bridges, the NED Plan would have no direct impact to a structural historical resource.

Indirect Impacts

As detailed above, the C02/C04 channels and associated bridges were assessed to be ineligible for listing in the NRHP, therefore, the proposed project would have no indirect impact to a structural historical resource.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Maintenance activities for the crossings would include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. These small-scale, routine maintenance activities already occur for the existing channels and crossings. Maintenance activities and long-term operation of the channels and crossings would have no impact to a structural historical resource since the C02/C04 channels and associated channels were assessed to be ineligible for listing in the NRHP.

C05/C06 Channels

Modification of the flood control channels within the C05/C06 system would involve a resource fifty years of age, and therefore requires compliance with Section 106 of the National Historic Preservation Act, and the obligation to consider effects to properties eligible for listing in the NRHP.

In terms of its public benefit and economic infusion, the Westminster Flood Control Channels have been no less impactful than other regional water management systems such as the Los Angeles River, a property identified as eligible for listing in the NRHP. Existing evaluation guidelines in fact confirm the channels are a potentially eligible type of historic water conveyance infrastructure. Under the area of significance, Conservation, the series of canals embody the themes of flood control and water management supporting vital agricultural and industrial economies, as well as residential infrastructure.

When completed by the Orange County Flood Control District, the channels were a successful government remedy that fully realized the county's public water service and conservation goals. Potential NRHP eligibility under Criterion A is therefore supported during the period of significance 1953-1963.

The Westminster Flood Control channels have not been shown to represent the important life work of a recognized individual and is therefore ineligible under Criterion B. From the perspective of engineering, the trapezoidal earthen and concrete lined ditches and associated bridge crossings are ubiquitous and undistinguished structures, and are nearly as prevalent on the southern California landscape as highways and roads. Because the form and engineering design of channels have changed little throughout the past century, the Westminster system does not project an outward temporal association with a particular era and therefore lacks NRHP eligibility under Criterion C.

Notwithstanding clear historical association with the area of significance, Conservation, the system does not meet the majority of essential aspects of integrity. Although the general design (i.e., trapezoidal or rectangular profile) remains, materials and workmanship have been altered in places with the application of concrete to previously earthen ditches, and the installation of sheet pile fortifications. The heavily urbanized area through which the channels pass has also dramatically changed the channel's historic backdrop (i.e., setting, feeling, and association), as the majority of buildings and structures are contemporary and no longer evoke the period of significance.

This non-eligibility assessment of the C05/C06 channels is consistent with the findings of a 2010 NRHP evaluation and determination of one of the Westminster Flood Control Channels, the C05 Channel. The determination of eligibility for which the California SHPO concurred, found the C05 portion of the overall system not eligible for listing in the NRHP.

In addition to the channels, the bridges to be affected by the implementation of the NED Plan were primarily built prior to, or during the years of original project completion, 1956-1963. Orange County records show that most all of these have been "modified," mostly due to widening and/or seismic reinforcement. Nowithstanding existing alterations and those proposed by the project, a 2000 NRHP evaluation of bridges by Orange County and recorded by Caltrans concluded no structures in the Westminster system are eligible for listing in the NRHP (see Table 19 and *Appendix L – Environmental Considerations*). Overall, due to the NRHP ineligibility of the C05/C06 channels and associated bridges, the NED Plan would have no direct impact to a structural historical resource.

Indirect Impacts

As detailed above, the C05/C06 channels and associated bridges were assessed to be ineligible for listing in the NRHP, therefore, the proposed project would have no indirect impact to a structural historical resource.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Maintenance activities for the crossings would include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. These small-scale, routine maintenance activities already occur for the existing channels and crossings. Maintenance activities and long-term operation of the channels and crossings would have no impact to a structural historical resource since the C05/C06 channels and associated channels were assessed to be ineligible for listing in the NRHP.

Diversion Channel

Direct Impacts

Although there is no structure present where the diversion channel will be constructed, a portion of the planned diversion channel alignment follows a relict alignment of a supply railway for the Naval base that is now the NWSSB. The segment of this railway that is planned for construction of the diversion channel no longer has integrity, and is therefore not NRHP eligible and would not cause a substantial direct adverse change to a structural historical resource.

Indirect Impacts

Although there is no structure present where the diversion channel will be constructed, a portion of the planned diversion channel alignment follows a relict alignment of a supply railway for the Naval base that is now the NWSSB. The segment of this railway that is planned for construction of the diversion channel no longer has integrity, and is therefore not NRHP eligible. Therefore, no indirect impact to a structural historical resource would occur.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the diversion channel would be no different than current maintenance activities that already occur on the existing channels within the system. Typical maintenance activities include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. None of these maintenance activities nor the long-term operation of the diversion channel would cause substantial adverse change to a structural historical resource, since there are no resources present within the vicinity of the diversion channel that are listed on the NRHP or eligible for listing.

Level of Impact for the LPP

No Impact. There would be no adverse impact to historical resources since the action area does not include any structural historical resources that are listed or eligible for listing on the NRHP.

5.9.4.2 IMPACT CR-2: Cause a substantial adverse change in the significant of an archaeological resources pursuant to § 15064.5.

A substantial adverse change in the significance of a historical/archaeological resource is defined as physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical/archaeological resource would be materially impaired. A historical/archaeological resource is considered materially impaired when a project 1) demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its inclusion in or eligibility for inclusion in the CRHR, 2) demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources, or 3) demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative there would be no project-related construction and therefore no impacts to cultural resources since no project would occur. The current level of risk would remain for flooding of communities. Currently, widespread overtopping within the project area would still occur between the 10% and 4% ACE events. The Bolsa Chica area, which is adjacent to the downstream reach of the C05 facility, is known to be archaeologically and culturally sensitive. Over the long-term, depending on the location, severity, and duration of the flooding, the location and extent of damage and impacts on culturally sensitive resources could range from minor to extensive.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

Results of the records and literature searches showed no previously recorded NRHP listed or eligible properties within or adjacent to the Area of Potential Effect (APE) for Warner Avenue Bridge, which was previously surveyed as part of the Bolsa Chica Lowlands project. Modification of the bridge does include excavation of an approximately 0.6 acre upland constriction located upstream of the bridge on the left descending bank of OBB. The land to be excavated has no prior construction and could be a location where subsurface archaeological resources may be present. Since the presence of possible unidentified subsurface archaeological deposits is unknown, construction activities associated with the modification of the bridge could cause a significant adverse impact. Mitigation measures MM-CR-1 through MM-CR-3 would be fulfilled through the preparation and implementation of a monitoring and discovery plan that would be prepared prior to construction activities occurring detailing specific actions that would take place in the event that previously undiscovered resources are encountered. These measures would ensure that work is halted and redirected elsewhere and protect the resources from potential vandalism and erosion while a tribal and SHPO consultation occurs. Implementation of these measures would ensure the protection of previously undiscovered resources that may be encountered during construction activities, thereby reducing the potential significant adverse impact to less than significant.

Indirect Impacts

As stated above for direct impacts, the modification of the bridge would include excavation of an approximately 0.6 acre upland constriction located upstream of the bridge on the left descending bank of OBB. The land to be excavated is previously undisturbed and could be a location where subsurface archaeological deposits may be present. If previously undiscovered archaeological resources are encountered, indirect impacts to these resources could occur if the resources are not protected appropriately from erosion and/or vandalism. Mitigation measure MM-CR-3 would be implemented to reduce this potentially significant adverse indirect impact to less than significant. Mitigation measure MM-CR-3 ensures that previously undiscovered archaeological deposits that may be encountered are protected appropriately from potential vandalism and erosion with applicable control measures.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged

expansion joints, bent or damaged railings, painting, erosion protection, and inspections. None of these maintenance activities nor the long-term operation of the bridge would cause substantial adverse changes to an historical/archaeological resource, since the Warner Avenue Bridge is not eligible for listing in the NRHP nor are there any known historical/archaeological resources present within the vicinity of the bridge.

Tide Gates

Direct Impacts

The tide gates that are to be permanently removed and replaced with an access bridge are located at the downstream end of C05 Reach 1. Results of the records and literature searches showed that there are archaeological resources in or adjacent to the APE of C05 Reach 1. This includes two historic period sites (P-30-100052 and P-30-179858), and one multicomponent site (CA-ORA-78/H) (see Section 2.8 for more information on the sites). Removal of the tide gates and construction of the new access bridge would occur only within the channel rights-of-way and no impacts to these identified cultural resources are expected with the implementation of this measure.

Indirect Impacts

As stated above, results of a records and literature search showed that there are archaeological resources in or adjacent to the APE of C05 Reach 1. Removal of the tide gates and construction of the new access bridge would occur only within the channel rights-of-way and would not occur on the Bolsa Chica Mesa where the archaeological resources are located. No indirect impacts to these identified cultural resources are expected with the implementation of this measure.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new access bridge would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. None of these maintenance activities nor the long-term operation of the bridge would cause substantial adverse changes to an historical/archaeological resource.

C02/C04 Channels

Direct Impacts

Results of the records and literature searches showed no previously recorded NRHP listed or eligible properties within or adjacent to the Area of Potential Effect (APE) of reaches C02/C04. In addition, the channels to be modified have already been impacted by the construction of the existing drainage channels and other construction within the area. Ultimately, no direct impact to historical/archaeological resources would occur.

Indirect Impacts

As stated above, results of a records and literature search showed no previously recorded NRHP listed or eligible properties within or adjacent to the APE of reaches C02/C04. Therefore, no indirect impact to historical/archaeological resources would occur.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities already occur for the existing channels. Maintenance activities and long-term operation of the channels would have no impact to an historical/archaeological resource since the C02/C04 channels have no previously recorded NRHP listed or eligible properties within or adjacent to the APE.

C05/C06 Channels

Direct Impacts

Results of the records and literature searches showed no previously recorded NRHP listed or eligible properties within or adjacent to the APE reaches of C06. This was also true for the majority of C05. In or adjacent to the APE of C05 Reach 1, there are two historic period sites (P-30-100052 and CA-30-179858), and one multicomponent site (CA-ORA-78/H) (see Section 2.8 for more information on the sites). Construction activities for C05 Reach 1 would occur only within the channel rights-of-way and would not occur on the Bolsa Chica Mesa. No impacts to these identified cultural resources are expected with the implementation of the NED Plan.

Indirect Impacts

As stated above, results of a records and literature search showed no previously recorded NRHP listed or eligible properties within or adjacent to the APE of reaches C06 and the majority of C05. Construction activities for C05 Reach 1 would occur only within the channel rights-of-way and would not occur on the Bolsa Chica Mesa. Therefore, no indirect impact to historical/archaeological resources is expected with implementation of the NED Plan.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities already occur for the existing channels. Maintenance activities and long-term operation of the channels would have no impact to an historical/archaeological resource.

Level of Impact for the NED Plan

Less than Significant with Mitigation Incorporated. There is the potential for the project to encounter previously undiscovered archaeological resources, especially during modification of the Warner Avenue Bridge which includes the excavation of approximately 0.6 acre of previously undisturbed upland. In addition, mitigation measures MM-CR-1 through MM-CR-3 would be implemented. The implementation of these measures would ensure the protection of previously undiscovered historical/archaeological resources that may be encountered during construction activities, thereby reducing the potential significant adverse impact to less than significant.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

Results of the records and literature searches showed no previously recorded NRHP listed or eligible properties within or adjacent to the Area of Potential Effect (APE) of reaches C02/C04. In addition, the channels to be modified have already been impacted by the construction of the existing drainage channels and other construction within the area. Ultimately, no direct impact to historical/archaeological resources would occur.

Indirect Impacts

As stated above, results of a records and literature search showed no previously recorded NRHP listed or eligible properties within or adjacent to the APE of reaches C02/C04. Therefore, no indirect impact to historical/archaeological resources would occur.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities already occur for the existing channels. Maintenance activities and long-term operation of the channels would have no impact to an historical/archaeological resource since the C02/C04 channels have no previously recorded NRHP listed or eligible properties within or adjacent to the APE.

C05/C06 Channels

Direct Impacts

Results of the records and literature searches showed no previously recorded NRHP listed or eligible properties within or adjacent to the APE reaches of C06. This was also true for the majority of C05. In or adjacent to the APE of C05 Reach 1, there are two historic period sites (P-30-100052 and CA-30-179858), and one multicomponent site (CA-ORA-78/H) (see Section 2.8 for more information on the sites). Construction activities for C05 Reach 1 would occur only within the channel rights-of-way and would not occur on the Bolsa Chica Mesa. No direct impacts to these identified cultural resources are expected with the implementation of the LPP.

Indirect Impacts

As stated above, results of a records and literature search showed no previously recorded NRHP listed or eligible properties within or adjacent to the APE of reaches C06 and the majority of C05. Construction

activities for C05 Reach 1 would occur only within the channel rights-of-way and would not occur on the Bolsa Chica Mesa. Therefore, no indirect impact to historical/archaeological resources is expected with implementation of the LPP.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities already occur for the existing channels. Maintenance activities and long-term operation of the channels would have no impact to an historical/archaeological resource.

Diversion Channel

Direct Impacts

Although there is no structure present where the diversion channel will be constructed, a portion of the planned diversion channel alignment follows a relict alignment of a supply railway for the Naval base that is now the NWSSB. The segment of this railway that is planned for construction of the diversion channel no longer has integrity, and is therefore not NRHP eligible and would not cause a substantial direct adverse change to a historical/archaeological resource.

Indirect Impacts

Although there is no structure present where the diversion channel will be constructed, a portion of the planned diversion channel alignment follows a relict alignment of a supply railway for the Naval base that is now the NWSSB. The segment of this railway that is planned for construction of the diversion channel no longer has integrity, and is therefore not NRHP eligible. Therefore, no direct impact to an historical/archaeological resource would occur.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the diversion channel would be the same as those that occur currently on the existing channels and are considered small in scale. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Maintenance activities and long-term operation of the channels would have no impact to an historical/archaeological resource since the APE for the diversion channel has no previously recorded NRHP listed or eligible properties within or adjacent to it.

Level of Impact for the LPP

Less than Significant with Mitigation Incorporated. There is the potential for the project to encounter previously undiscovered archaeological resources, especially during modification of the Warner Avenue Bridge which includes the excavation of approximately 0.6 acre of previously undisturbed upland. Mitigation measures MM-CR-1 through MM-CR-3 would be implemented. The implementation of these measures would ensure the protection of previously undiscovered resources that may be encountered during construction activities, thereby reducing the potential significant adverse impact to less than significant.

5.9.4.3 IMPACT CR-3: Disturb any human remains, including those interred outside of dedicated cemeteries.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

As part of the modification of the Warner Avenue Bridge, an approximately 0.6 acre upland area would be excavated to widen the channel beneath the bridge. Because the site has not been previously disturbed, it is possible that construction activity may unearth previously unknown human remains. Mitigation measure MM-CR-4 would be implemented if previously unknown human remains are encountered during construction activities. Mitigation measure MM-CR-4 includes halting construction activities and undertaking the process specified by California Health and Safety Code Section 7050.5 for the proper handling of human remains discovered outside of a dedicated cemetery. The County Coroner would be notified, and no further work would occur in the immediate area until the coroner made the necessary findings as to origin and disposition. If necessary, the Native American Heritage Commission would be contacted, and the remains would be managed in cooperation with designated MLD. Impacts to previously unidentified human remains would be less than significant.

Indirect Impacts

Indirect impacts could occur if widening of the Warner Avenue Bridge led to increased flow velocities that subsequently resulted in scouring of previously undisturbed areas. Scouring of these areas could lead to the unearthing of previously unknown human remains. Implementation of the NED Plan would decrease flow velocities within the vicinity of Warner Avenue Bridge from those experienced under the existing condition (refer to section 5.3 Earth Resources). Therefore, the NED Plan is not expected to increase scouring beyond what is experienced under the current condition. Since scouring would not be increased, potential indirect impacts to previously unidentified human remains would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Typical bank related maintenance activities would be related to erosion control on upland areas near the bridge. Maintenance activities are not expected to involve any excavation activities, therefore, there would be no long-term impact to previously unidentified human remains due to ground disturbance from maintenance activities.

Tide Gates

Direct Impacts

This measure includes the permanent removal of the tide gates and replacement with an access bridge. The site where the tide gates are located has been previously disturbed due to placement of the tide gates. Since the access bridge would be located within the footprint of the tide gates, construction activity would not disturb previously undisturbed soils. Because the site was previously disturbed and construction activities would not occur outside of previously disturbed areas, human remains are not anticipated to be

present; however, it is possible that construction activity may unearth previously undiscovered human remains. Mitigation measure MM-CR-4 would be implemented if previously unknown human remains are encountered during construction activities. Mitigation measure MM-CR-4 includes halting construction activities and undertaking the process specified by California Health and Safety Code Section 7050.5 for the proper handling of human remains discovered outside of a dedicated cemetery. The County Coroner would be notified, and no further work would occur in the immediate area until the coroner made the necessary findings as to origin and disposition. If necessary, the Native American Heritage Commission would be contacted, and the remains would be managed in cooperation with the designated MLD. Impacts to previously unidentified human remains would be less than significant.

Indirect Impacts

Indirect impacts could occur if replacing the tide gates with an access bridge led to increased flow velocities that subsequently resulted in scouring of previously undisturbed areas. Scouring of these areas could lead to the unearthing of previously unknown human remains. Removal of the tide gates is not anticipated to cause increased flow velocities, since the tide gates do not restrict flow into OBB from the C05 system, instead they are supposed to prevent the intrusion of saltwater from OBB upstream into C05 (although the tide gates currently do not work as they were designed). Therefore, the NED Plan is not expected to increase scouring beyond what is experienced under the current condition. Since scouring would not be increased, potential indirect impacts to previously unidentified human remains would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new access bridge would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Typical bank related maintenance activities would be related to erosion control on upland areas near the bridge. Maintenance activities are not expected to involve any excavation activities, therefore, there would be no long-term impact to previously unidentified human remains due to ground disturbance from maintenance activities.

C02/C04 Channels

Direct Impacts

Modification of the discharge channels would disturb soils since riprap and soil would be removed prior to lining trapezoidal channels with concrete in order to maintain the existing channel invert. All work would occur within the existing channel beds which have already been disturbed with the construction of the existing drainage channels. Because the channels were previously disturbed, human remains are not anticipated to be present, but it is possible that construction activity may unearth previously unknown human remains. Mitigation measure MM-CR-4 would be implemented if previously unknown human remains are encountered during construction activities. Mitigation measure MM-CR-4 includes halting construction activities and undertaking the process specified by California Health and Safety Code Section 7050.5 for the proper handling of human remains discovered outside of a dedicated cemetery. The County Coroner would be notified, and no further work would occur in the immediate area until the coroner made the necessary findings as to origin and disposition. If necessary, the Native American Heritage Commission would be contacted, and the remains would be managed in cooperation with the designated MLD. Impacts to previously unidentified human remains would be less than significant.

Indirect Impacts

Indirect impacts could occur of modifying the channels led to increased flow velocities that subsequently resulted in scouring of previously undisturbed areas. Scouring of these areas could lead to the unearthing of previously unknown human remains. While modification of the channels is expected to increase flow velocities within the channels, lining the channels with concrete would eliminate the potential of any scouring occurring within the channels. Therefore, the NED Plan is not expected to increase scouring within the channels. Since scouring would not be increased, potential indirect impacts to previously unidentified human remains would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the channels would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would not involve the disturbance of previously undisturbed soils. Therefore, long-term operation and maintenance activities would not impact previously unidentified human remains.

C05/C06 Channels

Direct Impacts

Modification of the discharge channels would disturb soils since riprap and soil would be removed prior to lining trapezoidal channels with concrete in order to maintain the existing channel invert. All work would occur within the existing channel beds which have already been disturbed with the construction of the existing drainage channels. Because the channels were previously disturbed, human remains are not anticipated to be present, but it is possible that construction activity may unearth previously unknown human remains. Mitigation measure MM-CR-4 would be implemented if previously unknown human remains are encountered during construction activities. Mitigation measure MM-CR-4 includes halting construction activities and undertaking the process specified by California Health and Safety Code Section 7050.5 for the proper handling of human remains discovered outside of a dedicated cemetery. The County Coroner would be notified, and no further work would occur in the immediate area until the coroner made the necessary findings as to origin and disposition. If necessary, the Native American Heritage Commission would be contacted, and the remains would be managed in cooperation with designated MLD. Impacts to previously unidentified human remains would be less than significant.

Indirect Impacts

Indirect impacts could occur of modifying the channels led to increased flow velocities that subsequently resulted in scouring of previously undisturbed areas. Scouring of these areas could lead to the unearthing of previously unknown human remains. While modification of the channels is expected to increase flow velocities within the channels, lining the channels with concrete would eliminate the potential of any scouring occurring within the channels. Therefore, the NED Plan is not expected to increase scouring within the channels. Since scouring would not be increased, potential indirect impacts to previously unidentified human remains would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the channels would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would not involve the

disturbance of previously undisturbed soils. Therefore, long-term operation and maintenance activities would not impact previously unidentified human remains.

Level of Impact for the NED Plan

Less than Significant. The NED Plan is expected to have less than significant direct, indirect, and long-term impacts to previously unidentified human remains since the project would primarily occur in areas where soils have already been disturbed.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

Modification of the discharge channels would disturb soils since soil, riprap, and concrete would be removed to convert the trapezoidal channels to open rectangular channels prior to lining with concrete. All work would occur within the existing channel beds which have already been disturbed with the construction of the existing drainage channels. Because the channels were previously disturbed, human remains are not anticipated to be present, but it is possible that construction activity may unearth previously undiscovered human remains. Mitigation measure MM-CR-4 would be implemented if previously unknown human remains are encountered during construction activities. Mitigation measure MM-CR-4 includes halting construction activities and undertaking the process specified by California Health and Safety Code Section 7050.5 for the proper handling of human remains discovered outside of a dedicated cemetery. The County Coroner would be notified, and no further work would occur in the immediate area until the coroner made the necessary findings as to origin and disposition. If necessary, the Native American Heritage Commission would be contacted, and the remains would be managed in cooperation with the designated MLD. Previously unidentified human remains impacts would be less than significant.

Indirect Impacts

Indirect impacts could occur of modifying the channels led to increased flow velocities that subsequently resulted in scouring of previously undisturbed areas. Scouring of these areas could lead to the unearthing of previously unknown human remains. While modification of the channels is expected to increase flow velocities within the channels, lining the channels with concrete would eliminate the potential of any scouring occurring within the channels. Therefore, the LPP is not expected to increase scouring within the channels. Since scouring would not be increased, potential indirect impacts to previously unidentified human remains would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the channels would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would not involve the disturbance of previously undisturbed soils. Therefore, long-term operation and maintenance activities would not impact previously unidentified human remains.

C05/C06 Channels

Direct Impacts

Modification of the discharge channels would disturb soils since soil, riprap, and concrete would be removed to convert the trapezoidal channels to open rectangular channels prior to lining with concrete. All work would occur within the existing channel beds which have already been disturbed with the construction of the existing drainage channels. Because the channels were previously disturbed, human remains are not anticipated to be present, but it is possible that construction activity may unearth previously unidentified human remains. Mitigation measure MM-CR-4 would be implemented if previously unknown human remains are encountered during construction activities. Mitigation measure MM-CR-4 includes halting construction activities and undertaking the process specified by California Health and Safety Code Section 7050.5 for the proper handling of human remains discovered outside of a dedicated cemetery. The County Coroner would be notified, and no further work would occur in the immediate area until the coroner made the necessary findings as to origin and disposition. If necessary, the Native American Heritage Commission would be contacted, and the remains would be managed in cooperation with the designated MLD. Previously unidentified human remains impacts would be less than significant.

Indirect Impacts

Indirect impacts could occur of modifying the channels led to increased flow velocities that subsequently resulted in scouring of previously undisturbed areas. Scouring of these areas could lead to the unearthing of previously unknown human remains. While modification of the channels is expected to increase flow velocities within the channels, lining the channels with concrete would eliminate the potential of any scouring occurring within the channels. Therefore, the LPP is not expected to increase scouring within the channels. Since scouring would not be increased, potential indirect impacts to previously unidentified human remains would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the channels would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would not involve the disturbance of previously undisturbed soils. Therefore, long-term operation and maintenance activities would not impact previously unidentified human remains.

Diversion Channel

Direct Impacts

Construction of the diversion channel would disturb soils through the excavation of material. Although the majority of the site is an abandoned railroad, it is likely that the construction of the diversion channel would disturb soils to a greater depth than they have previously been disturbed by prior activities.

Although soils would be disturbed to a greater depth, it is still not anticipated that human remains will be present. Regardless, it is possible that construction activity may unearth previously unknown human remains. Mitigation measure MM-CR-4 would be implemented if previously unknown human remains are encountered during construction activities. Mitigation measure MM-CR-4 includes halting construction activities and undertaking the process specified by California Health and Safety Code Section 7050.5 for the proper handling of human remains discovered outside of a dedicated cemetery. The County Coroner would be notified, and no further work would occur in the immediate area until the coroner made the necessary findings as to origin and disposition. If necessary, the Native American Heritage Commission would be contacted, and the remains would be managed in cooperation with the designated MLD. Previously unidentified human remains impacts would be less than significant.

Indirect Impacts

Indirect impacts could occur of construction of the diversion channel led to increased flow velocities that subsequently resulted in scouring of previously undisturbed areas. Scouring of these areas could lead to the unearthing of previously unknown human remains. While construction of the diversion channel is expected to increase flow velocities within the C04 system, lining the channels with concrete, as is proposed for the LPP, would eliminate the potential of any scouring occurring within the channels. Therefore, the LPP is not expected to increase scouring within the channels. Since scouring would not be increased, potential indirect impacts to previously unidentified human remains would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the diversion channel would be the same as those activities carried out on the existing channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would not involve the disturbance of previously undisturbed soils. Therefore, long-term operation and maintenance activities would not impact previously unidentified human remains.

Level of Impact for the LPP

Less than Significant. The LPP is expected to have less than significant direct, indirect, and long-term impacts to previously unidentified human remains since the project would primarily occur in areas where soils have already been disturbed.

5.10 Tribal Cultural Resources

5.10.1 Regulatory Framework

5.10.1.1 Federal

Native American Grave Protection and Repatriation Act (NAGPRA): NAGPRA was enacted in 1990 and establishes rights of Indian tribes and native Hawaiian organizations and their lineal descendants obtain repatriation of certain human remains, funerary objects, sacred objects and object of cultural patrimony from federal agencies and museums that are owned or funded by the federal government. NAGPRA also protects items that are located on or within federal land or tribal land from unauthorized excavation or removal. In addition to repatriation and graves protection, NAGPRA also establishes a criminal prohibition on trafficking in Native American human remains and cultural items.

Archaeological Resources Protection Act (ARPA): ARPA was enacted in 1979. ARPA prohibits the excavation or removal of archaeological resources from federal lands and "Indian Lands" unless done in accordance with a permit issued. A permit for excavation on "Indian Lands" requires the consent of the tribe with jurisdiction and the Indian landowner. A tribe itself is exempt from the requirement to obtain a permit. A tribal member is exempt from the permit requirement if the tribe has enacted "tribal law regulating the excavation or removal of archaeological resources on Indian lands." ARPA also prohibits the interstate commerce in archaeological resources taken in violation of ARPA itself or any other state, federal or local law.

National Historic Preservation Act (Public Law 89-665; as amended by Public Law 113-287, 54 U.S.C. 300101 et seq.): The National Historic Preservation Act (NHPA), as amended, establishes the National Register of Historic Places (or "National Register") and defines the Section 106 process requiring Federal agencies to consider the effects of an action on cultural resources in or eligible for listing in the National Register. Criteria for determining eligibility of cultural resources are provided in 36 C.F.R. Part 800. Even cultural resources that have not yet been discovered are subject to Section 106 review. Under § 106, Federal agencies are prohibited from approving any Federal "undertaking" (including the issuance of any license, permit or approval), without (1) taking into account the effects of the undertaking on the historic property, and (2) affording the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on the undertaking. The NHPA requires an agency to stop and consider the consequences of its undertakings on any historic property, and assures that the agency does so by requiring it to receive comment from the ACHP, or agencies acting in its stead, and from the public before proceeding with any such undertaking.

American Indian Religious Freedom Act (AIRFA): AIRFA was enacted in 1978. AIRFA acknowledges the right of Native Americans to have access to their sacred places. If a place of religious importance to American Indians may be affected by an undertaking, AIRFA promotes consultation with Indian religious practitioners, which may be coordinated with Section 106 consultation.

Executive Order 12898: Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (1994), requires that agencies try to avoid disproportionate and adverse environmental impacts on low income and minority populations. This is inclusive of impacts that may be cultural, for example, impacts on a culturally important religious, subsistence, or social practice.

5.10.1.2State

Assembly Bill 52 (AB 52): AB 52 amended CEQA to create a separate category of cultural resources, "tribal cultural resources" and provides that a project with an effect may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource.

Senate Bill 18 (SB 18): SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space.

5.10.2 Thresholds of Significance

The following tribal cultural resources of significance criteria are based on the CEQA checklist as provided in Appendix G to the CEQA Guidelines. These criteria are also being adopted for NEPA. Tribal Cultural Resource impacts would be considered significant if the No Action Alternative, NED Plan, or LPP would:

IMPACT-TR-1: Cause a substantial adverse change in the significance of a tribal cultural resource listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code 5020.1(k).

IMPACT-TR-2: Cause a substantial adverse change in the significance of a tribal cultural resource as determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

5.10.3 Mitigation Measures

Depending on the nature of the adverse effect, the following mitigation measures would be implemented for both the NED Plan and LPP:

TR-1 Preparing and implementing a monitoring and discovery plan; if previously undiscovered resources are identified during an undertaking, suspend work while the resource is evaluated and mitigated to avoid any further impact. Continue to consult with Native American groups to identify any tribal cultural resources or resource uses and address impacts.

TR-2 In the event that previously unknown tribal cultural resources are discovered, work in the immediate area would cease until the requirements in 36 C.F.R. 800.13 are complied with. The on-site supervisor shall contact the Corps Project Manager and District Archaeologist, and an approved archaeological consultant immediately. The on-site supervisor shall additionally divert all proposed project-related activities to other areas until the discovery has been evaluated by the approved archaeological consultant. The Corps will determine if further mitigation measures are warranted in consultation with the SHPO and consulting parties.

TR-3 Protecting exposed tribal cultural sites from vandalism and erosion with fencing and re-vegetation, or capping sites in an approved manner with appropriate material.

5.10.4 Tribal Cultural Resources Impacts

5.10.4.1 IMPACT TR-1: Cause a substantial adverse change in the significance of a tribal cultural resources listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code 5020.1(k)

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative, no project would be implemented. There would be no ground disturbance and no potential that buried pre-historic and/or historic period cultural resources within the study area would be adversely affected. Without the implementation of a project, the current level of risk would remain for flooding of communities. Currently, widespread overtopping within the project area would still occur between the 10% and 4% ACE events. The Bolsa Chica area, which is adjacent to the downstream reach of the C05 facility, is known to be archaeologically and culturally sensitive. Over the long-term, depending on the location, severity, and duration of the flooding, the location and extent of damage and impacts on culturally sensitive resources could range from minor to extensive.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

The Warner Avenue Bridge is not eligible for listing in the NRHP; therefore, the modification of the bridge would not cause a substantial direct adverse change to a historical resource. Modification of the bridge does include excavation of an approximately 0.6 acre upland constriction located upstream of the bridge on the left descending bank of OBB. The land to be excavated is previously undisturbed and could be a location where previously undiscovered tribal cultural resources that may be eligible for listing on the NRHP are present. Since the presence of previously unidentified tribal cultural resources is unknown, construction activities associated with the modification of the bridge could cause a significant adverse impact. Mitigation measure MM-TR-1 through MM-TR-3 would be fulfilled through the preparation and implementation of a monitoring and discovery plan that would be prepared prior to construction activities occurring detailing specific actions that would take place in the event that previously undiscovered tribal cultural resources are encountered. These measures would ensure that work is halted and redirected elsewhere and protecting the resources from potential vandalism and erosion while tribal and SHPO consultation occurs. Implementation of these measures would ensure the protection or previously undiscovered resources that may be encountered during construction activities, thereby reducing the potential significant adverse impact to less than significant.

Indirect Impacts

As stated above for direct impacts, the modification of the bridge would include excavation of an approximately 0.6 acre uplan constriction located upstream of the bridge on the left descending bank of OBB. The land to be excavated is previously undisturbed and could be a location where tribal cultural resources may be present. If previously undiscovered tribal cultural resources are encountered, indirect impacts to these resources could occur if the resources are not protected appropriately from erosion and/or vandalism. Mitigation measure MM-TR-3 would be implemented to reduce this potentially significant adverse indirect impact to less than significant. Mitigation measure MM-TR-3 ensures that previously undiscovered tribal cultural resources that may be encountered are protected appropriately from potential vandalism and erosion with applicable control measures.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. None of these maintenance activities nor the long-term operation of the bridge would cause substantial adverse change to a historical resource, since the Warner Avenue Bridge is not eligible for listing in the NRHP nor are there any known tribal cultural resources present at the bridge location.

Tide Gates

Direct Impacts

The tide gates are not a tribal cultural resource nor are there known tribal cultural resources at the location of the tide gates, therefore, the removal of the tide gates and replacement with a new access bridge would not cause a substantial direct adverse change to a tribal cultural resource.

Indirect Impacts

The tide gates are not a tribal cultural resource and there are no known tribal cultural resources at the location of the tide gates; therefore, the removal of the tide gates and replacement with an access bridge would not cause a substantial indirect adverse change to a tribal cultural resource.

Long-Term Operation and Maintenance Impacts

The new access bridge would require maintenance activities that would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. None of the maintenance activities nor the long-term operation of the new access bridge would cause substantial adverse change to a tribal cultural resource, since the bridge would be new and in eligible for listing in the NRHP and there are no known tribal cultural resources located at the tide gates.

C02/C04 Channels

Direct Impacts

The C02/C04 Channels are not eligible for listing in the NRHP; therefore, the modification of the channels would not cause a substantial direct adverse change to a structural historical resource. Channel modification would include removal of some sediments along previously excavated channel walls, and although these areas have been previously disturbed, some areas could be a location where previously undiscovered tribal cultural resources that may be eligible for listing on the NRHP are present. Selective monitoring of areas of perceived higher risk based on tribal consultation is planned for the next phase of the project. Since the presence of previously unidentified tribal cultural resources is unknown, construction activities associated with the modification of the bridge could cause a significant adverse impact. Mitigation measures MM-TR-1 through MM-TR-3 would be fulfilled through the preparation and implementation of a monitoring and discovery plan that would be prepared prior to construction activities occurring detailing specific actions that would take place in the event that previously undiscovered tribal cultural resources are encountered. These measures would ensure that work is halted and redirected elsewhere and protecting the resources from potential vandalism and erosion while tribal and SHPO consultation occurs. Implementation of these measures would ensure the protection of previously undiscovered resources that may be encountered during construction activities, thereby reducing the potential significant adverse impact to less than significant.

Indirect Impacts

As stated above for direct impacts, modification of the C02/C04 channels would include removal of some sediments along previously excavated channel walls, and could possibly expose previously undiscovered tribal cultural resources that may be eligible for listing on the NRHP. If previously undiscovered tribal cultural resources are encountered, indirect impacts to these resources could occur if the resources are not protected appropriately from erosion and/or vandalism. Mitigation measure MM-TR-3 would be implemented to reduce this potentially significant adverse indirect impact to less than significant. Mitigation measure MM-TR-3 ensures that previously undiscovered tribal cultural resources that may be encountered are protected appropriately from potential vandalism and erosion with applicable control measures.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels. Maintenance activities and long-term operation of the channels would have no impact to a tribal cultural resource since the modified C02/C04 channels would primarily be concrete lined.

C05/C06 Channels

Direct Impacts

The C05/C06 Channels are not eligible for listing in the NRHP; therefore, the modification of the channels would not cause a substantial direct adverse change to a structural historical resource. Channel modification would include removal of some sediments along previously excavated channel walls, and although these areas have been previously disturbed, some areas could be a location where previously undiscovered tribal cultural resources that may be eligible for listing on the NRHP are present. Selective monitoring of areas of perceived higher risk based on tribal consultation is planned for the next phase of the project.. Since the presence of previously unidentified tribal cultural resources is unknown, construction activities associated with the modification of the bridge could cause a significant adverse impact. Mitigation measures MM-TR-1 through MM-TR-3 would be fulfilled through the preparation and implementation of a monitoring and discovery plan that would be prepared prior to construction activities occurring detailing specific actions that would take place in the event that previously undiscovered tribal cultural resources are encountered. These measures would ensure that work is halted and redirected elsewhere and protecting the resources from potential vandalism and erosion while tribal and SHPO consultation occurs. Implementation of these measures would ensure the protection of previously undiscovered resources that may be encountered during construction activities, thereby reducing the potential significant adverse impact to less than significant.

Indirect Impacts

As stated above for direct impacts, modification of the C05/C06 channels would include removal of some sediments along previously excavated channel walls, and could possibly expose previously undiscovered tribal cultural resources that may be eligible for listing on the NRHP. If previously undiscovered tribal cultural resources are encountered, indirect impacts to these resources could occur if the resources are not protected appropriately from erosion and/or vandalism. Mitigation measure MM-TR-3 would be implemented to reduce this potentially significant adverse indirect impact to less than significant. Mitigation measure MM-TR-3 ensures that previously undiscovered tribal cultural resources that may be encountered are protected appropriately from potential vandalism and erosion with applicable control measures.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels. Maintenance activities and long-term operation of the channels would have no impact to a tribal cultural resource since the modified C05/C06 channels would primarily be concrete lined.

Level of Impact for the NED Plan

Less than Significant with Mitigation Incorporated. There is the potential for the project to encounter previously undiscovered tribal cultural resources, especially during modification of the Warner Avenue Bridge, which includes the excavation of approximately 0.6 acre of previously undisturbed upland. . In addition, mitigation measures MM-TR-1 through MM-TR-3 would be implemented. The implementation of these measures would ensure the protection of previously undiscovered resources that may be encountered during construction activities, thereby reducing the potential significant adverse impact to less than significant.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

The C02/C04 Channels are not eligible for listing in the NRHP; therefore, the modification of the channels would not cause a substantial direct adverse change to a structural historical resource. Channel modification would include removal of some sediments along previously excavated channel walls, and although these areas have been previously disturbed, some areas could be a location where previously undiscovered tribal cultural resources that may be eligible for listing on the NRHP are present. Selective monitoring of areas of perceived higher risk based on tribal consultation is planned for the next phase of the project.. Since the presence of previously unidentified tribal cultural resources is unknown, construction activities associated with the modification of the bridge could cause a significant adverse impact. Mitigation measures MM-TR-1 through MM-TR-3 would be fulfilled through the preparation and implementation of a monitoring and discovery plan that would be prepared prior to construction activities occurring detailing specific actions that would take place in the event that previously undiscovered tribal cultural resources are encountered. These measures would ensure that work is halted and redirected elsewhere and protecting the resources from potential vandalism and erosion while tribal and SHPO consultation occurs. Implementation of these measures would ensure the protection of previously undiscovered resources that may be encountered during construction activities, thereby reducing the potential significant adverse impact to less than significant.

Indirect Impacts

As stated above for direct impacts, modification of the C02/C04 channels would include removal of some sediments along previously excavated channel walls, and could possibly expose previously undiscovered tribal cultural resources that may be eligible for listing on the NRHP. If previously undiscovered tribal cultural resources are encountered, indirect impacts to these resources could occur if the resources are not

protected appropriately from erosion and/or vandalism. Mitigation measure MM-TR-3 would be implemented to reduce this potentially significant adverse indirect impact to less than significant. Mitigation measure MM-TR-3 ensures that previously undiscovered tribal cultural resources that may be encountered are protected appropriately from potential vandalism and erosion with applicable control measures.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Maintenance activities for the crossings would include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. These small-scale, routine maintenance activities already occur for the existing channels and crossings. Maintenance activities and long-term operation of the channels and crossings would have no impact to a tribal cultural resource since the modified C02/C04 channels would primarily be concrete lined .

C05/C06 Channels

The C05/C06 Channels are not eligible for listing in the NRHP; therefore, the modification of the channels would not cause a substantial direct adverse change to a structural historical resource. Channel modification would include removal of some sediments along previously excavated channel walls, and although these areas have been previously disturbed, some areas could be a location where previously undiscovered tribal cultural resources that may be eligible for listing on the NRHP are present. Selective monitoring of areas of perceived higher risk based on tribal consultation is planned for the next phase of the project.. Since the presence of previously unidentified tribal cultural resources is unknown, construction activities associated with the modification of the bridge could cause a significant adverse impact. Mitigation measures MM-TR-1 through MM-TR-3 would be fulfilled through the preparation and implementation of a monitoring and discovery plan that would be prepared prior to construction activities occurring detailing specific actions that would take place in the event that previously undiscovered tribal cultural resources are encountered. These measures would ensure that work is halted and redirected elsewhere and protecting the resources from potential vandalism and erosion while tribal and SHPO consultation occurs. Implementation of these measures would ensure the protection of previously undiscovered resources that may be encountered during construction activities, thereby reducing the potential significant adverse impact to less than significant.

Indirect Impacts

As stated above for direct impacts, modification of the C05/C06 channels would include removal of some sediments along previously excavated channel walls, and could possibly expose previously undiscovered tribal cultural resources that may be eligible for listing on the NRHP. If previously undiscovered tribal cultural resources are encountered, indirect impacts to these resources could occur if the resources are not protected appropriately from erosion and/or vandalism. Mitigation measure MM-TR-3 would be implemented to reduce this potentially significant adverse indirect impact to less than significant. Mitigation measure MM-TR-3 ensures that previously undiscovered tribal cultural resources that may be encountered are protected appropriately from potential vandalism and erosion with applicable control measures.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Maintenance activities for the crossings would

include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. These small-scale, routine maintenance activities already occur for the existing channels and crossings. Maintenance activities and long-term operation of the channels and crossings would have no impact to a tribal cultural resource since the modified C05/C06 channels would primarily be concrete lined.

Diversion Channel

Direct Impacts

Construction of the diversion channel would disturb soils through the excavation of material. Although the majority of the site is an abandoned railroad, it is likely that the construction of the diversion channel would disturb soils to a greater depth than they have previously been disturbed by prior activities. Although soils would be disturbed to a greater depth, it is still not anticipated that tribal cultural resources will be present. Regardless, it is possible that construction activity may unearth previously unknown tribal cultural resources. Mitigation measures MM-TR-1 through MM-TR-3 would be fulfilled through the preparation and implementation of a monitoring and discovery plan that would be prepared prior to construction activities occurring detailing specific actions that would take place in the event that previously undiscovered tribal cultural resources are encountered. These measures would ensure that work is halted and redirected elsewhere and protecting the resources from potential vandalism and erosion while tribal and SHPO consultation occurs. Implementation of these measures would ensure the protection of previously undiscovered resources that may be encountered during construction activities, thereby reducing the potential significant adverse impact to less than significant.

Indirect Impacts

Indirect impacts could occur of construction of the diversion channel led to increased flow velocities that subsequently resulted in scouring of previously undisturbed areas. Scouring of these areas could lead to the unearthing of previously unknown tribal cultural resources. While construction of the diversion channel is expected to increase flow velocities within the C04 system, lining the channels with concrete, as is proposed for the LPP, would eliminate the potential of any scouring occurring within the channels. Therefore, the LPP is not expected to increase scouring within the channels. Since scouring would not be increased, potential indirect impacts to previously unidentified tribal cultural resources would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the diversion channel would be no different than current maintenance activities that already occur on the existing channels within the system. Typical maintenance activities include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. None of these maintenance activities nor the long-term operation of the diversion channel would cause substantial adverse change to a tribal cultural resource, since there are no resources present within the vicinity of the diversion channel that are eligible for or listed on the CRHR.

Level of Impact for the LPP

Less than Significant with Mitigation Incorporated. There is the potential for the project to encounter previously undiscovered tribal cultural resources, especially during modification of the Warner Avenue Bridge which includes the excavation of approximately 0.6 acre of previously undisturbed upland. . In addition, mitigation measures MM-TR-1 through MM-TR-3 would be implemented. The implementation of these measures would ensure the protection of previously undiscovered resources that may be

encountered during construction activities, thereby reducing the potential significant adverse impact to less than significant.

5.10.4.2IMPACT TR-2: Cause a substantial adverse change in the significance of a tribal cultural resource as determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative, no project would be implemented. There would be no ground disturbance and no potential that buried prehistoric and/or historic period cultural resources within the study area would be adversely affected. Without the implementation of a project, the current level of risk would remain for flooding of communities. Currently, widespread overtopping within the project area would still occur between the 10% and 4% ACE events. The Bolsa Chica area, which is adjacent to the downstream reach of the C05 facility, is known to be archaeologically and culturally sensitive. Over the long-term, depending on the location, severity, and duration of the flooding, the location and extent of damage and impacts on culturally sensitive resources could range from minor to extensive.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

The Warner Avenue Bridge is not a significant tribal cultural resource, therefore, the modification of this structure would have no adverse direct impact. Modification of the bridge does include excavation of an approximately 0.6 acre upland constriction located upstream of the bridge on the left descending bank of OBB. The land to be excavated is previously undisturbed and could be a location where previously undiscovered tribal cultural resources that may be eligible for listing on the CRHR are present. . Since the presence of previously unidentified tribal cultural resources is unknown, construction activities associated with the modification of the bridge could cause a significant adverse impact. Mitigation measures MM-TR-1 through MM-TR-3 would be implemented. With the implementation of these measures a monitoring and discovery plan would be prepared prior to construction activities occurring that would detail specific actions that would occur in the event that previously undiscovered resources are encountered. In addition, these measures would ensure that work is halted and redirected elsewhere while tribal and SHPO consultation is conducted regarding the undiscovered resources. Lastly, the resources would be protected appropriately from potential vandalism and erosion with appropriate measures. The implementation of these measures would ensure the protection of previously undiscovered tribal cultural resources that may be encountered during construction activities, thereby reducing the potential significant adverse impact to less than significant.

Indirect Impacts

As stated above for direct impacts, the modification of the bridge does include excavation of an approximately 0.6 acre upland constriction located upstream of the bridge on the left descending bank of OBB. The land to be excavated is previously undisturbed and could be a location where tribal cultural resources may be present. If previously undiscovered tribal cultural resources are encountered, indirect impacts to these resources could occur if the resources are not protected appropriately from erosion and/or vandalism. Mitigation measure MM-TR-3 would be implemented to reduce this potentially significant adverse indirect impact to less than significant. Mitigation measure MM-TR-3 ensures that previously undiscovered archaeological resources that may be encountered are protected appropriately from potential vandalism and erosion with applicable control measures.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. None of these maintenance activities nor the long-term operation of the bridge would cause substantial adverse change to a tribal cultural resource, since the Warner Avenue Bridge is not considered a tribal cultural resource nor are there any known tribal cultural resources present at the bridge location.

Tide Gates

Direct Impacts

The tide gates are not a significant tribal cultural resource nor are there known significant tribal cultural resources at the location of the tide gates, therefore, the permanent removal of this structure and replacement with a new access bridge would have no adverse direct impact to tribal cultural resources.

Indirect Impacts

The tide gates are not a significant tribal cultural resource, therefore, the permanent removal of this structure and replacement with a new access bridge would have no adverse indirect impact to tribal cultural resources.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels. Maintenance activities and long-term operation of the channels would have no impact to tribal cultural resource since the modified C02/C04 channels would primarily be concrete lined.

C02/C04 Channels

Direct Impacts

The discharge channels are not a significant tribal cultural resource, therefore, the modification of the channels would have no adverse direct impact to tribal cultural resources.

Indirect Impacts

The discharge channels are not a significant tribal cultural resource, therefore, the modification of the channels would have no adverse indirect impact to tribal cultural resources.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels. Maintenance activities and long-term operation of the channels would have no impact to tribal cultural resource since the modified C02/C04 channels would primarily be concrete lined.

C05/C06 Channels

Direct Impacts

The discharge channels are not a significant tribal cultural resource, therefore, the modification of the channels would have no adverse direct impact to tribal cultural resources.

Indirect Impacts

The discharge channels are not a significant tribal cultural resource, therefore, the modification of the channels would have no adverse indirect impact to tribal cultural resources.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels. Maintenance activities and long-term operation of the channels would have no impact to tribal cultural resource since the modified C05/C06 channels would primarily be concrete lined.

Level of Impact for the NED Plan

Less than Significant with Mitigation Incorporated. There is the potential for the project to encounter previously undiscovered archaeological resources, especially during modification of the Warner Avenue Bridge which includes the excavation of approximately 0.6 acre of previously undisturbed upland. . In addition, mitigation measures MM-TR-1 through MM-TR-3 would be implemented. The implementation of these measures would ensure the protection of previously undiscovered resources that may be encountered during construction activities, thereby reducing the potential significant adverse impact to less than significant.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

The discharge channels are not a significant tribal cultural resource, therefore, the modification of the channels would have no adverse direct impact to tribal cultural resources.

Indirect Impacts

The discharge channels are not a significant tribal cultural resource, therefore, the modification of the channels would have no adverse indirect impact to tribal cultural resources.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels. Maintenance activities and long-term operation of the channels would have no impact to tribal cultural resource since the modified C02/C04 channels would primarily be concrete lined.

C05/C06 Channels

Direct Impacts

The discharge channels are not a significant tribal cultural resource, therefore, the modification of the channels would have no adverse direct impact to tribal cultural resources.

Indirect Impacts

The discharge channels are not a significant tribal cultural resource, therefore, the modification of the channels would have no adverse indirect impact to tribal cultural resources.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels. Maintenance activities and long-term operation of the channels would have no impact to tribal cultural resource since the modified C05/C06 channels would primarily be concrete lined.

Diversion Channel

Direct Impacts

The diversion channel would be constructed on land that has been previously disturbed by the presence of an abandoned railroad right-of-way. Therefore, it is not anticipated that any previously undiscovered tribal cultural resources would be uncovered during construction of the diversion channel. Ultimately, the construction of the diversion channel would have no adverse direct impact to tribal cultural resources.

Indirect Impacts

The diversion channel would be constructed on land that has been previously disturbed by the presence of an abandoned railroad right-of-way. Therefore, it is not anticipated that any previously undiscovered tribal cultural resources would be uncovered during construction of the diversion channel. Ultimately, the construction of the diversion channel would have no adverse indirect impact to tribal cultural resources.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the diversion channel would be the same types of activities that are currently carried out for the existing channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channel if needed. Maintenance activities and long-term operation of the channel would have no impact to tribal cultural resources since the newly constructed diversion channel would be concrete lined.

Level of Impact for the LPP

Less than Significant with Mitigation Incorporated. There is the potential for the project to encounter previously undiscovered archaeological resources, especially during modification of the Warner Avenue Bridge which includes the excavation of approximately 0.6 acre of previously undisturbed upland. . In addition, mitigation measures MM-TR-1 through MM-TR-3 would be implemented. The implementation of these measures would ensure the protection of previously undiscovered resources that may be encountered during construction activities, thereby reducing the potential significant adverse impact to less than significant.

5.11 Socioeconomic/Environmental Justice

5.11.1 Regulatory Framework

5.11.1.1 Federal

Executive Order 12898: Federal Executive Order 12898 was signed by President Bill Clinton on February 11, 1994, to focus Federal attention on the environmental and human health conditions of minority and low-income populations with the goal of achieving environmental protection for all communities. The Order directed Federal agencies to develop environmental justice strategies to aid Federal agencies identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. Environmental justice concerns may arise from impacts on the natural and physical environment, such as human health or ecological impacts on minority populations, low-income populations, and children, or from related social or economic impacts.

5.11.1.2 State

In addition to its prioritization by the Federal government, California was one of the first states in the Nation to pass legislation to codify environmental justice in state statute, defining “environmental justice” as “The fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies.” (Government Code Section 65040.12)

5.11.2 Impact Significance Criteria

5.11.2.1 CEQA Threshold

The following impact significance criterion is derived from Appendix G of the CEQA Guidelines. For purposes of analysis, the No Action Plan, NED Plan, and LPP would have a significant impact related to Socioeconomics and Environmental Justice if it would:

IMPACT SE-1: Induce substantial unplanned population growth in an area, either directly or indirectly.

IMPACT SE-2: Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

5.11.2.2 NEPA Threshold

Under NEPA, the No Action Plan, NED Plan, and LPP would have a significant impact related to Socioeconomics and Environmental Justice if one or more of the conditions described below were to occur because of implementation of the project:

IMPACT SE-3: Have disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations. The CEQ guidance identifies three factors to be considered to the extent practicable when determining whether environmental effects are disproportionately high and adverse (CEQ, 1997):

- Whether there is or would be an impact on the natural or physical environment that significantly (as the term is employed by NEPA) and adversely affects a minority population, low-income population, or children. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or children when those impacts are interrelated to impacts on the natural or physical environment.

- Whether the environmental effects are significant (as the term is employed by NEPA) and are or may be having an adverse impact on minority populations, low-income populations, or children that appreciably exceeds or is likely to appreciably exceed those of the general population or other appropriate comparison group.

- Whether the environmental effects occur or would occur in a minority population, low income population or children affected by cumulative or multiple adverse exposures from environmental hazards.

5.11.3 Mitigation Measures

No mitigation measures are proposed for implementation with the NED Plan or LPP.

5.11.4 Socioeconomic and Environmental Justice Impacts

Rather than addressing effects measure-by-measure as is done for most other resource categories, effects related to socioeconomics and environmental justice can be presented more clearly by considering the overall total population, ethnic groups, and household income levels that are present and may be affected within the entire study area. This cumulative analysis is presented below for each of the significance criteria.

5.11.4.1 IMPACT SE-1: Induce substantial unplanned population growth in an area, either directly or indirectly.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no project would be implemented. Therefore, there would be no impact to the existing population levels within the study area due to a project. The current level of risk would remain for flooding of communities within the vicinities of the channels. Widespread overtopping within the project area begins to occur between the 10% and 4% ACE events. Flooding and inundation could require temporary or permanent relocation of residents and businesses to nearby communities depending on the location, severity, and duration of the flooding.

ALTERNATIVE: NED PLAN

Direct Impacts

Under the NED Plan, the span of Warner Avenue Bridge would increase, the tide gates on Reach 1 of C05 would be permanently removed and replaced with a new access bridge, and the channels within C02/C04 and C05/C06 drainage channel systems would be modified to allow for increased conveyance efficiency. For a detailed description of modifications to the channels on a reach by reach basis for the NED Plan refer to Section 3.6. None of these measures involve the construction of new housing, commercial, or industrial development, nor would the implementation of these measures facilitate such development. Therefore, the implementation of the NED Plan would have no direct impact related to this criterion.

Indirect Impacts

Construction activities associated with the NED Plan would generate a limited amount of short-term and seasonal employment opportunities within the study area. It is expected that a majority of these employment opportunities would be filled by currently employed and unemployed labor force participants from the local and surrounding areas. Since there could be minor instances where employment opportunities are filled by labor force located outside the local and surrounding areas, nominal population growth could occur within the study area. Therefore, the change to existing population levels within the study area would be less than significant.

Long-term Operation and Maintenance Impacts

Long-term operation, maintenance, and adaptive management activities would generate a limited amount of employment opportunities. It is expected that a majority of these employment opportunities would be filled by currently employed and unemployed labor force participants from the local and surrounding areas. Since there could be minor instances where employment opportunities are filled by labor force located outside the local and surrounding areas, nominal population growth could occur within the study area. Therefore, the change to existing population levels within the study area due to long-term operation and maintenance of the project would be less than significant.

Level of Impact for the NED Plan

Less than Significant Impact. Construction, long-term operation and maintenance, and adaptive management activities would not induce population growth within the study area, either directly or indirectly.

ALTERNATIVE: LPP

Direct Impacts

Under the LPP, the span of Warner Avenue Bridge would increase, the tide gates on Reach 1 of C05 would be replaced, and the channels within C02/C04 and C05/C06 drainage channel systems would be modified to allow for increased conveyance efficiency and capacity. For a detailed description of modifications to the channels on a reach by reach basis for the LPP refer to Section 3.6. None of these measures involve the construction of new housing, commercial, or industrial development, nor would the implementation of these measures facilitate such development. Therefore, the implementation of the LPP would have no direct impact related to this criterion.

Indirect Impacts

Similar to the NED Plan, construction activities associated with the LPP would generate a limited amount of short-term and seasonal employment opportunities within the study area. It is expected that a majority of these employment opportunities would be filled by currently employed and unemployed labor force participants from the local and surrounding areas. Since there could be minor instances where employment opportunities are filled by labor force located outside the local and surrounding areas, nominal population growth could occur within the study area. Therefore, the change to existing population levels within the study area would be less than significant.

Long-term Operation and Maintenance Impacts

Similar to the NED Plan, long-term operation, maintenance, and adaptive management activities would generate a limited amount of employment opportunities. It is expected that a majority of these employment opportunities would be filled by currently employed and unemployed labor force participants from the local and surrounding areas. Since there could be minor instances where employment opportunities are filled by labor force located outside the local and surrounding areas, nominal population growth could occur within the study area. Therefore, the change to existing population levels within the study area due to long-term operation and maintenance of the project would be less than significant.

Level of Impact for the LPP

Less than Significant Impact. Construction, long-term operation and maintenance, and adaptive management activities would not induce population growth within the study area, either directly or indirectly.

5.11.4.2 IMPACT SE-2: Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no project would be implemented. Therefore, there would be no impact to the existing population levels within the study area due to a project. The current level of risk would remain for flooding of communities within the vicinities of the channels. Widespread overtopping within the project area begins to occur between the 10% and 4% ACE events. Flooding and inundation could displace substantial numbers of existing people or housing depending on the location, severity, and duration of the flooding.

ALTERNATIVE: NED PLAN

Direct Impacts

Under the NED Plan, the span of Warner Avenue Bridge would increase, the tide gates on Reach 1 of C05 would be permanently removed and replaced with a new access bridge, and the channels within the C02/C04 and C05/C06 drainage channel systems would be modified to allow for increased conveyance efficiency. For a detailed description of modifications to the channels on a reach by reach basis for the NED Plan refer to Section 3.6. None of these measures include activities that would displace people or housing, thereby necessitating the construction of replacement housing elsewhere. Therefore, the implementation of the NED Plan would have no direct impact related to this criterion.

Indirect Impacts

None of the measures that are part of the NED Plan include activities that would indirectly displace people or housing, thereby necessitating the construction of replacement housing elsewhere. Therefore, the implementation of the NED Plan would have no indirect impacts related to this criterion.

Long-term Operation and Maintenance Impacts

Long-term operation, maintenance, and adaptive management activities would not involve activities that would displace people or housing, thereby necessitating the construction of replacement housing elsewhere. Therefore, the implementation of the NED Plan would have no long-term operation or maintenance impacts.

Level of Impact for the NED Plan

No Impact. The NED Plan does not include activities that would directly, indirectly, or long-term cause displacement of people or housing, thereby necessitating the construction of replacement housing elsewhere.

ALTERNATIVE: LPP

Direct Impacts

Under the LPP, the span of Warner Avenue Bridge would increase, the tide gates on Reach 1 of C05 would be permanently removed and replaced with a new access bridge, and the channels within C02/C04 and C05/C06 drainage channel systems would be modified to allow for increased conveyance efficiency and capacity. For a detailed description of modifications to the channels on a reach by reach basis for the LPP refer to Section 3.6. None of these measures include activities that would displace people or housing, thereby necessitating the construction of replacement housing elsewhere. Therefore, the implementation of the NED Plan would have no direct impact related to this criterion.

Indirect Impacts

None of the measures that are part of the LPP include activities that would indirectly displace people or housing, thereby necessitating the construction of replacement housing elsewhere. Therefore, the implementation of the LPP would have no indirect impacts related to this criterion.

Long-term Operation and Maintenance Impacts

Long-term operation, maintenance, and adaptive management activities would not involve activities that would displace people or housing, thereby necessitating the construction of replacement housing elsewhere. Therefore, the implementation of the LPP would have no long-term operation or maintenance impacts.

Level of Impact for the LPP

No Impact. The LPP does not include activities that would directly, indirectly, or long-term cause displacement of people or housing, thereby necessitating the construction of replacement housing elsewhere.

5.11.4.3 IMPACT SE-3: Disproportionately affect minorities, low income residents, or children.

The CEQ guidance identifies three factors to be considered to the extent practicable when determining whether environmental effects are disproportionately high and adverse (CEQ, 1997):

- Whether there is or would be an impact on the natural or physical environment that significantly (as the term is employed by NEPA) and adversely affects a minority population, low-income population, or children. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or children when those impacts are interrelated to impacts on the natural or physical environment.

- Whether the environmental effects are significant (as the term is employed by NEPA) and are or may be having an adverse impact on minority populations, low-income populations, or children that appreciably exceeds or is likely to appreciably exceed those of the general population or other appropriate comparison group.

- Whether the environmental effects occur or would occur in a minority population, low income population or children affected by cumulative or multiple adverse exposures from environmental hazards.

When analyzing whether the proposed project would have a disproportionate significant impact on minority populations, low-income populations, and/or children the following definitions were used. For the purposes of E.O. 12898, the term minority means “individual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic” (CEQ 1997). A population is identified as minority in an area affected by the implementation of a project if “either (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis” (CEQ 1997). A minority population exists “if these is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the aforementioned thresholds” (CEQ 1997).

In terms of low-income population, there is no official definition. For the purposes of this analysis, a low-income population was characterized in two ways: (a) those households that have been identified by the U.S. Census Bureau as below the poverty line, and (b) those families whose median household income is above the poverty line, but meaningfully below the County and/or State median household income.

Therefore, a low-income population exists in the study area if one of the aforementioned thresholds is met.

In terms of children, U.S. Census Bureau data on children under age 18 was reviewed for cities within the study area. For the purposes of this analysis, a greater proportion of children was considered present within the study area if the percentage of children under 18 within a city was meaningfully greater than the County and/or State percentage of children under 18. If a greater proportion of children under 18 is within the study area it could mean the proposed project could have a disproportionate impact on children.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no project would be implemented. Therefore, there would be no impact to minorities, low-income populations, or children. The current level of risk would remain for flooding of communities within the vicinities of the channels. Widespread overtopping within the project area begins to occur between the 10% and 4% ACE events. Flooding and inundation could disproportionately affect minorities, low income residents, or children depending on the location, severity, and duration of flooding.

ALTERNATIVE: NED PLAN

Direct Impacts

Under the NED Plan, the span of the Warner Avenue Bridge would increase, the tide gates on Reach 1 of C05 would be removed and replaced with an access bridge, and the channels within C02/C04 and C05/C06 drainage channel systems would be modified to allow for increased conveyance efficiency. For a detailed description of modifications to the channels on a reach by reach basis for the NED Plan refer to Section 3.6. Cities adjacent to the study area include Fountain Valley, Garden Grove, Huntington Beach, Santa Ana, and Westminster. To evaluate potential disproportional adverse impacts to minority populations, low-income residents, or children within the study area, socioeconomic data from cities adjacent to the study area were compared to countywide and statewide socioeconomic data. The EJSCREEN tool provided by the USEPA was also used to look at the state percentiles regarding minority populations, low-income residents, and children within the study area. Specifically, the tool was used to look at the aforementioned environmental justice communities within the 80th percentile or higher adjacent or within 0.5 mile of the flood control channels within the Westminster Watershed. This analysis showed the percentage of the project that would have the potential to impact the aforementioned environmental justice communities within the 80th percentile or higher.

City of Fountain Valley

To evaluate potential disproportional adverse impacts to minority populations or to low-income households, socioeconomic data from Orange County and the State of California was compared to socioeconomic data for the City of Fountain Valley. Approximately 53.4% of the total population in the City of Fountain Valley is comprised of minority populations. This means that a minority population exists within the City of Fountain Valley since the minority population exceeds 50 percent. However, when compared to the countywide and statewide data, approximately 56.0% of the total population in

Orange County and 62.1% of the total population in California is comprised of minority populations. Since the minority population percentage for Fountain Valley is less than the countywide and statewide percentage, this is not considered a meaningful difference.

The median household income in the City of Fountain Valley is $86,602. The median household income in Orange County is $81,851 while the median household income for California is $67,169, which indicates that there is a lower percentage of low-income households in the study area as compared to Orange County and the State as a whole. Additionally, within the City of Fountain Valley, 8.7% of households are below the poverty line, whereas an average of 12.1% of households in Orange County and 15.1% of households in California are below the poverty line. These differences in percentages also indicate that fewer low-income households occur within the study area as compared to the County as a whole.

Approximately 20.4% of the total population in the City of Fountain Valley is comprised of children under the age of 18. In comparison, approximately 22.7% of the total population in Orange County and 23.4% of the total population in California is comprised of children under the age of 18. These percentages indicate that there is a lower percentage of children under age 18 within the study area as compared to the County and State as a whole.

In summary, the City of Fountain Valley meets one of the two thresholds for the presence of a minority population, but does not meet the thresholds for a low-income population or a community with a high proportion of children. Although a minority population exists within the City of Fountain Valley, the implementation of the NED Plan is not expected to have a disproportionate impact on a minority community. Under the NED Plan, flood damage risk would be reduced up to approximately the 1% ACE event in some locations, but other locations upstream of the I-405 would still occur between the 10% and 4% ACE. By reducing the risk of flooding, the project would result in beneficial impacts to the City of Fountain Valley and its minority population by reducing the likelihood of flooding, loss of life, or pain and suffering. Ultimately, the NED Plan would not have a disproportionately high or cumulative effect on human health, or disproportionately high or cumulative environmental effects on minorities, low-income populations, or children.

City of Garden Grove

To evaluate potential disproportional adverse impacts to minority populations or to low-income households, socioeconomic data from Orange County and the State of California was compared to socioeconomic data for the City of Garden Grove. Approximately 79.3% of the total population in the City of Garden Grove is comprised of minority populations. This means that a minority population exists within the City of Garden Grove since the minority population exceeds 50 percent. Additionally, the minority population of Garden Grove exceeds the minority populations for Orange County and California, which have 56.0% and 62.1% of their total populations comprised of minority populations, respectively.

The median household income in the City of Garden Grove is $62,675. The median household income in Orange County is $81,851 while the median household income for California is $67,169, which indicates that there is a higher percentage of low-income households in the study area as compared to Orange County and the State as a whole. Additionally, within the City of Garden Grove, 15.8% of households are below the poverty line, whereas an average of 12.1% of households in Orange County and 15.1% of households in California are below the poverty line. These differences in percentages also indicate that more low-income households occur within the study area as compared to the County and State as a whole.

Approximately 22.3% of the total population in the City of Garden Grove is comprised of children under the age of 18. In comparison, approximately 22.7% of the total population in Orange County and 23.4% of the total population in California is comprised of children under the age of 18. These percentages indicate that there is a lower percentage of children under age 18 within the study area as compared to the County and State as a whole.

In summary, the City of Garden Grove meets thresholds for the presence of a minority population and a low-income population, but does not meet the threshold for a population with a high proportion of children. Although there is a higher percentage of minorities and low-income households within this portion of the study area, the implementation of the NED Plan is not expected to have a disproportionate impact on a minority or low-income community. Under the NED Plan, flood damage risk would be reduced up to approximately the 1% ACE event in some locations, but other locations upstream of the I-405 would still occur between the 10% and 4% ACE. By reducing the risk of flooding, the project would result in beneficial impacts to the City of Garden Grove and its minority and low-income populations by reducing the likelihood of flooding, loss of life, or pain and suffering. Ultimately, the NED Plan would not have a disproportionately high or cumulative effect on human health, or disproportionately high or cumulative environmental effects on minorities, low-income populations, or children.

City of Huntington Beach

To evaluate potential disproportional adverse impacts to minority populations or to low-income households, socioeconomic data from Orange County and the State of California was compared to socioeconomic data for the City of Huntington Beach. Approximately 36.9% of the total population in the City of Huntington Beach is comprised of minority populations. Since the minority population does not exceed 50%, it does not meet the threshold for a minority population. In addition, the minority population in the City of Huntington Beach is less than the minority populations for Orange County and California which are 56.0% and 62.1%, respectively. These percentages mean that the two thresholds which signify a minority population are not met for the City of Huntington Beach, and the city has a lower percentage of minority populations as compared to the County and State as a whole.

The median household income in the City of Huntington Beach is $88,079. The median household income in Orange County is $81,851 while the median household income for California is $67,169, which indicates that there is a lower percentage of low-income households in the study area as compared to Orange County and the State as a whole. Additionally, within the City of Huntington Beach, 8.9% of households are below the poverty line, whereas an average of 12.1% of households in Orange County and 15.1% of households in California are below the poverty line. These differences in percentages also indicate that fewer low-income households occur within the study area as compared to the County and State as a whole.

Approximately 19.5% of the total population in the City of Huntington Beach is comprised of children under the age of 18. In comparison, approximately 22.7% of the total population in Orange County and 23.4% of the total population in California is comprised of children under the age of 18. These percentages indicate that there is a lower percentage of children under age 18 within the study area as compared to the County and State as a whole.

In summary, the City of Huntington Beach does not meet the thresholds for the presence of a minority population, low-income population, or a population with a high proportion of children. Therefore, the project would not have a disproportionate impact on minority populations, low-income populations, or children. Additionally, under the NED Plan flood damage risk would be reduced up to approximately the 1% ACE event in some locations, but other locations upstream of the I-405 would still occur between the

10% and 4% ACE. By reducing the risk of flooding, the project would result in beneficial impacts to socioeconomics by reducing the likelihood of flooding, loss of life, or pain and suffering. Ultimately, the NED Plan would not have a disproportionately high or cumulative effect on human health, or disproportionately high or cumulative environmental effects on minorities, low-income populations, or children.

City of Santa Ana

To evaluate potential disproportional adverse impacts to minority populations or to low-income households, socioeconomic data from Orange County and the State of California was compared to socioeconomic data for the City of Santa Ana. Approximately 90.6% of the total population in the City of Santa Ana is comprised of minority populations. This means that a minority population exists within the City of Santa Ana since the minority population exceeds 50 percent. In addition, approximately 56.0% of the total population in Orange County and 61.2% of the total population in California is comprised of minority populations. These percentages mean that there is a higher percentage of minority populations within the study area as compared to the County and State as a whole.

The median household income in the City of Santa Ana is $57,151. The median household income in Orange County is $81,851 while the median household income in California is $67,169, which indicates that there is a higher percentage of low-income households in the study area as compared to Orange County and the State as a whole. Additionally, within the City of Santa Ana, 19.5% of households are considered below the poverty line, whereas an average of 12.1% of households in Orange County and 15.1% of households in California are below the poverty line. This indicates that there is a higher percentage of low-income households in the study area as compared to Orange County and the State as a whole.

Approximately 27.5% of the total population in the City of Santa Ana is comprised of children under the age of 18. In comparison, approximately 22.7% of the total population in Orange County and 23.4% of the total population in California is comprised of children under the age of 18. These percentages indicate that there is a higher percentage of children under age 18 within this portion of the study area as compared to the County and State as a whole,

In summary, the City of Santa Ana meets thresholds for the presence of a minority population, a low-income population, and a population with a high proportion of children. Although there is a higher percentage of minorities, low-income households, and children within this portion of the study area, the implementation of the NED Plan is not expected to have a disproportionate impact on a minority or low-income community, or children. Under the NED Plan, flood damage risk would be reduced up to approximately the 1% ACE event in some locations, but other locations upstream of the I-405 would still occur between the 10% and 4% ACE. By reducing the risk of flooding within the study area, the project would result in beneficial impacts to the City of Santa Ana and its minority, low-income, and children populations by reducing the likelihood of flooding, loss of life, or pain and suffering. Ultimately, the NED Plan would not have a disproportionately high or cumulative effect on human health, or disproportionately high or cumulative environmental effects on minorities, low-income populations, or children.

City of Westminster

To evaluate potential disproportional adverse impacts to minority populations, low-income households, or children, socioeconomic data from Orange County and the State of California was compared to socioeconomic data for the City of Westminster. Approximately 75.5% of the total population in the City

of Westminster is comprised of minority populations. This means that a minority population exists within the City of Westminster since the minority population exceeds 50 percent. In addition, approximately 56.0% of the total population in Orange County and 62.1% of the total population in California is comprised of minority populations. These percentages mean that there is a higher percentage of minority populations within the study area as compared to the County and State as a whole.

The median household income in the City of Westminster is $57,575. The median household income in Orange County is $81,851 while the median household income in California is $67,169, which indicates that there is a higher percentage of low-income households in the study area as compared to Orange County and the State as a whole. Additionally, within the City of Westminster, 7.3% of households are below the poverty line, whereas an average of 12.1% of households in Orange County and 15.1% of households in California are below the poverty line. This indicates that there is a lower percentage of low-income households in the study area as compared to Orange County as a whole. However, since one of the thresholds is met, the City of Westminster is considered to have a low-income population.

Approximately 20.2% of the total population in the City of Westminster is comprised of children under the age of 18. In comparison, approximately 22.7% of the total population in Orange County and 23.4% of the total population in California is comprised of children under the age of 18. These percentages indicate that there is a lower percentage of children under age 18 within the study area as compared to the County and State as a whole.

In summary, the City of Westminster meets thresholds for the presence of a minority population and a low-income population. The City of Westminster does not meet the threshold for a city with a high proportion of children to the total population. Although there is a higher percentage of minorities and low-income households within this portion of the study area, the implementation of the NED Plan is not expected to have a disproportionate impact on a minority or low-income community. Under the NED Plan, flood damage risk would be reduced up to approximately the 1% ACE event in some locations, but other locations upstream of the I-405 would still occur between the 10% and 4% ACE. By reducing the risk of flooding within the study area, the project would result in beneficial impacts to the City of Westminster and its minority and low-income populations by reducing the likelihood of flooding, loss of life, or pain and suffering. Ultimately, the NED Plan would not have a disproportionately high or cumulative effect on human health, or disproportionately high or cumulative environmental effects on minorities, low-income population, or children.

EJSCREEN Analysis

Under NED Plan, only the C05/C06 channel system would be modified to allow for increased conveyance efficiency. The EJSCREEN tool was also used to evaluate whether or not there could be potential environmental justice concerns within the study area. The EJSCREEN is made available by the USEPA and provides data on 12 environmental indicators and six demographic variables across the United States (USEPA 2016). This information can help provide an overview of places where environmental justice may warrant greater consideration. When using the EJSCREEN, the 80th percentile is a suggested starting point for the purpose of identifying geographic areas in the United States that may warrant further consideration, analysis, or outreach (USEPA 2016). While the 80th percentile is the suggested starting point for identifying areas that may warrant further consideration, it is not a threshold signifying that an impact to an environmental justice community would occur. No threshold is state in the analysis guidance (USEPA 2016). For the purpose of this project, the proportion of the channel work that would occur adjacent or within 0.5 mile of environmental justice communities within the 80th percentile or greater was analyzed. The potential impact to environmental justice communities was considered less than significant

if 50% or less of the proposed project occurred adjacent or within 0.5 mile of environmental justice communities.

In regards to low-income residents within the 80th percentile and above, approximately 36.8% of the project would occur adjacent or within 0.5 mile of low-income residents. For minority populations within the 80th percentile and above, approximately 39.5% of the project would occur adjacent or within 0.5 mile of minority populations. Lastly for the NED Plan, approximately 33.3% of the project would occur adjacent or within 0.5 mile of children under age 5 within the 80th percentile and above. With the implementation of the NED Plan, less than half of the project would occur adjacent or within 0.5 mile of environmental justice communities (i.e., low-income residents, minority populations, and children under age 5).

Indirect Impacts

Potential indirect impacts to environmental justice communities could occur due to implementation of the NED Plan, as a result of construction equipment traffic within the study area. According to Houston et al. (2004), minority and low-income communities within the Southern California region experience more than two times the level of traffic density when compared to other communities within the region. With the implementation of the NED Plan, increased construction equipment traffic is expected within the study area which could further increase traffic density in environmental justice communities that already experience high levels of traffic. Increased construction equipment traffic in traffic dense areas could also increase the risk of exposure of environmental justice communities within the study area to vehicle-related pollutants. To off-set any potential indirect impacts to environmental justice communities due to the implementation of the NED Plan, construction worker arrival and departure times would avoid peak traffic times (i.e., 7:00 – 9:00 a.m. and 4:00 – 6:00 p.m.) when roads are expected to be more congested. Therefore, the potential indirect impact to environmental justice communities would be less than significant.

Long-term Operation and Maintenance Impacts

Anticipated operation and maintenance activities, such as vegetation control, levee and channel repair, and sediment removal would occur within areas already analyzed by the proposed project construction. There are no long-term operation and maintenance impacts that could potentially result in a disproportionately high or cumulative effect to the human health, or disproportionately high or cumulative environmental effects on minority, low-income population, or children.

Level of Impact for the NED Plan

Less than Significant Impact. Overall the project as a whole is providing a benefit to the communities within the Westminster Watershed by reducing the potential for flooding and flood induced impacts to residences. Under the NED Plan, flood damage risk would be reduced up to approximately the 1% ACE event in some locations, but other locations upstream of the I-405 would still occur between the 10% and 4% ACE. By reducing the risk of flooding, the project would result in positive impacts to socioeconomics by reducing the likelihood of flooding, loss of life, or pain and suffering. Construction and long-term operation and maintenance activities would not have a disproportionately high or cumulative effect on human health, or disproportionately high or cumulative environmental effects on minority populations, low-income populations, or children.

ALTERNATIVE: LPP

Direct Impacts

Under the LPP, the span of Warner Avenue Bridge would increase, the tide gates on Reach 1 of C05 would be removed, and the channels within C05/C06 and C02/C04 would be modified to allow for increased conveyance efficiency and capacity. For a detailed description of modifications to the channels on a reach by reach basis for the LPP refer to Section 3.6. Cities adjacent to the study area include Fountain Valley, Garden Grove, Huntington Beach, Santa Ana, Seal Beach, and Westminster. To evaluate potential disproportional adverse impacts to minority populations, low-income residents, or children within the study area, socioeconomic data from cities adjacent to the study area were compared to countywide socioeconomic data. The EJSCREEN tool provided by the USEPA was also used to look at the state percentiles regarding minority populations, low-income residents, and children within the study area. Specifically, the tool was used to look at the aforementioned environmental justice communities within the 80th percentile or higher adjacent or within 0.5 mile of the flood control channels within the Westminster Watershed. This analysis showed the percentage of the project that would have the potential to impact the aforementioned environmental justice communities within the 80th percentile or higher.

City of Fountain Valley

Socioeconomic data for the City of Fountain Valley was discussed under the NED Plan. Potential environmental impacts due to implementation of the LPP upon the City of Fountain Valley community would be the same as those discussed for the NED Plan. Therefore, similar to the NED Plan, the LPP would not have a disproportionately high or cumulative effect on human health, or disproportionately high or cumulative environmental effects on minorities, low-income populations, or children. The LPP would have an overall beneficial impact to the communities within the Westminster Watershed by reducing the potential for flooding and flood induced impacts to residents. Under the LPP, flood damage risk would be reduced to events greater than the 1% ACE. By reducing the risk of flooding, the project would result in positive impacts to socioeconomics by reducing the likelihood of flooding, loss of life, or pain and suffering.

City of Garden Grove

Socioeconomic data for the City of Garden Grove was discussed under the NED Plan. Potential environmental impacts due to implementation of the LPP upon the City of Garden Grove population would be the same as those discussed for the NED Plan. Therefore, similar to the NED Plan, the LPP would have a less than significant impact related to this criterion. The project as a whole is providing a beneficial impact to the communities within the Westminster Watershed by reducing the potential for flooding and flood induced impacts to residents. Under the LPP, flood damage risk would be reduced to events greater than the 1% ACE. By reducing the risk of flooding, the project would result in positive impacts to socioeconomics by reducing the likelihood of flooding, loss of life, or pain and suffering.

City of Huntington Beach

Socioeconomic data for the City of Huntington Beach was discussed under the NED Plan. Potential environmental impacts due to implementation of the LPP upon the City of Huntington Beach population would be the same as those discussed for the NED Plan. Therefore, similar to the NED Plan, the LPP would have a less than significant impact related to this criterion. The project as a whole is providing a beneficial impact to the communities within the Westminster Watershed by reducing the potential for flooding and flood induced impacts to residents. Under the LPP, flood damage risk would be reduced to

events greater than the 1% ACE. By reducing the risk of flooding, the project would result in positive impacts to socioeconomics by reducing the likelihood of flooding, loss of life, or pain and suffering.

City of Santa Ana

Socioeconomic data for the City of Santa Ana was discussed under the NED Plan. Potential environmental impacts due to implementation of the LPP upon the City of Santa Ana population would be the same as those discussed for the NED Plan. Therefore, similar to the NED Plan, the LPP would have a less than significant impact related to this criterion. The project as a whole is providing a beneficial impact to the communities within the Westminster Watershed by reducing the potential for flooding and flood induced impacts to residents. Under the LPP, flood damage risk would be reduced to events greater than the 1% ACE. By reducing the risk of flooding, the project would result in positive impacts to socioeconomics by reducing the likelihood of flooding, loss of life, or pain and suffering.

City of Seal Beach

To evaluate potential disproportional adverse impacts to minority populations, low-income households, or children, socioeconomic data from Orange County and the State of California was compared to socioeconomic data for the City of Seal Beach. Approximately 27.4% of the total population in the City of Seal Beach is comprised of minority populations. In comparison, approximately 56.0% of the total population in Orange County and 62.1% of the total population in California is comprised of minority populations. These percentages mean that there is a lower percentage of minority populations within the study area as compared to the County and State as a whole.

The median household income in the City of Seal Beach is $65,401. The median household income in Orange County is $81,851 while the median household income in California is $67,169, which indicates that there is a higher percentage of low-income households in the study area as compared to Orange County and the State as a whole. Additionally, within the City of Seal Beach, 7.3% of households are below the poverty line, whereas an average of 12.1% of households in Orange County and 15.1% of households in California are below the poverty line. This indicates that there is a lower percentage of low-income households in the study area as compared to Orange County and the State as a whole.

Approximately 11.9% of the total population in the City of Seal Beach is comprised of children under the age of 18. In comparison, approximately 22.7% of the total population in Orange County and 23.4% of the total population in California is comprised of children under the age of 18. These percentages indicate that there is a lower percentage of children under age 5 within the study area as compared to the County and State as a whole.

In summary, the City of Seal Beach meets thresholds for the presence of a low-income population, but does not meet the thresholds for the presence of a minority population or a high proportion of children when compared to the total population. Although there is a higher percentage of low-income households within this portion of the study area, the implementation of the LPP is not expected to have a disproportionate impact on low-income communities. Under the LPP, flood damage risk would be reduced to events greater than the 1% ACE. By reducing the risk of flooding within the study area, the project would result in beneficial impacts to the City of Seal Beach and its low-income communities by reducing the likelihood of flooding, loss of life, or pain and suffering. Ultimately, the LPP would not have a disproportionately high or cumulative effect on human health, or disproportionately high or cumulative environmental effects on minorities, low-income population, or children.

City of Westminster

Socioeconomic data for the City of Westminster was discussed under the NED Plan. Potential environmental impacts due to implementation of the LPP upon the City of Westminster population would be the same as those discussed for the NED Plan. Therefore, similar to the NED Plan, the LPP would have a less than significant impact related to this criterion. The project as a whole is providing a beneficial impact to the communities within the Westminster Watershed by reducing the potential for flooding and flood induced impacts to residents. Under the LPP, flood damage risk would be reduced to events greater than the 1% ACE. By reducing the risk of flooding, the project would result in positive impacts to socioeconomics by reducing the likelihood of flooding, loss of life, or pain and suffering.

EJSCREEN Analysis

Under the LPP, both the C05/C06 and C02/C04 channel systems would be modified to allow for increased conveyance efficiency and capacity. The EJSCREEN tool was used to evaluate whether or not there could be potential environmental justice concerns within the study area. The EJSCREEN is made available by the USEPA and provides data on 12 environmental indicators and six demographic variables across the United States (USEPA 2016). This information can help provide an overview of places where environmental justice may warrant greater consideration. When using the EJSCREEN, the 80th percentile is a suggested starting point for the purpose of identifying geographic areas in the United States that may warrant further consideration, analysis, or outreach (USEPA 2016). While the 80th percentile is the suggested starting point for identifying areas that may warrant further consideration, it is not a threshold signifying that an impact to an environmental justice community would occur. No threshold is stated in the analysis guidance. For the purpose of this project, the proportion of the channel work that would occur adjacent or within 0.5 mile of environmental justice communities within the 80th percentile or greater was analyzed. The potential impact to environmental justice communities was considered less than significant if 50% or less of the proposed project occurred adjacent or within 0.5 mile of environmental justice communities.

In regards to low-income residents within the 80th percentile and above, approximately 36.8% of the project within the C05/C06 channel system and 55.4% of the project within the C02/C04 channel system would occur adjacent or within 0.5 mile of low-income residents. For minority populations within the 80th percentile and above, approximately 39.5% of the project within the C05C06 channel system and 50.3% of the project within the C02/C04 channel system would occur adjacent or within 0.5 mile of minority populations. Lastly for the LPP, approximately 33.3% of the project within the C05/C06 channel system and 42.7% of the project within the C02/C04 channel system would occur adjacent or within 0.5 mile of children under age 5 within the 80th percentile and above.

In comparison with the NED Plan, the LPP has a higher potential to impact environmental justice communities, since the LPP includes the modification of both the C05/C06 and C02/C04 channel systems, whereas the NED Plan only includes the modification of the C05/C06 channel system. Similar to the NED Plan, under the LPP less than half of the project within the C05/C06 channel system would occur adjacent or within 0.5 mile of environmental justice communities (i.e., low-income residents, minority populations, and children under age 5). However, over 50% (i.e., range between 50.3%-55.4%) of the project within the C02/C04 channel system would occur adjacent or within 0.5 mile of low-income residents and minority populations. Slightly over 40% (i.e., 42.7%) of the project within the C02/C04 channel system would occur adjacent or within 0.5 mile of children under age 5.

Although the LPP has a higher potential to impact environmental justice communities than the NED Plan, the LPP would have a greater benefit to environmental justice communities once the project is

implemented when compared to the NED Plan. The LPP reduces the potential for flooding and flood induced impacts to more communities within the study area than the NED Plan since it also includes modifications to the C02/C04 channel system as well as the C05/C06 channel system. In addition, under the LPP flood damage risk would be reduced to events greater than the 1% ACE whereas under the NED Plan flood damage risk would be reduced up to approximately the 1% ACE event in some locations, but other locations upstream of the I-405 would still occur between the 10% and 4% ACE. Ultimately, the LPP would not have a disproportionately high or cumulative effect on human health, or disproportionately high or cumulative environmental effects on minorities, low-income populations, or children. Instead, the LPP would provide additional benefits to minorities, low-income populations, and children by reducing the potential for flooding and flood induced impacts in more environmental justice communities than the NED Plan.

Indirect Impacts

Potential indirect impacts to environmental justice communities could occur due to implementation of the LPP, as a result of construction equipment traffic within the study area. According to Houston et al. (2004), minority and low-income communities within the Southern California region experience more than two times the level of traffic density when compared to other communities within the region. With the implementation of the LPP, increased construction equipment traffic is expected within the study area which could further increase traffic density in environmental justice communities that already experience high levels of traffic. Increased construction equipment traffic in traffic dense areas could also increase the risk of exposure of environmental justice communities within the study area to vehicle-related pollutants. To off-set any potential indirect impacts to environmental justice communities due to the implementation of the LPP several, construction worker arrival and departure times would avoid peak traffic times (i.e., 7:00 – 9:00 a.m. and 4:00 – 6:00 p.m.) when roads are expected to be more congested. Therefore, the potential indirect impact to environmental justice communities would be reduced to less than significant.

Long-term Operation and Maintenance Impacts

Anticipated operation and maintenance activities, such as vegetation control, levee and channel repair, and sediment removal would occur within areas already analyzed by the proposed project construction. There are no long-term operation and maintenance impacts that could potentially result in a disproportionately high or cumulative effect to the human health, or disproportionately high or cumulative environmental effects on minority, low-income population, or children.

Level of Impact for the LPP

Less than Significant Impact. Overall the project as a whole is providing a benefit to the communities within the Westminster Watershed by reducing the potential for flooding and flood induced impacts to residents. Under the LPP, flood damage risk would be reduced to events greater than the 1% ACE. In comparison, the NED Plan would only reduce flood damage risk up to approximately the 1% ACE event in some locations, while other locations upstream of the I-405 would still experience flood damage risk between the 10% and 4% ACE. By reducing the risk of flooding in more communities within the study area than the NED Plan, the LPP would result in positive impacts to socioeconomics by reducing the likelihood of flooding, loss of life, or pain and suffering. Construction and long-term operation and maintenance activities would not have a disproportionately high or cumulative effect on human health, or disproportionately high or cumulative environmental effects on minority populations, low-income populations, or children.

5.12 Hazards and Hazardous Materials

5.12.1 Regulatory Framework

5.12.1.1 Federal

The principal federal regulatory agency for hazardous substances is the USEPA. The key federal regulations pertaining to hazardous substances are as follows.

Resources Conservation and Recovery Act (RCRA): The Resource Conservation and Recovery Act (RCRA) gives USEPA the authority to control hazardous waste from the "cradle-to-grave". This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled USEPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA): The Comprehensive Environmental Response, Compensation, and Liability Act – otherwise known as CERCLA of Superfund – provides a Federal "Superfund" to clean up uncontrolled or abandoned hazardous-waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment. Through CERCLA, USEPA was given power to seek out those parties responsible for any release and assure their cooperation in the cleanup.

5.12.1.2 State

State regulations may implement federal requirements where the state regulations are authorized to implement federal regulatory programs under a delegated authority. State requirements that are not implemented under a delegated federal authority would apply to the actions of the NFS for O&M activities.

Hazardous Waste Control Law: The Hazardous Waste Control Law (HWCL) is the State Law similar to the Federal RCRA program. HWCL describes the requirements for the proper management of hazardous wastes including:

- Criteria for identification and classifications of hazardous wastes
- Generation and transportation of hazardous waste
- Design and permitting of facilities that recycle, treat, store, and dispose hazardous wastes
- Treatment Standards
- Operation of facilities
- Closure of facilities and liability requirements

5.12.2 Impact Significance Criteria

The impact criteria below were taken from Appendix G of the CEQA guidelines and are also being adopted for NEPA. For purposes of this analysis, the No Action Plan, NED Plan, and LPP would have a significant impact related to Public Health and Safety if it would:

IMPACT HAZ-1: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

IMPACT HAZ-2: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

IMPACT HAZ-3: Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

IMPACT HAZ-4: Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would it create a significant hazard to the public or the environment.

IMPACT HAZ-5: For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area.

IMPACT HAZ-6: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

IMPACT HAZ-7: Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.

5.12.3 Mitigation Measures

For both the NED Plan and LPP, the following mitigation measures would be implemented to minimize the risk of encountering HTRW during project implementation.

MM-HAZ-1 Compliance with all applicable local, regional, state, and Federal laws, policies, and regulations regarding the transportation, storage, handling, management, and disposal of hazardous materials and wastes.

MM-HAZ-2 Construction contractors are responsible for development of an Environmental Protection Plan to ensure that all environmental resources are protected during construction and that all construction activities conducted on the project site comply with Federal, State, and local environmental laws and regulations. The Contractors solid and hazardous materials and waste management plan will be included in the Environmental Protection Plan.

MM-HAZ-3 Contractors are responsible for development of an accidental spill prevention and response plan for all hazardous materials that may be used onsite. In the event of a spill or release of hazardous substances at the construction site, the contaminated soil shall be immediately contained, excavated, and treated per Federal and state regulations developed by the USEPA, as well as local hazardous waste ordinances.

MM-HAZ-4 A comprehensive HTRW Phase I Environmental Site Assessment, including a complete review of the EDR database search results will be conducted in PED, when project footprints are defined, to determine the scope and scale of REC occurrences that may exist in the surrounding areas, and if RECs will have an impact on the implementation of the proposed project. Site reconnaissance, review of historical maps, review of previous HTRW assessments and recommendations, and review of existing information will be conducted as part of this investigation.

MM-HAZ-5 Prior to the start of construction the applicant would prepare an Emergency Evacuation Plan that contains procedures for the demobilization of construction equipment and evacuation of personnel from the study area in the event of a pending significant storm event or other emergency that jeopardizes the safety of personnel or equipment.

MM-HAZ-6 Prior to the start of construction the applicant would prepare a traffic control plan that would be approved by the City and County. The traffic control plan will include provisions for notification of emergency services prior to construction.

5.12.4 Hazards and Hazardous Materials Impacts

5.12.4.1 IMPACT HAZ-1: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no project would be implemented. Therefore, there would be no adverse impacts in creating a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials due to the implementation of a project. Reasonably foreseeable conditions under the No Action Plan could involve the use of small quantities of hazardous or toxic equipment fluids required for equipment used for future repair work of the existing drainage channels. Since the amount used would be small in quantity, it is unlikely that there would be a significant adverse impact as a result of routine transport, use or disposal of hazardous materials under the No Action Plan.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

Construction activities associated with the modification of the Warner Avenue Bridge would involve the use of small quantities of hazardous or toxic equipment fluids such as fuels, greases, and cleaning materials for the equipment. The transport, use, and disposal of hazardous materials would adhere to existing regulations of several agencies, including the Department of Toxic Substances Control (DTSC), the USEPA, the OSHA, Orange County Fire Authority (OCFA), and the Orange County Environmental Health Division. Compliance with applicable laws and regulations governing the use, transportation, and disposal of hazardous materials would ensure that potentially hazardous materials are used and handled in an appropriate manner and would minimize the potential for safety impacts to occur. In addition to the use of small quantities of hazardous or toxic equipment fluids which could result in the public being exposed to these hazards, the modification of the Warner Avenue Bridge involves excavation of the upstream constriction point located on the left descending bank of OBB. The soil material to be excavated could contain hazardous materials that could create a hazard to the public.

A limited HTRW Phase I Environmental Site Assessment (ESA) was completed to identify the risk of encountering HTRW and non-HTRW environmental issues and to determine if any RECs present have impacted the project site or will impact implementation of the proposed measure. The information used to complete the limited HTRW Phase I ESA was obtained from a database search. The only potential HTRW and non-HTRW concern near the Warner Avenue Bridge is the Bolsa Chica Lowland Restoration Project which is located approximately 4,000 feet south of the proposed project; results of the limited Phase I ESA suggest it is unlikely that the Contractor will encounter hazardous materials during construction. Excess soils generated from the project site that cannot be reused onsite will be

characterized prior to offsite disposal to a licensed and permitted disposal facility. Disposal of excess materials will be in accordance with Orange County's regulations.

During the PED phase of the project, a comprehensive HTRW Phase I ESA, including a complete review of the EDR database search results will be conducted, when project footprints are defined, to determine the scope and scale of REC occurrences that may exist in the surrounding areas, and if RECs will have an impact on the implementation of this measure. Site reconnaissance, review of historical maps, review of previous HTRW site assessments and recommendations, and review of existing information will be conducted as part of this investigation. In addition, if during PED a contaminated site is identified, it would be either avoided or remediated by the NFS before project construction to minimize the potential exposure of the public. All response actions shall follow Federal, State and local laws.

Since transport, use and disposal of hazardous materials would adhere to existing regulations of several agencies and the limited HTRW phase I ESA suggests that it is unlikely that the Contractor will encounter hazardous materials during construction, the implementation of this measure would have a less than significant direct impact to the public or the environment through the routine transport, use, or disposal of hazardous materials.

Indirect Impacts

There are no activities that would result in indirect impacts that would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge; therefore, these typical maintenance activities would not be expected to substantially increase or decrease the exposure of the public or the environment to hazardous materials. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Hazardous or toxic equipment fluids, such as fuels and oils, may be introduced into the area as a result of construction equipment being used during maintenance activities. Exposure to hazardous or toxic materials may result from spillage or leakage of containment units if they are inadvertently damaged during maintenance activities. Fuels, oils, and other hazardous materials used on site during maintenance activities would adhere to all Federal, State, and local hazardous materials use laws. Therefore, the impact due to long-term operation and maintenance activities would be less than significant.

Tide Gates

Direct Impacts

Construction activities associated with the removal of the tide gates and replacement with a new access bridge would involve the use of small quantities of hazardous or toxic equipment fluids such as fuels, greases, and cleaning materials for the equipment. Exposure to hazardous or toxic equipment fluids may result from spillage or leakage of containment units if they are inadvertently damaged during implementation of this measure. The use, storage, transport, and disposal of hazardous materials would adhere to existing regulations of several agencies, including the DTSC, the USEPA, the OSHA, OCFA, and the Orange County Environmental Health Division. Compliance with applicable laws and regulations

governing the use, storage, and transportation of hazardous materials would ensure that potentially hazardous materials are used and handled in an appropriate manner and would minimize the potential for safety impacts to occur. In addition to the use of small quantities of hazardous or toxic equipment fluids which could result in the public being exposed to these hazards, the removal of the tide gates and replacement with a small span bridge involves minor excavation of soil. The soil material to be excavated could contain hazardous materials that could create a hazard to the public.

A limited HTRW Phase I ESA was completed to identify the risk of encountering HTRW and non-HTRW environmental issues and to determine if any RECs present have impacted the project site or will impact implementation of the proposed project. The information used to complete the limited HTRW Phase I ESA was obtained from a database search. A focused assessment of the database report was conducted for sites that are on, or directly adjacent to the proposed project area. A summary of potential HTRW and non-HTRW concerns are outlined below:

The Bolsa Chica Lowland Restoration Project is adjacent to C05 Reach 1 where the tide gates are located. The status of all remedial activities conducted at the Bolsa Chica Lowlands site should be reviewed during design phase to determine if there are any areas in the proposed project footprint that may affect any remaining contamination (metals, oil & grease, petroleum hydrocarbons, and PCBs) and/or contaminated fill left onsite as part of the remedial action plan.

Excess soils generated from the project site that cannot be reused onsite will be characterized prior to offsite disposal to a licensed and permitted disposal facility. Disposal of excess materials will be in accordance with Federal, State, and local laws and regulations. In addition, the U.S. Department of Transportation regulates the safe handling and transportation of hazardous materials.

During the PED phase of the project, a comprehensive HTRW Phase I ESA, including a complete review of the EDR database search results will be conducted, when project footprints are defined, to determine the scope and scale of REC occurrences that may exist in the surrounding areas, and if RECs will have an impact on the implementation of this measure. Site reconnaissance, review of historical maps, review of previous HTRW site assessments and recommendations, and review of existing information will be conducted as part of this investigation. In addition, if during PED a contaminated site is identified, it would be either avoided or remediated by the NFS before project construction to minimize the potential exposure of the public. All response actions shall follow Federal, State and local laws.

Since transport, use and disposal of hazardous materials would adhere to existing regulations of several agencies, the implementation of this measure would have a less than significant direct impact to the public or the environment through the routine transport, use, or disposal of hazardous materials.

Indirect Impacts

There are no activities that would result in indirect impacts that would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new access bridge would be no different than maintenance activities that are undertaken for other bridges; therefore, these typical maintenance activities would not be expected to substantially increase or decrease the exposure of the public or the environment to hazardous materials. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings,

painting, erosion protection, and inspections. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Hazardous or toxic equipment fluids, such as fuels and oils, may be introduced into the area as a result of construction equipment being used during maintenance activities. Exposure to hazardous or toxic materials may result from spillage or leakage of containment units if they are inadvertently damaged during maintenance activities. Fuels, oils, and other hazardous materials used on site during maintenance activities would adhere to all Federal, State, and local hazardous materials use laws. Therefore, the impact due to long-term operation and maintenance activities would be less than significant.

C02/C04 Channels

Direct Impacts

Construction activities associated with the modification of the flood control channels within the C02/C04 system would involve the use of small quantities of hazardous or toxic equipment fluids such as fuels, greases, and cleaning materials for the equipment. Exposure to hazardous or toxic equipment fluids may result from spillage or leakage of containment units if they are inadvertently damaged during implementation of this measure. The use, storage, transport, and disposal of hazardous materials would adhere to existing regulations of several agencies, including the DTSC, the USEPA, the OSHA, OCFA, and the Orange County Environmental Health Division. Compliance with applicable laws and regulations governing the use, storage, and transportation of hazardous materials would ensure that potentially hazardous materials are used and handled in an appropriate manner and would minimize the potential for safety impacts to occur. In addition to the use of small quantities of hazardous or toxic equipment fluids which could result in the public being exposed to these hazards, the modification of the flood control channels would involve excavation in order to maintain the existing grade of the channels once they are lined with concrete. The soil material to be excavated could contain hazardous materials that could create a hazard to the public.

A limited HTRW Phase I ESA was completed to identify the risk of encountering HTRW and non-HTRW environmental issues and to determine if any RECs present have impacted the project site or will impact implementation of the proposed project. The information used to complete the limited HTRW Phase I ESA was obtained from a database research. Due to the scale of the proposed project, and the amount of information obtained from the database search, assessment of information collected is broad-scaled in nature. A focused assessment of the database report was conducted for sites that are on, or directly adjacent to the proposed project areas. A summary of potential HTRW and non-HTRW concerns are outlined below:

Review of EDR database returns on or adjacent to the project area suggests that there are LUSTs adjacent to the project area that have not been fully remediated. The status of ongoing LUST remedial actions should be confirmed prior to project implementation to confirm the risk of encountering contaminated soils or groundwater (HTRW) during construction.

There are several service stations with active USTs and a facility with a potential surface impoundment directly adjacent to the potential project work area. The status of the facilities and location of existing infrastructure, USTs, and impoundments should be reviewed during design to confirm that project implementation is not affected by the presence of USTs, impoundments, or changes in the status of the facilities.

Excess soils generated from the project site that cannot be reused onsite will be characterized prior to offsite disposal to a licensed and permitted disposal facility. Disposal of excess materials will be in

accordance with Federal, State, and local laws and regulations. In addition, the U.S. Department of Transportation regulates the safe handling and transportation of hazardous materials.

During the PED phase of the project, a comprehensive HTRW Phase I ESA, including a complete review of the EDR database search results will be conducted, when project footprints are defined, to determine the scope and scale of REC occurrences that may exist in the surrounding areas, and if RECs will have an impact on the implementation of this measure. Site reconnaissance, review of historical maps, review of previous HTRW site assessments and recommendations, and review of existing information will be conducted as part of this investigation. In addition, if during PED a contaminated site is identified, it would be either avoided or remediated by the NFS before project construction to minimize the potential exposure of the public. All response actions shall follow Federal, State and local laws.

Since transport, use and disposal of hazardous materials would adhere to existing regulations of several agencies, the implementation of this measure would have a less than significant direct impact to the public or the environment through the routine transport, use, or disposal of hazardous materials.

Indirect Impacts

There are no activities that would result in indirect impacts that would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels; therefore, the long-term operation and maintenance of the modified channels would not be expected to substantially increase or decrease the exposure of the public or the environment to hazardous materials. Therefore, the impact would be less than significant.

C05/C06 Channels

Direct Impacts

Construction activities associated with the modification of the flood control channels within the C05/C06 system would involve the use of small quantities of hazardous or toxic equipment fluids such as fuels, greases, and cleaning materials for the equipment. Exposure to hazardous or toxic equipment fluids may result from spillage or leakage of containment units if they are inadvertently damaged during implementation of this measure. The use, storage, transport, and disposal of hazardous materials would adhere to existing regulations of several agencies, including DTSC, USEPA, OSHA, OCFA, and the Orange County Environmental Health Division. Compliance with applicable laws and regulations governing the use, storage, and transportation of hazardous materials would ensure that potentially hazardous materials are used and handled in an appropriate manner and would minimize the potential for safety impacts to occur. In addition to the use of small quantities of hazardous or toxic equipment fluids which could result in the public being exposed to these hazards, the modification of the flood control channels would involve excavation in order to maintain the existing grade of the channels once they are lined with concrete. The soil material to be excavated could contain hazardous materials that could create a hazard to the public.

A limited HTRW Phase I ESA was completed to identify the risk of encountering HTRW and non-HTRW environmental issues and to determine if any RECs present have impacted the project site or will impact implementation of the proposed project. The information used to complete the limited HTRW Phase I ESA was obtained from a database research. Due to the scale of the proposed project, and the amount of information obtained from the database search, assessment of information collected is broad-scaled in nature. A focused assessment of the database report was conducted for sites that are on, or directly adjacent to the proposed project areas. A summary of potential HTRW and non-HTRW concerns are outlined below:

Review of EDR database returns on or adjacent to the project area suggests that there are LUSTs adjacent to the project area that have not been fully remediated. The status of ongoing LUST remedial actions should be confirmed prior to project implementation to confirm the risk of encountering contaminated soils or groundwater (HTRW) during construction.

There are several service stations with active USTs and a facility with a potential surface impoundment directly adjacent to the potential project work area. The status of the facilities and location of existing infrastructure, USTs, and impoundments should be reviewed during design to confirm that project implementation is not affected by the presence of USTs, impoundments, or changes in the status of the facilities.

The Bolsa Chica Lowland Restoration Project is adjacent to C05 Reach 1. The status of all remedial activities conducted at the Bolsa Chica Lowlands site should be reviewed during design phase to determine if there are any areas in the proposed project footprint that may affect any remaining contamination (metals, oil & grease, petroleum hydrocarbons, and PCBs) and/or contaminated fill left onsite as part of the remedial action plan.

Excess soils generated from the project site that cannot be reused onsite will be characterized prior to offsite disposal to a licensed and permitted disposal facility. Disposal of excess materials will be in accordance with Federal, State, and local laws and regulations. In addition, the U.S. Department of Transportation regulates the safe handling and transportation of hazardous materials.

During the PED phase of the project, a comprehensive HTRW Phase I ESA, including a complete review of the EDR database search results will be conducted, when project footprints are defined, to determine the scope and scale of REC occurrences that may exist in the surrounding areas, and if RECs will have an impact on the implementation of this measure. Site reconnaissance, review of historical maps, review of previous HTRW site assessments and recommendations, and review of existing information will be conducted as part of this investigation. In addition, if during PED a contaminated site is identified, it would be either avoided or remediated by the NFS before project construction to minimize the potential exposure of the public. All response actions shall follow Federal, State and local laws.

Since transport, use and disposal of hazardous materials would adhere to existing regulations of several agencies, the implementation of this measure would have a less than significant direct impact to the public or the environment through the routine transport, use, or disposal of hazardous materials.

Indirect Impacts

There are no activities that would result in indirect impacts that would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels; therefore, the long-term operation and maintenance of the modified channels would not be expected to substantially increase or decrease the exposure of the public or the environment to hazardous materials. Therefore, the impact would be less than significant.

Level of Impact for the NED Plan

Less than Significant. Since transport, use and disposal of hazardous materials would adhere to existing regulations of several agencies, the implementation of this measure would have a less than significant direct impact to the public or the environment through the routine transport, use, or disposal of hazardous materials. No indirect impacts are anticipated, and the long-term operation of the project would have a less than significant impact.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Channels C02/C04

Direct Impacts

Construction activities associated with the modification of the flood control channels within the C02/C04 system would involve the use of small quantities of hazardous or toxic equipment fluids such as fuels, greases, and cleaning materials for the equipment. Exposure to hazardous or toxic equipment fluids may result from spillage or leakage of containment units if they are inadvertently damaged during implementation of this measure. The use, storage, transport, and disposal of hazardous materials would adhere to existing regulations of several agencies, including DTSC, the USEPA, OSHA, OCFA, and the Orange County Environmental Health Division. Compliance with applicable laws and regulations governing the use, storage, and transportation of hazardous materials would ensure that potentially hazardous materials are used and handled in an appropriate manner and would minimize the potential for safety impacts to occur. In addition to the use of small quantities of hazardous or toxic equipment fluids which could result in the public being exposed to these hazards, the modification of the flood control channels would involve excavation in order to maintain the existing grade of the channels once they are lined with concrete. The soil material to be excavated could contain hazardous materials that could create a hazard to the public.

A limited HTRW Phase I ESA was completed to identify the risk of encountering HTRW and non-HTRW environmental issues and to determine if any RECs present have impacted the project site or will impact implementation of the proposed project. The information used to complete the limited HTRW Phase I ESA was obtained from a database research. Due to the scale of the proposed project, and the amount of information obtained from the database search, assessment of information collected is broad-scaled in nature. A focused assessment of the database report was conducted for sites that are on, or directly adjacent to the proposed project areas. A summary of potential HTRW and non-HTRW concerns are outlined below:

Review of EDR database returns on or adjacent to the project area suggests that there are LUSTs adjacent to the project area that have not been fully remediated. The status of ongoing LUST remedial actions should be confirmed prior to project implementation to confirm the risk of encountering contaminated soils or groundwater (HTRW) during construction.

There are several service stations with active USTs and a facility with a potential surface impoundment directly adjacent to the potential project work area. The status of the facilities and location of existing infrastructure, USTs, and impoundments should be reviewed during design to confirm that project implementation is not affected by the presence of USTs, impoundments, or changes in the status of the facilities.

Excess soils generated from the project site that cannot be reused onsite will be characterized prior to offsite disposal to a licensed and permitted disposal facility. Disposal of excess materials will be in accordance with Federal, State, and local laws and regulations. In addition, the U.S. Department of Transportation regulates the safe handling and transportation of hazardous materials.

During the PED phase of the project, a comprehensive HTRW Phase I ESA, including a complete review of the EDR database search results will be conducted, when project footprints are defined, to determine the scope and scale of REC occurrences that may exist in the surrounding areas, and if RECs will have an impact on the implementation of this measure. Site reconnaissance, review of historical maps, review of previous HTRW site assessments and recommendations, and review of existing information will be conducted as part of this investigation. In addition, if during PED a contaminated site is identified, it would be either avoided or remediated by the NFS before project construction to minimize the potential exposure of the public. All response actions shall follow Federal, State and local laws.

Since transport, use and disposal of hazardous materials would adhere to existing regulations of several agencies, the implementation of this measure would have a less than significant direct impact to the public or the environment through the routine transport, use, or disposal of hazardous materials.

Indirect Impacts

There are no activities that would result in indirect impacts that would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels; therefore, the long-term operation and maintenance of the modified channels would not be expected to substantially

increase or decrease the exposure of the public or the environment to hazardous materials. Therefore, the impact would be less than significant.

Channels C05/C06

Direct Impacts

Construction activities associated with the modification of the flood control channels within the C05/C06 system would involve the use of small quantities of hazardous or toxic equipment fluids such as fuels, greases, and cleaning materials for the equipment. Exposure to hazardous or toxic equipment fluids may result from spillage or leakage of containment units if they are inadvertently damaged during implementation of this measure. The use, storage, transport, and disposal of hazardous materials would adhere to existing regulations of several agencies, including DTSC, the USEPA, OSHA, OCFA, and the Orange County Environmental Health Division. Compliance with applicable laws and regulations governing the use, storage, and transportation of hazardous materials would ensure that potentially hazardous materials are used and handled in an appropriate manner and would minimize the potential for safety impacts to occur. In addition to the use of small quantities of hazardous or toxic equipment fluids which could result in the public being exposed to these hazards, the modification of the flood control channels would involve excavation in order to maintain the existing grade of the channels once they are lined with concrete. The soil material to be excavated could contain hazardous materials that could create a hazard to the public.

A limited HTRW Phase I ESA was completed to identify the risk of encountering HTRW and non-HTRW environmental issues and to determine if any RECs present have impacted the project site or will impact implementation of the proposed project. The information used to complete the limited HTRW Phase I ESA was obtained from a database research. Due to the scale of the proposed project, and the amount of information obtained from the database search, assessment of information collected is broad-scaled in nature. A focused assessment of the database report was conducted for sites that are on, or directly adjacent to the proposed project areas. A summary of potential HTRW and non-HTRW concerns are outlined below:

Review of EDR database returns on or adjacent to the project area suggests that there are LUSTs adjacent to the project area that have not been fully remediated. The status of ongoing LUST remedial actions should be confirmed prior to project implementation to confirm the risk of encountering contaminated soils or groundwater (HTRW) during construction.

There are several service stations with active USTs and a facility with a potential surface impoundment directly adjacent to the potential project work area. The status of the facilities and location of existing infrastructure, USTs, and impoundments should be reviewed during design to confirm that project implementation is not affected by the presence of USTs, impoundments, or changes in the status of the facilities.

The Bolsa Chica Lowland Restoration Project is adjacent to C05 Reach 1. The status of all remedial activities conducted at the Bolsa Chica Lowlands site should be reviewed during design phase to determine if there are any areas in the proposed project footprint that may affect any remaining contamination (metals, oil & grease, petroleum hydrocarbons, and PCBs) and/or contaminated fill left onsite as part of the remedial action plan.

Excess soils generated from the project site that cannot be reused onsite will be characterized prior to offsite disposal to a licensed and permitted disposal facility. Disposal of excess materials will be in

accordance with Federal, State, and local laws and regulations. In addition, the U.S. Department of Transportation regulates the safe handling and transportation of hazardous materials.

During the PED phase of the project, a comprehensive HTRW Phase I ESA, including a complete review of the EDR database search results will be conducted, when project footprints are defined, to determine the scope and scale of REC occurrences that may exist in the surrounding areas, and if RECs will have an impact on the implementation of this measure. Site reconnaissance, review of historical maps, review of previous HTRW site assessments and recommendations, and review of existing information will be conducted as part of this investigation. In addition, if during PED a contaminated site is identified, it would be either avoided or remediated by the NFS before project construction to minimize the potential exposure of the public. All response actions shall follow Federal, State and local laws.

Since transport, use and disposal of hazardous materials would adhere to existing regulations of several agencies, the implementation of this measure would have a less than significant direct impact to the public or the environment through the routine transport, use, or disposal of hazardous materials.

Indirect Impacts

There are no activities that would result in indirect impacts that would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels; therefore, the long-term operation and maintenance of the modified channels would not be expected to substantially increase or decrease the exposure of the public or the environment to hazardous materials. Therefore, the impact would be less than significant.

Diversion Channel

Direct Impacts

Construction activities associated with the construction of the diversion channel would involve the use of small quantities of hazardous or toxic equipment fluids such as fuels, greases, and cleaning materials for the equipment. Exposure to hazardous or toxic equipment fluids may result from spillage or leakage of containment units if they are inadvertently damaged during implementation of this measure. The use, storage, transport, and disposal of hazardous materials would adhere to existing regulations of several agencies, including DTSC, the USEPA, OSHA, OCFA, and the Orange County Environmental Health Division. Compliance with applicable laws and regulations governing the use, storage, and transportation of hazardous materials would ensure that potentially hazardous materials are used and handled in an appropriate manner and would minimize the potential for safety impacts to occur. In addition to the use of small quantities of hazardous or toxic equipment fluids which could result in the public being exposed to these hazards, the construction of the diversion channel would involve excavation in order to create the new flood control channel reach. The soil material to be excavated could contain hazardous materials that could create a hazard to the public.

A limited HTRW Phase I ESA was completed to identify the risk of encountering HTRW and non-HTRW environmental issues and to determine if any RECs present have impacted the project site or will

impact implementation of the proposed project. The information used to complete the limited HTRW Phase I ESA for the Diversion Channel was obtained from online research. Results of the investigation suggest that there is limited potential to encounter CERCLA or RCRA regulated sites in the project area. Additional Phase I ESA investigation is recommended.

Excess soils generated from the project site that cannot be reused onsite will be characterized prior to offsite disposal to a licensed and permitted disposal facility. Disposal of excess materials will be in accordance with Federal, State, and local laws and regulations. In addition, the U.S. Department of Transportation regulates the safe handling and transportation of hazardous materials.

During the PED phase of the project, a comprehensive HTRW Phase I ESA, including a complete review of the EDR database search results will be conducted, when project footprints are defined, to determine the scope and scale of REC occurrences that may exist in the surrounding areas, and if RECs will have an impact on the implementation of this measure. Site reconnaissance, review of historical maps, review of previous HTRW site assessments and recommendations, and review of existing information will be conducted as part of this investigation. In addition, if during PED a contaminated site is identified, it would be either avoided or remediated by the NFS before project construction to minimize the potential exposure of the public. All response actions shall follow Federal, State and local laws.

Since transport, use and disposal of hazardous materials would adhere to existing regulations of several agencies, the implementation of this measure would have a less than significant direct impact to the public or the environment through the routine transport, use, or disposal of hazardous materials.

Indirect Impacts

There are no activities that would result in indirect impacts that would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels; therefore, the long-term operation and maintenance of the diversion channel would not be expected to substantially increase or decrease the exposure of the public or the environment to hazardous materials. Therefore, the impact would be less than significant.

Level of Impact for LPP

Less than Significant. Since transport, use and disposal of hazardous materials would adhere to existing regulations of several agencies, the implementation of this measure would have a less than significant direct impact to the public or the environment through the routine transport, use, or disposal of hazardous materials. No indirect impacts are anticipated, and the long-term operation of the project would have a less than significant impact.

5.12.4.2 IMPACT HAZ-2: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no project would be implemented. Therefore, there would be no adverse impacts in creating a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment due to the implementation of a project. Reasonably foreseeable conditions under the No Action Plan could involve the use of small quantities of hazardous or toxic equipment fluids required for equipment used for future repair work of the existing drainage channels. The accidental leak or spill of these fluids depending on the quantity could result in a significant adverse impact to the public or environment under the No Action Plan. In addition, continued flooding within the area could create a significant hazard to the public or the environment through the inundation of nearby oil fields. Oil production operated by CalResources LLP currently occurs at the west end of C05, within the vicinity of the BCER. When overtopping of the C05 drainage channel occurs due to flooding, flood waters can inundate the adjacent active oil fields, which could subsequently cause widespread distribution of oil-laden runoff into sensitive areas of the BCER. This is a potential significant adverse impact to the environment under the No Action Plan.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

Construction activities associated with the modification of the Warner Avenue Bridge would involve the use of small quantities of hazardous or toxic equipment fluids such as fuels, greases, and cleaning materials for the equipment. Exposure to hazardous or toxic equipment fluids may result from spillage or leakage of containment units if they are inadvertently damaged during implementation of this measure. The use, storage, transport, and disposal of hazardous materials would adhere to existing regulations of several agencies, including DTSC, USEPA, OSHA, OCFA, and the Orange County Environmental Health Division. Compliance with applicable laws and regulations governing the use, storage, and transportation of hazardous materials would ensure that potentially hazardous materials are used and handled in an appropriate manner and would minimize the potential for safety impacts to occur. In addition, standard construction practices would be observed such that any materials that are released would be appropriately contained and remediated as required by local, state, and federal law.

Since construction of this measure would involve the use of small quantities of hazardous or toxic equipment that could be inadvertently leaked or spilled, a significant adverse impact to the public or environment could occur. Mitigation measures MM-HAZ-1 through MM-HAZ-3 would be implemented. Mitigation measure MM-HAZ-1 ensures that the during implementation of the project the contractor would comply with all applicable laws, policies and regulations regarding transportation and handling of hazardous materials and wastes in order to minimize the possibility of an inadvertent leak or spill that could have an adverse impact on the public or environment. Mitigation measures MM-HAZ-2 and MM-HAZ-3 include requirements of the contractor to prepare an Environmental Protection Plan as well as an Accidental Spill Prevention Plan in order to ensure that if an accidental leak or spill does occur during project construction, personnel know how to address the leak or spill in an appropriate manner to minimize impacts potential adverse impacts to the public as well as the environment. With the

implementation of mitigation measures MM-HAZ-1 through MM-HAZ-3, the proposed project would not create a significant hazard for the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Therefore, this impact would be reduced to less than significant.

Indirect Impacts

There are no activities that would result in indirect impacts that would create a significant hazard for the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Hazardous or toxic equipment fluids, such as fuels and oils, may be introduced into the area as a result of construction equipment being used during maintenance activities. Exposure to hazardous or toxic materials may result from spillage or leakage of containment units if they are inadvertently damaged during maintenance activities. Fuels, oils, and other hazardous materials used on site during maintenance activities would adhere to all Federal, State, and local hazardous materials use laws. In addition, standard construction practices would be observed during maintenance activities such that any materials that are released would be appropriately contained and remediated as required by local, state, and federal law. Therefore, the impact due to long-term operation and maintenance activities would be less than significant.

Tide Gates

Direct Impacts

Construction activities associated with the removal of the tide gates and replacement with a small span bridge would involve the use of small quantities of hazardous or toxic equipment fluids such as fuels, greases, and cleaning materials for the equipment. Exposure to hazardous or toxic equipment fluids may result from spillage or leakage of containment units if they are inadvertently damaged during implementation of this measure. The use, storage, transport, and disposal of hazardous materials would adhere to existing regulations of several agencies, including DTSC, USEPA, OSHA, OCFA, and the Orange County Environmental Health Division. Compliance with applicable laws and regulations governing the use, storage, and transportation of hazardous materials would ensure that potentially hazardous materials are used and handled in an appropriate manner and would minimize the potential for safety impacts to occur. In addition, standard construction practices would be observed such that any materials that are released would be appropriately contained and remediated as required by local, state, and federal law.

During the PED phase of the project, a comprehensive HTRW Phase I ESA, including a complete review of the EDR database search results will be conducted, when project footprints are defined, to determine the scope and scale of REC occurrences that may exist in the surrounding areas, and if RECs will have an impact on the implementation of this measure. Site reconnaissance, review of historical maps, review of previous HTRW site assessments and recommendations, and review of existing information will be conducted as part of this investigation. In addition, if during PED a contaminated site is identified, it

would be either avoided or remediated by the NFS before project construction to minimize the potential exposure of the public. All response actions shall follow Federal, State and local laws.

Since construction of this measure would involve the use of small quantities of hazardous or toxic equipment that could be inadvertently leaked or spilled, a significant adverse impact to the public or environment could occur. Mitigation measures MM-HAZ-1 through MM-HAZ-3 would be implemented. Mitigation measure MM-HAZ-1 ensures that the during implementation of the project the contractor would comply with all applicable laws, policies and regulations regarding transportation and handling of hazardous materials and wastes in order to minimize the possibility of an inadvertent leak or spill that could have an adverse impact on the public or environment. Mitigation measures MM-HAZ-2 and MM-HAZ-3 include requirements of the contractor to prepare an Environmental Protection Plan as well as an Accidental Spill Prevention Plan in order to ensure that if an accidental leak or spill does occur during project construction, personnel know how to address the leak or spill in an appropriate manner to minimize impacts potential adverse impacts to the public as well as the environment. With the implementation of mitigation measures MM-HAZ-1 through MM-HAZ-3, the proposed project would not create a significant hazard for the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Therefore, this impact would be reduced to less than significant.

Indirect Impacts

There are no activities that would result in indirect impacts that would create a significant hazard for the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with new span bridge would be no different than maintenance activities that are undertaken for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Hazardous or toxic equipment fluids, such as fuels and oils, may be introduced into the area as a result of construction equipment being used during maintenance activities. Exposure to hazardous or toxic materials may result from spillage or leakage of containment units if they are inadvertently damaged during maintenance activities. Fuels, oils, and other hazardous materials used on site during maintenance activities would adhere to all Federal, State, and local hazardous materials use laws. In addition, standard construction practices would be observed during maintenance activities such that any materials that are released would be appropriately contained and remediated as required by local, state, and federal law. Therefore, the impact due to long-term operation and maintenance activities would be less than significant.

C02/C04 Channels

Direct Impacts

Construction activities associated with the modification of the flood control channels within the C02/C04 system would involve the use of small quantities of hazardous or toxic equipment fluids such as fuels, greases, and cleaning materials for the equipment. Exposure to hazardous or toxic equipment fluids may result from spillage or leakage of containment units if they are inadvertently damaged during implementation of this measure. The use, storage, transport, and disposal of hazardous materials would

adhere to existing regulations of several agencies, including DTSC, USEPA, OSHA, OCFA, and the Orange County Environmental Health Division. Compliance with applicable laws and regulations governing the use, storage, and transportation of hazardous materials would ensure that potentially hazardous materials are used and handled in an appropriate manner and would minimize the potential for safety impacts to occur. In addition, standard construction practices would be observed such that any materials that are released would be appropriately contained and remediated as required by local, state, and federal law.

During the PED phase of the project, a comprehensive HTRW Phase I ESA, including a complete review of the EDR database search results will be conducted, when project footprints are defined, to determine the scope and scale of REC occurrences that may exist in the surrounding areas, and if RECs will have an impact on the implementation of this measure. Site reconnaissance, review of historical maps, review of previous HTRW site assessments and recommendations, and review of existing information will be conducted as part of this investigation. In addition, if during PED a contaminated site is identified, it would be either avoided or remediated by the NFS before project construction to minimize the potential exposure of the public. All response actions shall follow Federal, State and local laws.

Since construction of this measure would involve the use of small quantities of hazardous or toxic equipment that could be inadvertently leaked or spilled, a significant adverse impact to the public or environment could occur. Mitigation measures MM-HAZ-1 through MM-HAZ-3 would be implemented. Mitigation measure MM-HAZ-1 ensures that the during implementation of the project the contractor would comply with all applicable laws, policies and regulations regarding transportation and handling of hazardous materials and wastes in order to minimize the possibility of an inadvertent leak or spill that could have an adverse impact on the public or environment. Mitigation measures MM-HAZ-2 and MM-HAZ-3 include requirements of the contractor to prepare an Environmental Protection Plan as well as an Accidental Spill Prevention Plan in order to ensure that if an accidental leak or spill does occur during project construction, personnel know how to address the leak or spill in an appropriate manner to minimize impacts potential adverse impacts to the public as well as the environment. With the implementation of mitigation measures MM-HAZ-1 through MM-HAZ-3, the proposed project would not create a significant hazard for the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Therefore, this impact would be reduced to less than significant.

Indirect Impacts

There are no activities that would result in indirect impacts that would create a significant hazard for the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels; therefore, the long-term operation and maintenance of the modified channels would not be expected to substantially increase or decrease the probability of creating a significant hazard for the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. In addition, standard construction practices would be observed during maintenance activities such that any materials that are release would be appropriately contained and

remediated as required by local, state, and federal law. Therefore, the impact due to long-term operation and maintenance activities would be less than significant.

C05/C06 Channels

Direct Impacts

Construction activities associated with the modification of the flood control channels within the C05/C06 system would involve the use of small quantities of hazardous or toxic equipment fluids such as fuels, greases, and cleaning materials for the equipment. Exposure to hazardous or toxic equipment fluids may result from spillage or leakage of containment units if they are inadvertently damaged during implementation of this measure. The use, storage, transport, and disposal of hazardous materials would adhere to existing regulations of several agencies, including DTSC, USEPA, OSHA, OCFA, and the Orange County Environmental Health Division. Compliance with applicable laws and regulations governing the use, storage, and transportation of hazardous materials would ensure that potentially hazardous materials are used and handled in an appropriate manner and would minimize the potential for safety impacts to occur. In addition, standard construction practices would be observed such that any materials that are released would be appropriately contained and remediated as required by local, state, and federal law.

During the PED phase of the project, a comprehensive HTRW Phase I ESA, including a complete review of the EDR database search results will be conducted, when project footprints are defined, to determine the scope and scale of REC occurrences that may exist in the surrounding areas, and if RECs will have an impact on the implementation of this measure. Site reconnaissance, review of historical maps, review of previous HTRW site assessments and recommendations, and review of existing information will be conducted as part of this investigation. In addition, if during PED a contaminated site is identified, it would be either avoided or remediated by the NFS before project construction to minimize the potential exposure of the public. All response actions shall follow Federal, State and local laws.

Since construction of this measure would involve the use of small quantities of hazardous or toxic equipment that could be inadvertently leaked or spilled, a significant adverse impact to the public or environment could occur. Mitigation measures MM-HAZ-1 through MM-HAZ-3 would be implemented. Mitigation measure MM-HAZ-1 ensures that the during implementation of the project the contractor would comply with all applicable laws, policies and regulations regarding transportation and handling of hazardous materials and wastes in order to minimize the possibility of an inadvertent leak or spill that could have an adverse impact on the public or environment. Mitigation measures MM-HAZ-2 and MM-HAZ-3 include requirements of the contractor to prepare an Environmental Protection Plan as well as an Accidental Spill Prevention Plan in order to ensure that if an accidental leak or spill does occur during project construction, personnel know how to address the leak or spill in an appropriate manner to minimize impacts potential adverse impacts to the public as well as the environment. With the implementation of mitigation measures MM-HAZ-1 through MM-HAZ-3, the proposed project would not create a significant hazard for the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Therefore, this impact would be reduced to less than significant.

Indirect Impacts

There are no activities that would result in indirect impacts that would create a significant hazard for the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels; therefore, the long-term operation and maintenance of the modified channels would not be expected to substantially increase or decrease the probability of creating a significant hazard for the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. In addition, standard construction practices would be observed during maintenance activities such that any materials that are release would be appropriately contained and remediated as required by local, state, and federal law. Therefore, the impact due to long-term operation and maintenance activities would be less than significant.

Level of Impact for the NED Plan

Less than Significant with Mitigation Incorporated. Construction of the proposed project would involve the use of small quantities of hazardous or toxic equipment that could be inadvertently leaked or spilled which could result in an adverse significant impact to the public or environment. Mitigation measures MM-HAZ-1 through MM-HAZ-3 would be implemented. Mitigation measures MM-HAZ-1 ensures that during implementation of the project the contractor would comply with all applicable laws, policies and regulations regarding transportation and handling of hazardous materials and wastes in order to minimize the possibility of an inadvertent leak or spill that could have an adverse impact on the public or environment. Mitigation measures MM-HAZ-2 and MM-HAZ-3 include requirements of the contractor to prepare an Environmental Protection Plan as well as an Accidental Spill Prevention Plan in order to ensure that if an accidental leak or spill does occur during project construction, personnel know how to address the leak or spill in an appropriate manner to minimize potential adverse impacts to the public as well as the environment. With these mitigation measures incorporated, the potential significant adverse impact would be reduce to less than significant. No indirect impacts are anticipated with project implementation and less than significant long-term impacts are anticipated.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

Construction activities associated with the modification of the flood control channels within the C02/C04 system would involve the use of small quantities of hazardous or toxic equipment fluids such as fuels, greases, and cleaning materials for the equipment. Exposure to hazardous or toxic equipment fluids may

result from spillage or leakage of containment units if they are inadvertently damaged during implementation of this measure. The use, storage, transport, and disposal of hazardous materials would adhere to existing regulations of several agencies, including DTSC, USEPA, OSHA, OCFA, and the Orange County Environmental Health Division. Compliance with applicable laws and regulations governing the use, storage, and transportation of hazardous materials would ensure that potentially hazardous materials are used and handled in an appropriate manner and would minimize the potential for safety impacts to occur. In addition, standard construction practices would be observed such that any materials that are released would be appropriately contained and remediated as required by local, state, and federal law.

During the PED phase of the project, a comprehensive HTRW Phase I ESA, including a complete review of the EDR database search results will be conducted, when project footprints are defined, to determine the scope and scale of REC occurrences that may exist in the surrounding areas, and if RECs will have an impact on the implementation of this measure. Site reconnaissance, review of historical maps, review of previous HTRW site assessments and recommendations, and review of existing information will be conducted as part of this investigation. In addition, if during PED a contaminated site is identified, it would be either avoided or remediated by the NFS before project construction to minimize the potential exposure of the public. All response actions shall follow Federal, State and local laws.

Since construction of this measure would involve the use of small quantities of hazardous or toxic equipment that could be inadvertently leaked or spilled, a significant adverse impact to the public or environment could occur. Mitigation measures MM-HAZ-1 through MM-HAZ-3 would be implemented. Mitigation measure MM-HAZ-1 ensures that the during implementation of the project the contractor would comply with all applicable laws, policies and regulations regarding transportation and handling of hazardous materials and wastes in order to minimize the possibility of an inadvertent leak or spill that could have an adverse impact on the public or environment. Mitigation measures MM-HAZ-2 and MM-HAZ-3 include requirements of the contractor to prepare an Environmental Protection Plan as well as an Accidental Spill Prevention Plan in order to ensure that if an accidental leak or spill does occur during project construction, personnel know how to address the leak or spill in an appropriate manner to minimize impacts potential adverse impacts to the public as well as the environment. With the implementation of mitigation measures MM-HAZ-1 through MM-HAZ-3, the proposed project would not create a significant hazard for the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Therefore, this impact would be reduced to less than significant.

Indirect Impacts

There are no activities that would result in indirect impacts that would create a significant hazard for the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels; therefore, the long-term operation and maintenance of the modified channels would not be expected to substantially increase or decrease the probability of creating a significant hazard for the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. In addition, standard construction practices would be observed during

maintenance activities such that any materials that are release would be appropriately contained and remediated as required by local, state, and federal law. Therefore, the impact due to long-term operation and maintenance activities would be less than significant.

C05/C06 Channels

Direct Impacts

Construction activities associated with the modification of the flood control channels within the C05/C06 system would involve the use of small quantities of hazardous or toxic equipment fluids such as fuels, greases, and cleaning materials for the equipment. Exposure to hazardous or toxic equipment fluids may result from spillage or leakage of containment units if they are inadvertently damaged during implementation of this measure. The use, storage, transport, and disposal of hazardous materials would adhere to existing regulations of several agencies, including DTSC, USEPA, OSHA, OCFA, and the Orange County Environmental Health Division. Compliance with applicable laws and regulations governing the use, storage, and transportation of hazardous materials would ensure that potentially hazardous materials are used and handled in an appropriate manner and would minimize the potential for safety impacts to occur. In addition, standard construction practices would be observed such that any materials that are released would be appropriately contained and remediated as required by local, state, and federal law.

During the PED phase of the project, a comprehensive HTRW Phase I ESA, including a complete review of the EDR database search results will be conducted, when project footprints are defined, to determine the scope and scale of REC occurrences that may exist in the surrounding areas, and if RECs will have an impact on the implementation of this measure. Site reconnaissance, review of historical maps, review of previous HTRW site assessments and recommendations, and review of existing information will be conducted as part of this investigation. In addition, if during PED a contaminated site is identified, it would be either avoided or remediated by the NFS before project construction to minimize the potential exposure of the public. All response actions shall follow Federal, State and local laws.

Since construction of this measure would involve the use of small quantities of hazardous or toxic equipment that could be inadvertently leaked or spilled, a significant adverse impact to the public or environment could occur. Mitigation measures MM-HAZ-1 through MM-HAZ-3 would be implemented. Mitigation measure MM-HAZ-1 ensures that the during implementation of the project the contractor would comply with all applicable laws, policies and regulations regarding transportation and handling of hazardous materials and wastes in order to minimize the possibility of an inadvertent leak or spill that could have an adverse impact on the public or environment. Mitigation measures MM-HAZ-2 and MM-HAZ-3 include requirements of the contractor to prepare an Environmental Protection Plan as well as an Accidental Spill Prevention Plan in order to ensure that if an accidental leak or spill does occur during project construction, personnel know how to address the leak or spill in an appropriate manner to minimize impacts potential adverse impacts to the public as well as the environment. With the implementation of mitigation measures MM-HAZ-1 through MM-HAZ-3, the proposed project would not create a significant hazard for the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Therefore, this impact would be reduced to less than significant.

Indirect Impacts

There are no activities that would result in indirect impacts that would create a significant hazard for the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels; therefore, the long-term operation and maintenance of the modified channels would not be expected to substantially increase or decrease the probability of creating a significant hazard for the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. In addition, standard construction practices would be observed during maintenance activities such that any materials that are release would be appropriately contained and remediated as required by local, state, and federal law. Therefore, the impact due to long-term operation and maintenance activities would be less than significant.

Diversion Channel

Direct Impacts

Construction activities associated with the construction of the diversion channel would involve the use of small quantities of hazardous or toxic equipment fluids such as fuels, greases, and cleaning materials for the equipment. Exposure to hazardous or toxic equipment fluids may result from spillage or leakage of containment units if they are inadvertently damaged during implementation of this measure. The use, storage, transport, and disposal of hazardous materials would adhere to existing regulations of several agencies, including DTSC, USEPA, OSHA, OCFA, and the Orange County Environmental Health Division. Compliance with applicable laws and regulations governing the use, storage, and transportation of hazardous materials would ensure that potentially hazardous materials are used and handled in an appropriate manner and would minimize the potential for safety impacts to occur. In addition, standard construction practices would be observed such that any materials that are released would be appropriately contained and remediated as required by local, state, and federal law.

During the PED phase of the project, a comprehensive HTRW Phase I ESA, including a complete review of the EDR database search results will be conducted, when project footprints are defined, to determine the scope and scale of REC occurrences that may exist in the surrounding areas, and if RECs will have an impact on the implementation of this measure. Site reconnaissance, review of historical maps, review of previous HTRW site assessments and recommendations, and review of existing information will be conducted as part of this investigation. In addition, if during PED a contaminated site is identified, it would be either avoided or remediated by the NFS before project construction to minimize the potential exposure of the public. All response actions shall follow Federal, State and local laws.

Since construction of this measure would involve the use of small quantities of hazardous or toxic equipment that could be inadvertently leaked or spilled, a significant adverse impact to the public or environment could occur. Mitigation measures MM-HAZ-1 through MM-HAZ-3 would be implemented. Mitigation measure MM-HAZ-1 ensures that the during implementation of the project the contractor would comply with all applicable laws, policies and regulations regarding transportation and handling of hazardous materials and wastes in order to minimize the possibility of an inadvertent leak or spill that could have an adverse impact on the public or environment. Mitigation measures MM-HAZ-2 and MM-HAZ-3 include requirements of the contractor to prepare an Environmental Protection Plan as well as an Accidental Spill Prevention Plan in order to ensure that if an accidental leak or spill does occur during project construction, personnel know how to address the leak or spill in an appropriate manner to minimize impacts potential adverse impacts to the public as well as the environment. With the implementation of mitigation measures MM-HAZ-1 through MM-HAZ-3, the proposed project would not

create a significant hazard for the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Therefore, this impact would be reduced to less than significant.

Indirect Impacts

There are no activities that would result in indirect impacts that would create a significant hazard for the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels; therefore, the long-term operation and maintenance of the diversion channel would not be expected to substantially increase or decrease the probability of creating a significant hazard for the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. In addition, standard construction practices would be observed during maintenance activities such that any materials that are release would be appropriately contained and remediated as required by local, state, and federal law. Therefore, the impact due to long-term operation and maintenance activities would be less than significant.

Level of Impact for the LPP

Less than Significant with Mitigation Incorporated. Construction of the proposed project would involve the use of small quantities of hazardous or toxic equipment that could be inadvertently leaked or spilled which could result in an adverse significant impact to the public or environment. Mitigation measures MM-HAZ-1 through MM-HAZ-3 would be implemented. Mitigation measures MM-HAZ-1 ensures that during implementation of the project the contractor would comply with all applicable laws, policies and regulations regarding transportation and handling of hazardous materials and wastes in order to minimize the possibility of an inadvertent leak or spill that could have an adverse impact on the public or environment. Mitigation measures MM-HAZ-2 and MM-HAZ-3 include requirements of the contractor to prepare an Environmental Protection Plan as well as an Accidental Spill Prevention Plan in order to ensure that if an accidental leak or spill does occur during project construction, personnel know how to address the leak or spill in an appropriate manner to minimize potential adverse impacts to the public as well as the environment. With these mitigation measures incorporated, the potential significant adverse impact would be reduce to less than significant. No indirect impacts are anticipated with project implementation and less than significant long-term impacts are anticipated.

5.12.4.3 IMPACT HAZ-3: Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no project would be implemented. Therefore, there would be no adverse impacts in creating a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment due to the implementation of a project. Reasonably foreseeable conditions under the No Action Plan could involve

the use of small quantities of hazardous or toxic equipment fluids required for equipment used for future repair work of the existing drainage channels. The accidental leak or spill of these fluids depending on the quantity and location to an existing or proposed school could result in a significant adverse impact under the No Action Plan.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

The Warner Avenue Bridge is not located within 0.25 mile of a school. The nearest schools are Harbour View Elementary School and Marine View Middle School, both in Huntington Beach, which are located approximately 0.8 mile northeast and 1.8 miles southeast, respectively, of the project site. In addition, the proposed staging area for the modification of the Warner Avenue Bridge (Figure 45), is not located within 0.25 mile of a school. The nearest schools are Harbour View Elementary School and Marine View Middle School which are located approximately 0.75 mile northeast and 1.77 miles southeast, respectively, of the proposed staging area. Since no schools are located within 0.25 mile of the project site or proposed staging area there would be no direct impact.

Indirect Impacts

The proposed project site and staging area are not located within 0.25 mile of an existing or proposed school, therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Although hazardous materials such as fuels, greases, and cleaning substances may be used during project maintenance activities, no significant risk to the public or the environment is anticipated if an onsite accident were to occur. In addition, the project site is not located within 0.25 mile of a school. Therefore, there would be no long-term impacts or impacts associated with maintenance activities.

Tide Gates

Direct Impacts

The tide gates and the location for the proposed new small span bridge to replace the tide gates are not located within 0.25 mile of a school. The nearest schools are Harbour View Elementary School and Marine View Middle School, both in Huntington Beach, which are located approximately 1.24 miles north and 1.42 miles east, respectively, of the proposed project site. In addition, the proposed staging area for the proposed project (Figure 46), is not located within 0.25 mile of a school. The nearest schools are Marine View Middle School and Hope View Elementary School, both in Huntington Beach, which are located approximately 0.53 mile east and 1.14 miles east, respectively, of the proposed staging area. Since no schools are located within 0.25 mile of the project site or proposed staging area there would be no direct impact.

Indirect Impacts

The proposed project site and staging area are not located within 0.25 mile of an existing or proposed school, therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new span bridge would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Although hazardous materials such as fuels, greases, and cleaning substances may be used during project maintenance activities, no significant risk to the public or the environment is anticipated if an onsite accident were to occur. In addition, the project site is not located within 0.25 mile of a school. Therefore, there would be no long-term impacts or impacts associated with maintenance activities.

C02/C04 Channels

Direct Impacts

Channel reaches to be modified as part of the proposed project are located within 0.25 mile of a school. The schools and the reach they are within the vicinity of are as follows:

- LePort Montessori Huntington Harbour, Huntington Beach, is located approximately 0.16 mile south of C02 Reach 23.
- Village View Elementary School, Huntington Beach, is located approximately 0.19 mile south of C04 Reach 20.
- Monarch Preschool, Huntington Beach, is located approximately 0.25 mile south of C04 Reach 20.
- Marina High School, Huntington Beach, is located approximately 0.09 mile north and west of C04 Reach 20.
- Schroeder Elementary School, Huntington Beach, is located approximately 0.16 mile south of C04 Reach 20.
- Helen Stacey Middle School, Huntington Beach, is located approximately 0.25 mile north of C04 Reach 20.
- Ada Clegg Elementary School, Huntington Beach, is located approximately 0.22 mile north of C04 Reach 20.
- Warner Middle School, Westminster, is located approximately 0.11 mile north of C04 Reach 22.
- Merton E. Hill Elementary School, Garden Grove, is located approximately 0.09 mile south of C04 Reach 22.
- Morningside Elementary School, Garden Grove, is located approximately 0.06 mile north of C04 Reach 22.
- Mitchell Elementary School, Garden Grove, is located approximately 0.16 mile northwest of C04 Reach 22.

In addition, proposed staging areas for the project would be located primarily within the channel right-of-way; however, where the channel right-of-way is limited and/or does not provide sufficient space, alternative staging areas have been proposed, some of which include using a small portion of yard from an adjacent school. Schools that have been identified as potentially providing a staging area for the proposed project include Marina High School and Hill Elementary School.

Hazardous materials such as fuels, greases, and cleaning substances may be used during project demolition and construction activities. Because of the small amount that may be used during the channel modifications, no significant risk to the public or the environment is anticipated if an onsite accident were to occur. The construction crew would be required to comply with existing local, state, and federal regulations for handling of hazardous materials. In addition, to ensure that any potential impacts are minimized, mitigation measures MM-HAZ-1 through MM-HAZ-3 would be implemented during project construction. Mitigation measure MM-HAZ-1 ensures that the during implementation of the project the contractor would comply with all applicable laws, policies and regulations regarding transportation and handling of hazardous materials and wastes in order to minimize the possibility of an inadvertent leak or spill that could have an adverse impact on the public or environment. Mitigation measures MM-HAZ-2 and MM-HAZ-3 include requirements of the contractor to prepare an Environmental Protection Plan as well as an Accidental Spill Prevention Plan in order to ensure that if an accidental leak or spill does occur during project construction, personnel know how to address the leak or spill in an appropriate manner to minimize impacts potential adverse impacts to the public as well as the environment. Overall, since the quantity of hazardous materials being used is small and mitigation measures MM-HAZ-1 through MM-HAZ-3 would be implemented during construction, direct hazardous material accident impacts to the aforementioned schools would be less than significant.

Indirect Impacts

There are no activities that would result in indirect impacts that would create a significant hazard to the above listed schools due to the handling of hazardous materials or substances.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels; therefore, the long-term operation and maintenance of the modified channels would not be expected to substantially increase or decrease the probability of hazardous material accident impacts to the aforementioned schools. In addition, standard construction practices would be observed during maintenance activities such that any materials that are release would be appropriately contained and remediated as required by local, state, and federal law. Therefore, the impact due to long-term operation and maintenance activities would be less than significant.

C05/C06 Channels

Direct Impacts

Channel reaches to be modified as part of the proposed project are located within 0.25 mile of a school. The schools and the reach they are within the vicinity of are as follows:

- Marine View Middle School, Huntington Beach, is located approximately 0.17 mile south of C05 Reach 1.

- Spring View Middle School, Huntington Beach, is located approximately 0.20 mile north of C05 Reach 1.
- Ocean View High School, Huntington Beach, is located approximately 0.20 mile south of C05 Reach 2.
- John Marshall Elementary School, Westminster, is located approximately 0.10 mile south of C05 Reach 4.
- Susan B. Anthony Elementary School, Westminster, is located approximately 0.11 mile north of C05 Reach 5.
- La Quinta High School, Westminster, is located approximately 0.16 mile south of C05 Reach 5.
- St. Barbara School, Santa Ana, is located approximately 0.10 mile south of C05 Reach 5.
- Heritage Elementary School, Santa Ana, is located approximately 0.14 mile east of C05 Reach 5.
- Urbain H. Plavan Elementary School, Fountain Valley, is located approximately 0.07 mile south of C06 Reach 17.
- Mamie L. Northcutt Elementary School, Fountain Valley, is located approximately 0.09 mile south of C06 Reach 19.
- Los Amigos High School, Fountain Valley, is located approximately 0.22 mile northeast of C06 Reach 19.

In addition, proposed staging areas for the project would be located primarily within the channel right-of-way; however, where the channel right-of-way is limited and/or does not provide sufficient space, alternative staging areas have been proposed, some of which include using a small portion of yard from an adjacent school. Schools that have been identified as potentially providing a staging area for the proposed project include John Marshall Elementary School, Heritage Elementary School, Urbain H. Plavan Elementary School, and Mamie L. Northcutt Elementary School.

Hazardous materials such as fuels, greases, and cleaning substances may be used during project demolition and construction activities. Because of the small amount that may be used during the channel modifications, no significant risk to the public or the environment is anticipated if an onsite accident were to occur. The construction crew would be required to comply with existing local, state, and federal regulations for handling of hazardous materials. In addition, to ensure that any potential impacts are minimized, mitigation measures MM-HAZ-1 through MM-HAZ-3 would be implemented during project construction. Mitigation measure MM-HAZ-1 ensures that the during implementation of the project the contractor would comply with all applicable laws, policies and regulations regarding transportation and handling of hazardous materials and wastes in order to minimize the possibility of an inadvertent leak or spill that could have an adverse impact on the public or environment. Mitigation measures MM-HAZ-2 and MM-HAZ-3 include requirements of the contractor to prepare an Environmental Protection Plan as well as an Accidental Spill Prevention Plan in order to ensure that if an accidental leak or spill does occur during project construction, personnel know how to address the leak or spill in an appropriate manner to minimize impacts potential adverse impacts to the public as well as the environment. Overall, since the quantity of hazardous materials being used is small and mitigation measures MM-HAZ-1 through MM-HAZ-3 would be implemented during construction, direct hazardous material accident impacts to the aforementioned schools would be less than significant.

Indirect Impacts

There are no activities that would result in indirect impacts that would create a significant hazard to the above listed schools due to the handling of hazardous materials or substances.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels; therefore, the long-term operation and maintenance of the modified channels would not be expected to substantially increase or decrease the probability of hazardous material accident impacts to the aforementioned schools. In addition, standard construction practices would be observed during maintenance activities such that any materials that are release would be appropriately contained and remediated as required by local, state, and federal law. Therefore, the impact due to long-term operation and maintenance activities would be less than significant.

Level of Impact for the NED Plan

Less than Significant. Hazardous materials such as fuels, greases, and cleaning substances may be used during project demolition and construction activities. Because of the small amount that may be used during the channel modifications, no significant risk to the public or the environment is anticipated if an onsite accident were to occur. The construction crew would be required to comply with existing local, state, and federal regulations for handling of hazardous materials. Overall, construction activities and long-term operation of the project would not create significant hazardous material accident impacts to schools located within 0.25 mile of the proposed project.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

Channel reaches to be modified as part of the proposed project are located within 0.25 mile of a school. The schools and the reach they are within the vicinity of are as follows:

- LePort Montessori Huntington Harbour, Huntington Beach, is located approximately 0.16 mile south of C02 Reach 23.

- Village View Elementary School, Huntington Beach, is located approximately 0.19 mile south of C04 Reach 20.
- Monarch Preschool, Huntington Beach, is located approximately 0.25 mile south of C04 Reach 20.
- Marina High School, Huntington Beach, is located approximately 0.09 mile north and west of C04 Reach 20.
- Schroeder Elementary School, Huntington Beach, is located approximately 0.16 mile south of C04 Reach 20.
- Helen Stacey Middle School, Huntington Beach, is located approximately 0.25 mile north of C04 Reach 20.
- Ada Clegg Elementary School, Huntington Beach, is located approximately 0.22 mile north of C04 Reach 20.
- Warner Middle School, Westminster, is located approximately 0.11 mile north of C04 Reach 22.
- Merton E. Hill Elementary School, Garden Grove, is located approximately 0.09 mile south of C04 Reach 22.
- Morningside Elementary School, Garden Grove, is located approximately 0.06 mile north of C04 Reach 22.
- Mitchell Elementary School, Garden Grove, is located approximately 0.16 mile northwest of C04 Reach 22.

In addition, proposed staging areas for the project would be located primarily within the channel right-of-way; however, where the channel right-of-way is limited and/or does not provide sufficient space, alternative staging areas have been proposed, some of which include using a small portion of yard from an adjacent school. Schools that have been identified as potentially providing a staging area for the proposed project include Marina High School and Hill Elementary School.

Hazardous materials such as fuels, greases, and cleaning substances may be used during project demolition and construction activities. Because of the small amount that may be used during the channel modifications, no significant risk to the public or the environment is anticipated if an onsite accident were to occur. The construction crew would be required to comply with existing local, state, and federal regulations for handling of hazardous materials. In addition, to ensure that any potential impacts are minimized, mitigation measures MM-HAZ-1 through MM-HAZ-3 would be implemented during project construction. Mitigation measure MM-HAZ-1 ensures that the during implementation of the project the contractor would comply with all applicable laws, policies and regulations regarding transportation and handling of hazardous materials and wastes in order to minimize the possibility of an inadvertent leak or spill that could have an adverse impact on the public or environment. Mitigation measures MM-HAZ-2 and MM-HAZ-3 include requirements of the contractor to prepare an Environmental Protection Plan as well as an Accidental Spill Prevention Plan in order to ensure that if an accidental leak or spill does occur during project construction, personnel know how to address the leak or spill in an appropriate manner to minimize impacts potential adverse impacts to the public as well as the environment. Overall, since the quantity of hazardous materials being used is small and mitigation measures MM-HAZ-1 through MM-HAZ-3 would be implemented during construction, direct hazardous material accident impacts to the aforementioned schools would be less than significant.

Indirect Impacts

There are no activities that would result in indirect impacts that would create a significant hazard to the above listed schools due to the handling of hazardous materials or substances.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels; therefore, the long-term operation and maintenance of the modified channels would not be expected to substantially increase or decrease the probability of hazardous material accident impacts to the aforementioned schools. In addition, standard construction practices would be observed during maintenance activities such that any materials that are release would be appropriately contained and remediated as required by local, state, and federal law. Therefore, the impact due to long-term operation and maintenance activities would be less than significant.

C05/C06 Channels

Direct Impacts

Channel reaches to be modified as part of the proposed project are located within 0.25 mile of a school. The schools and the reach they are within the vicinity of are as follows:

- Marine View Middle School, Huntington Beach, is located approximately 0.17 mile south of C05 Reach 1.
- Spring View Middle School, Huntington Beach, is located approximately 0.20 mile north of C05 Reach 1.
- Ocean View High School, Huntington Beach, is located approximately 0.20 mile south of C05 Reach 2.
- John Marshall Elementary School, Westminster, is located approximately 0.10 mile south of C05 Reach 4.
- Susan B. Anthony Elementary School, Westminster, is located approximately 0.11 mile north of C05 Reach 5.
- La Quinta High School, Westminster, is located approximately 0.16 mile south of C05 Reach 5.
- St. Barbara School, Santa Ana, is located approximately 0.10 mile south of C05 Reach 5.
- Ari Guiragos Minassian Armenian School, Santa Ana, is located approximately 0.03 mile south of C05 Reach 5.
- Heritage Elementary School, Santa Ana, is located approximately 0.14 mile east of C05 Reach 5.
- Rosita Elementary School, Santa Ana, is located approximately 0.10 mile northwest of C05 Reach 6, 0.19 mile southwest of C05 Reach 7, and 0.23 mile southwest of C05 Reach 8.
- Santiago High School, Garden Grove, is located approximately 0.07 mile south of C05 Reach 9.
- Clinton Elementary School, Garden Grove, is located approximately 0.19 mile southeast of C05 Reach 9.

- Dwight D. Eisenhower Elementary School, Garden Grove, is located approximately 0.24 mile east of C05 Reach 9.
- Lampson Elementary School, Garden Grove, is located approximately 0.25 mile east of C05 Reach 11 and 0.21 mile southeast of C05 Reach 12.
- Liberty Christian School, Westminster, is located approximately 0.15 mile south of C06 Reach 13.
- Urbain H. Plavan Elementary School, Fountain Valley, is located approximately 0.07 mile south of C06 Reach 17.
- Mamie L. Northcutt Elementary School, Fountain Valley, is located approximately 0.09 mile south of C06 Reach 19.
- Los Amigos High School, Fountain Valley, is located approximately 0.22 mile northeast of C06 Reach 19.

In addition, proposed staging areas for the project would be located primarily within the channel right-of-way; however, where the channel right-of-way is limited and/or does not provide sufficient space, alternative staging areas have been proposed, some of which include using a small portion of yard from an adjacent school. Schools that have been identified as potentially providing a staging area for the proposed project include John Marshall Elementary School, Heritage Elementary School, Rosita Elementary School, Santiago High School, Urbain H. Plavan Elementary School, and Mamie L. Northcutt Elementary School.

Hazardous materials such as fuels, greases, and cleaning substances may be used during project demolition and construction activities. Because of the small amount that may be used during the channel modifications, no significant risk to the public or the environment is anticipated if an onsite accident were to occur. The construction crew would be required to comply with existing local, state, and federal regulations for handling of hazardous materials. In addition, to ensure that any potential impacts are minimized, mitigation measures MM-HAZ-1 through MM-HAZ-3 would be implemented during project construction. Mitigation measure MM-HAZ-1 ensures that the during implementation of the project the contractor would comply with all applicable laws, policies and regulations regarding transportation and handling of hazardous materials and wastes in order to minimize the possibility of an inadvertent leak or spill that could have an adverse impact on the public or environment. Mitigation measures MM-HAZ-2 and MM-HAZ-3 include requirements of the contractor to prepare an Environmental Protection Plan as well as an Accidental Spill Prevention Plan in order to ensure that if an accidental leak or spill does occur during project construction, personnel know how to address the leak or spill in an appropriate manner to minimize impacts potential adverse impacts to the public as well as the environment. Overall, since the quantity of hazardous materials being used is small and mitigation measures MM-HAZ-1 through MM-HAZ-3 would be implemented during construction, direct hazardous material accident impacts to the aforementioned schools would be less than significant.

Indirect Impacts

There are no activities that would result in indirect impacts that would create a significant hazard to the above listed schools due to the handling of hazardous materials or substances.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities

(e.g., levee and channel repairs and sediment removal) already occur for the existing channels; therefore, the long-term operation and maintenance of the modified channels would not be expected to substantially increase or decrease the probability of hazardous material accident impacts to the aforementioned schools. In addition, standard construction practices would be observed during maintenance activities such that any materials that are release would be appropriately contained and remediated as required by local, state, and federal law. Therefore, the impact due to long-term operation and maintenance activities would be less than significant.

Diversion Channel

Direct Impacts

Where the diversion channel will be constructed is located within 0.25 mile of a school. The schools within the vicinity of the diversion channel are as follows:

- Schroeder Elementary School, Huntington Beach, is located approximately 0.23 mile southwest of the proposed diversion channel.
- Ada Clegg Elementary School, Huntington Beach, is located approximately 0.14 mile west of the proposed diversion channel.
- Helen Stacey Middle School, Huntington Beach, is located approximately 0.25 mile west of the proposed diversion channel.
- Westminster High School, Westminster, is located approximately 0.17 mile north of the proposed diversion channel.
- Willmore Elementary School, Westminster, is located approximately 0.13 mile north of the proposed diversion channel.

In addition, proposed staging areas for the project would be located within channel right-of-ways for C04 Reach 20, C04 Reach 21, or along the area where the diversion channel would be constructed. Although none of the schools within 0.25 mile of the proposed diversion channel would be used for staging areas, the proposed staging areas that are located where the diversion channel would be constructed would all be within 0.25 mile or less of the aforementioned schools.

Hazardous materials such as fuels, greases, and cleaning substances may be used during project demolition and construction activities. Because of the small amount that may be used during the channel modifications, no significant risk to the public or the environment is anticipated if an onsite accident were to occur. The construction crew would be required to comply with existing local, state, and federal regulations for handling of hazardous materials. In addition, to ensure that any potential impacts are minimized, mitigation measures MM-HAZ-1 through MM-HAZ-3 would be implemented during project construction. Mitigation measure MM-HAZ-1 ensures that the during implementation of the project the contractor would comply with all applicable laws, policies and regulations regarding transportation and handling of hazardous materials and wastes in order to minimize the possibility of an inadvertent leak or spill that could have an adverse impact on the public or environment. Mitigation measures MM-HAZ-2 and MM-HAZ-3 include requirements of the contractor to prepare an Environmental Protection Plan as well as an Accidental Spill Prevention Plan in order to ensure that if an accidental leak or spill does occur during project construction, personnel know how to address the leak or spill in an appropriate manner to minimize impacts potential adverse impacts to the public as well as the environment. Overall, since the quantity of hazardous materials being used is small and mitigation measures MM-HAZ-1 through MM-

HAZ-3 would be implemented during construction, direct hazardous material accident impacts to the aforementioned schools would be less than significant.

Indirect Impacts

There are no activities that would result in indirect impacts that would create a significant hazard to the above listed schools due to the handling of hazardous materials or substances.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels; therefore, the long-term operation and maintenance of the diversion channel would not be expected to substantially increase or decrease the probability of hazardous material accident impacts to the aforementioned schools. In addition, standard construction practices would be observed during maintenance activities such that any materials that are release would be appropriately contained and remediated as required by local, state, and federal law. Therefore, the impact due to long-term operation and maintenance activities would be less than significant.

Level of Impact for the LPP

Less than Significant. Hazardous materials such as fuels, greases, and cleaning substances may be used during project demolition and construction activities. Because of the small amount that may be used during the channel modifications, no significant risk to the public or the environment is anticipated if an onsite accident were to occur. The construction crew would be required to comply with existing local, state, and federal regulations for handling of hazardous materials. Overall, construction activities and long-term operation of the project would not create significant hazardous material accident impacts to schools located within 0.25 mile of the proposed project.

5.12.4.4 IMPACT HAZ-4: Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would it create a significant hazard to the public or the environment.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no project would be implemented or constructed on a site included on a list of hazardous materials sites. Reasonably foreseeable conditions under the No Action Plan also do not entail the construction of a project on a site included on a list of hazardous materials sites; therefore, no impact to the public or environment would occur under the No Action Plan.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

California Government Code Section 65962.5 requires that a list of hazardous materials sites be compiled to include: hazardous waste facilities; hazardous waste discharges for which the State Water Quality Control Board has issued certain types of orders; public drinking water wells containing detectable levels

of organic contaminants; USTs with reported unauthorized releases; and solid waste disposal facilities from which hazardous waste has migrated.

The limited Phase I ESA includes a search of available environmental records and regulated properties utilizing Environmental Database Resources, Inc. (EDR). EDR searched federal and state databases using a standard search distance from the proposed project area. A focused assessment of the database report was conducted for sites that are on, or directly adjacent to the project area. The status of the EDR sites on, or adjacent to, the project area and a summary of the potential project impacts are provided in *Appendix F - HTRW*.

Warner Avenue Bridge is not listed on the database of hazardous materials sites. Since Warner Avenue Bridge is not listed on the database it is unlikely that during construction activities hazardous materials would be encountered. Although encountering hazardous materials is not anticipated, mitigation measure MM-HAZ-4 would be implemented during construction activities in order to minimize any potential impacts due to encountering previously unidentified hazardous materials. MM-HAZ-4 minimizes potential impacts by halting construction activities if contaminated areas are encountered until the extent and type of contamination is assessed. Overall, the potential direct impact to the public or environment due to construction activities occurring within the vicinity of an unidentified hazardous materials site would be less than significant.

Indirect Impacts

Warner Avenue Bridge is not listed on the database of hazardous materials sites. Implementation of this measure would have less than significant indirect impacts to the public or environment.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Maintenance activities would be restricted to the vicinity of the bridge and the bridge is not listed on the database of hazardous materials sites. Therefore, there would be no long-term impacts to the public or environment or impacts associated with maintenance activities.

Tide Gates

Direct Impacts

The limited Phase I ESA includes a search of available environmental records and regulated properties utilizing EDR. EDR searched federal and state databases using a standard search distance from the proposed project area. A focused assessment of the database report was conducted for sites that are on, or directly adjacent to the project area. The status of the EDR sites on, or adjacent to, the project area and a summary of the potential project impacts are provided in *Appendix F - HTRW*. The tide gate property is listed in the State of California Integrated Water Quality System database; no releases of hazardous waste or enforcement actions are noted for the site.

Although not listed in the databases, the Bolsa Chica Lowland Restoration Project Site is adjacent to C05 Reach 1 where the tide gates are located. The status of all remedial activities conducted at the Bolsa Chica Lowlands site should be reviewed during the design phase to determine if there are any areas in the

proposed project footprint that may affect any remaining contamination (e.g., metals, oil & grease, petroleum hydrocarbons, and PCBs) and/or contaminated fill left onsite as part of the remedial action plan. Although encountering hazardous materials is not anticipated since the proposed project would occur within the channel rights-of-way, mitigation measure MM-HAZ-4 would be implemented during construction activities in order to minimize any potential impacts due to encountering previously unidentified hazardous materials. MM-HAZ-4 minimizes potential impacts by halting construction activities if contaminated areas are encountered until the extent and type of contamination is assessed. Overall, the potential direct impact to the public or environment due to construction activities occurring within the vicinity of an unidentified hazardous materials site would be less than significant.

Indirect Impacts

The tide gates are not listed on the database of hazardous materials sites and there are no known hazardous materials sites within 650 feet of the project site. Therefore, implementation of this measure would have less than significant indirect impacts to the public or environment.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with new span bridge that is to replace the tide gates would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Maintenance activities would be restricted to the vicinity of the bridge and the area is not listed on the database of hazardous materials sites. Therefore, there would be no long-term impacts to the public or environment or impacts associated with maintenance activities.

C02/C04 Channels

Direct Impacts

The limited Phase I ESA includes a search of available environmental records and regulated properties utilizing EDR. EDR searched federal and state databases using a standard search distance from the proposed project area. A focused assessment of the database report was conducted for sites that are on, or directly adjacent to the project area. The status of the EDR sites on, or adjacent to, the project area and a summary of the potential project impacts are provided in *Appendix F - HTRW*. Review of the EDR database returns on or adjacent to the project area suggests that there are two LUSTs adjacent to the project area that have not been fully remediated. In addition to these two facilities, there are several service stations with active USTs and a facility with a potential surface impoundment directly adjacent to the potential project work area. The status of these facilities and location of existing infrastructure, USTs, and impoundements should be reviewed during PED to confirm that project implementation is not affected by the presence of USTs or impoundments in the work area. In addition, the status of ongoing LUST remedial actions should be confirmed prior to project implementation to confirm the risk of encountering contaminated soils or groundwater during construction.

DoD/FUDS/UXO Seal Beach: The Installation Restoration Program (IRP) at NWSSB began in 1985 with an Initial Assessment Study in which 25 locations of potential contamination were identified. A further Resource Conservation and Recovery Act Facility Assessment in 1989 and subsequent discoveries brought this total up to 76 locations. During the course of these and later studies, 49 sites were determined to contain no significant contamination, five currently operating, permitted facilities were removed from

the program, and two additional sites were transferred to other environmental programs specializing in USTs. Fifteen sites have had cleanup actions completed. The remaining five IRP sites are in various stages of active study or cleanup. A Military Munitions Response Program (MMRP) Preliminary Assessment was conducted in late 2008, with five MMRP sites recommended for Site Inspections. As a result of these investigations two sites were recommended for no further action and remaining three sites will undergo more detailed analysis. Review of the sites with ongoing remedial actions should conducted in PED to confirm that project implementation is not affected by any ongoing or planned remedial activities. Sites with ongoing remedial actions are presented below. Sites 7, 75, and UXO 6 are adjacent to the Channel C02/04 project area:

- Site 7 – Station landfill. Previous disposal of solvents, transformer oil, lubricants, paint sludge, asbestos, photo solutions, and mercury. Remedial action complete, O&M ongoing,
- Site 75 – KAYO-SB Ag Well. Groundwater contamination, chlorinated solvents. Site being inspected and Navy working with regulatory agencies on plan.
- UXO 6 – Westminster POLB Fill Area. Remedial investigation ongoing for munitions and explosives of concern, munitions constituents.

The C02 and C04 flood control channels are not listed on the database of hazardous materials sites. It is unlikely that substantial amounts of hazardous materials from the above facilities with open status would impact the flood control channels due to the proximity of the sites to the project area. Although encountering hazardous materials is not anticipated, mitigation measure MM-HAZ-4 would be implemented during construction activities in order to minimize any potential impacts due to encountering previously unidentified hazardous materials. MM-HAZ-4 minimizes potential impacts by halting construction activities if contaminated areas are encountered until the extent and type of contamination is assessed. Overall, the potential direct impact to the public or environment due to construction activities occurring within the vicinity of a hazardous materials site would be less than significant.

Indirect Impacts

The C02/C04 flood control channels are not listed on the database of hazardous materials sites. Therefore, implementation of this measure would have less than significant indirect impacts to the public or environment.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels and would be restricted to the vicinity of the flood control channels and their right-of-ways. Therefore, there would be no long-term impacts to the public or environment or impacts associated with maintenance activities.

C05/C06 Channels

Direct Impacts

The limited Phase I ESA includes a search of available environmental records and regulated properties utilizing EDR. EDR searched federal and state databases using a standard search distances from the proposed project area. A focused assessment of the database report was conducted for sites that are on, or directly adjacent to the project area. The status of the EDR sites on, or adjacent to, the project area and a

summary of the potential project impacts are provided in *Appendix F - HTRW*. Review of EDR database returns suggest that Channel C05/C06 is listed in the State of California Integrated Water Quality System and NPDES database: no releases of hazardous waste or enforcement actions are noted for the site. There are several service stations with active USTs directly adjacent to the potential project work area. The status of these facilities and location of existing infrastructure and USTs should be reviewed during PED to confirm that project implementation is not affected by the presences of USTs in the work area. Although not listed in the databases, the Bolsa Chica Lowland Restoration Project Site is adjacent to C05 Reach 1 where the tide gates are located. The status of all remedial activities conducted at the Bolsa Chica Lowlands site should be reviewed during the design phase to determine if there are any areas in the proposed project footprint that may affect any remaining contamination (e.g., metals, oil & grease, petroleum hydrocarbons, and PCBs) and/or contaminated fill left onsite as part of the remedial action plan.

The C05 and C06 flood control channels are not listed on the database of hazardous materials sites. Although encountering hazardous materials is not anticipated, mitigation measure MM-HAZ-4 would be implemented during construction activities in order to minimize any potential impacts due to encountering previously unidentified hazardous materials. MM-HAZ-4 minimizes potential impacts by halting construction activities if contaminated areas are encountered until the extent and type of contamination is assessed. Overall, the potential direct impact to the public or environment due to construction activities occurring within the vicinity of a hazardous materials site would be less than significant.

Indirect Impacts

The C05/C06 flood control channels are not listed on the database of hazardous materials sites. It is unlikely that substantial amounts of hazardous materials from adjacent facilities with open status would impact the flood control channels due to the proximity of the sites to the project area. Therefore, implementation of this measure would have less than significant indirect impacts to the public or environment.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels and would be restricted to the vicinity of the flood control channels and their right-of-ways. Therefore, there would be no long-term impacts to the public or environment or impacts associated with maintenance activities.

Level of Impact for the NED Plan

Less than Significant. The flood control channels are not listed on the database of hazardous materials sites. There are hazardous materials sites with cases still open within the vicinity of the channels, however, mitigation measure MM-HAZ-4 would be implemented during construction activities in order to minimize any potential impacts due to encountering previously unidentified hazardous materials. MM-HAZ-4 minimizes potential impacts by halting construction activities if contaminated areas are encountered until the extent and type of contamination is assessed. Overall, due to the drainage channels not being listed on the database of hazardous materials sites and the implementation of mitigation measure MM-HAZ-4, the potential direct, indirect, and long-term impacts to the public or environment due to potential disturbance of previously unidentified and/or adjacent sites would be less than significant.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact would be the same for the LPP as discussed for the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact would be the same for the LPP as discussed for the NED Plan.

C02/C04 Channels

Direct Impacts

The limited Phase I ESA includes a search of available environmental records and regulated properties utilizing EDR. EDR searched federal and state databases using a standard search distances from the proposed project area. A focused assessment of the database report was conducted for sites that are on, or directly adjacent to the project area. The status of the EDR sites on, or adjacent to, the project area and a summary of the potential project impacts are provided in *Appendix F - HTRW*. Review of EDR database returns on or adjacent to the project area suggests that there are two LUSTs adjacent to the project area that have not been fully remediated. In addition to these two facilities, there are several service stations with active USTs and a facility with a potential surface impoundment directly adjacent to the potential project work area. The status of these facilities and location of existing infrastructure, USTs, and impoundments should be reviewed during PED to confirm that project implementation is not affected by the presences of USTs or impoundments in the work area. In addition, the status of ongoing LUST remedial actions should be confirmed prior to project implementation to confirm the risk of encountering contaminated soils or groundwater during construction.

DoD/FUDS/UXO Seal Beach: The IRP at NWSSB began in 1985 with an Initial Assessment Study in which 25 locations of potential contamination were identified. A further Resource Conservation and Recovery Act Facility Assessment in 1989 and subsequent discoveries brought this total up to 76 locations. During the course of these and later studies, 49 sites were determined to contain no significant contamination, five currently operating, permitted facilities were removed from the program, and two additional sites were transferred to other environmental programs specializing in USTs. Fifteen sites have had cleanup actions completed. The remaining five IRP sites are in various stages of active study or cleanup. A MMRP Preliminary Assessment was conducted in late 2008, with five MMRP sites recommended for Site Inspections. As a result of these investigations two sites were recommended for no further action and remaining three sites will undergo more detailed analysis. Review of the sites with ongoing remedial actions should conducted in PED to confirm that project implementation is not affected by any ongoing or planned remedial activities. Sites with ongoing remedial actions are presented below. Sites 7, 75, and UXO 6 are adjacent to the Channel C02/04 project area:

- Site 7 – Station landfill. Previous disposal of solvents, transformer oil, lubricants, paint sludge, asbestos, photo solutions, and mercury. Remedial action complete, O&M ongoing,
- Site 75 – KAYO-SB Ag Well. Groundwater contamination, chlorinated solvents. Site being inspected and Navy working with regulatory agencies on plan.

- UXO 6 – Westminster POLB Fill Area. Remedial investigation ongoing for munitions and explosives of concern, munitions constituents.

The C02 and C04 flood control channels are not listed on the database of hazardous materials sites. It is unlikely that substantial amounts of hazardous materials from the above facilities with open status would impact the flood control channels due to the proximity of the sites to the project area. Although encountering hazardous materials is not anticipated, mitigation measure MM-HAZ-4 would be implemented during construction activities in order to minimize any potential impacts due to encountering previously unidentified hazardous materials. MM-HAZ-4 minimizes potential impacts by halting construction activities if contaminated areas are encountered until the extent and type of contamination is assessed. Overall, the potential direct impact to the public or environment due to construction activities occurring within the vicinity of a hazardous materials site would be less than significant.

Indirect Impacts

The C02/C04 flood control channels are not listed on the database of hazardous materials sites. It is unlikely that substantial amounts of hazardous materials from adjacent facilities with open status would impact the flood control channels due to the proximity of the sites to the project area. Therefore, implementation of this measure would have less than significant indirect impacts to the public or environment.

C05/C06 Channels

Direct Impacts

The limited Phase I ESA includes a search of available environmental records and regulated properties utilizing EDR. EDR searched federal and state databases using a standard search distances from the proposed project area. A focused assessment of the database report was conducted for sites that are on, or directly adjacent to the project area. The status of the EDR sites on, or adjacent to, the project area and a summary of the potential project impacts are provided in *Appendix F - HTRW*. Review of EDR database returns suggest that Channel C05/C06 is listed in the State of California Integrated Water Quality System and NPDES database: no releases of hazardous waste or enforcement actions are noted for the site. There are several service stations with active USTs directly adjacent to the potential project work area. The status of these facilities and location of existing infrastructure and USTs should be reviewed during PED to confirm that project implementation is not affected by the presences of USTs in the work area. Although not listed in the databases, the Bolsa Chica Lowland Restoration Project Site is adjacent to C05 Reach 1 where the tide gates are located. The status of all remedial activities conducted at the Bolsa Chica Lowlands site should be reviewed during the design phase to determine if there are any areas in the proposed project footprint that may affect any remaining contamination (e.g., metals, oil & grease, petroleum hydrocarbons, and PCBs) and/or contaminated fill left onsite as part of the remedial action plan.

The C05 and C06 flood control channels are not listed on the database of hazardous materials sites. Although encountering hazardous materials is not anticipated, mitigation measure MM-HAZ-4 would be implemented during construction activities in order to minimize any potential impacts due to encountering previously unidentified hazardous materials. MM-HAZ-4 minimizes potential impacts by halting construction activities if contaminated areas are encountered until the extent and type of contamination is assessed. Overall, the potential direct impact to the public or environment due to construction activities occurring within the vicinity of a hazardous materials site would be less than significant.

Indirect Impacts

The C05/C06 flood control channels are not listed on the database of hazardous materials sites. It is unlikely that substantial amounts of hazardous materials from adjacent facilities with open status would impact the flood control channels due to the proximity of the sites to the project area. Therefore, implementation of this measure would have less than significant indirect impacts to the public or environment.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels and would be restricted to the vicinity of the flood control channels and their right-of-ways. Therefore, there would be no long-term impacts to the public or environment or impacts associated with maintenance activities.

Diversion Channel

Direct Impacts

A limited HTRW Phase I ESA was completed to identify the risk of encountering HTRW and non-HTRW environmental issues and to determine if any RECs present have impacted the project site or will impact implementation of the proposed project. The information used to complete the limited HTRW Phase I ESA for the Diversion channel was obtained from online research. Results of the investigation suggest that there is limited potential to encounter CERCLA or RCRA regulated sites in the project area. Additional Phase I ESA investigation is recommended.

Where the diversion channel would be constructed is not listed on the database of hazardous materials sites. It is unlikely that substantial amounts of hazardous materials from adjacent properties would impact the diversion channel project site. Although encountering hazardous materials is not anticipated, mitigation measure MM-HAZ-4 would be implemented during construction activities in order to minimize any potential impacts due to encountering previously unidentified hazardous materials. MM-HAZ-4 minimizes potential impacts by halting construction activities if contaminated areas are encountered until the extent and type of contamination is assessed. Overall, the potential direct impact to the public or environment due to construction activities occurring within the vicinity of an unidentified hazardous materials site would be less than significant.

Indirect Impacts

The location of the proposed diversion channel is not listed on the database of hazardous materials sites. Is unlikely that substantial amounts of hazardous materials from adjacent properties would impact the diversion channel project site. Therefore, the implementation of this measure would have less than significant indirect impacts to the public or environment.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) already occur for the existing channels and would be restricted to the vicinity of the proposed diversion channel and its right-of-way. Therefore, there would be no long-term impacts to the public or environment or impacts associated with maintenance activities.

Level of Impact for the LPP

Less than Significant. The flood control channels are not listed on the database of hazardous materials sites. There are hazardous materials sites with cases still open within the vicinity of the channels, however, mitigation measure MM-HAZ-4 would be implemented during construction activities in order to minimize any potential impacts due to encountering previously unidentified hazardous materials. MM-HAZ-4 minimizes potential impacts by halting construction activities if contaminated areas are encountered until the extent and type of contamination is assessed. Overall, due to the drainage channels not being listed on the database of hazardous materials sites and the implementation of mitigation measure MM-HAZ-4, the potential direct, indirect, and long-term impacts to the public or environment due to potential disturbance of previously unidentified and/or adjacent sites would be less than significant.

5.12.4.5 IMPACT HAZ-5: For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no project would be implemented or constructed on a site located within an airport land use plan or within two miles of a public airport or public use airport. Reasonably foreseeable conditions include continued maintenance and upkeep of the existing drainage channels, however, the majority of the channels are not within two miles of an airport and these routine maintenance activities would not be expected to result in a safety hazard or excessive noise for people residing or working within the vicinity of the existing drainage channels. Therefore, no impact to the public or would occur under the No Action Plan.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The Los Alamitos Air Force Base private airstrip is located approximately 4.71 miles north of Warner Avenue Bridge. The Long Beach public airport is located approximately 7.84 miles northwest of the bridge. The John Wayne public airport is located approximately 9.85 miles southeast of the bridge. Based on the above information, Warner Avenue Bridge is not located within a 2-mile radius of a public or private airstrip. Therefore, the project would not result in a direct, indirect, or long-term safety hazard or excessive noise for people residing or working in the project area.

Tide Gates

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The Los Alamitos Air Force Base private airstrip is located approximately 5.18 miles north of the tide gates. The Long Beach public airport is located approximately 8.45 miles northwest of the tide gates. The John Wayne public airport is located approximately 9.39 miles southeast of the tide gates. Based on the

above information, the tide gates are not located within a 2-mile radius of a public or private airstrip. Therefore, the project would not result in a direct, indirect, or long-term safety hazard or excessive noise for people residing or working in the project area.

C02/C04 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The channels within the C02/C04 drainage system are varying distances away from the region's private and public airports. For this analysis, the channel reach that is closest to an airport within the region is identified as well as the distance the channel is located from that particular airport. The Los Alamitos Air Force Base private airstrip is located approximately 3.11 miles north of C04 Reach 20. The Long Beach public airport is located approximately 7.54 miles northwest of C02 Reach 23. The John Wayne public airport is located approximately 6.53 miles southeast of C04 Reach 22. The Fullerton Municipal public airport is located approximately 6.63 miles north of C04 Reach 22. Based on the above information, none of the reaches within the C02/C04 drainage channel system are located within a 2-mileradius of a public or private airstrip. Therefore, the project would not result in a direct, indirect, or long-term safety hazard or excessive noise for people residing or working in the project area.

C05/C06 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The channels within the C05/C06 drainage system are varying distances away from the region's private and public airports. For this analysis, the channel reach that is closest to an airport within the region is identified as well as the distance the channel is located from that particular airport. The Los Alamitos Air Force Base private airstrip is located approximately 4.57 miles north of C05 Reach 1. The Long Beach public airport is located approximately 8.74 miles northwest of C05 Reach 1. The John Wayne public airport is located approximately 4.19 miles southeast of C06 Reach 19. The Fullerton Municipal public airport is located approximately 8.21 miles north of C05 Reach 5. Based on the above information, none of the reaches within the C05/C06 drainage channel system are located within a 2-mile radius of a public or private airstrip. Therefore, the project would not result in a direct, indirect, or long-term safety hazard or excessive noise for people residing or working in the project area.

Level of Impact for the NED Plan

No Impact. There are no public or private airstrips within a 2-mile radius of the proposed project, therefore, the project would result in a safety hazard or excessive noise for people residing or working in the project area.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact would be the same for the LPP as discussed for the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact would be the same for the LPP as discussed for the NED Plan.

C02/C04 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The channels within the C02/C04 drainage system are varying distances away from the region's private and public airports. For this analysis, the channel reach that is closest to an airport within the region is identified as well as the distance the channel is located from that particular airport. The Los Alamitos Air Force Base private airstrip is located approximately 3.11 miles north of C04 Reach 20. The Long Beach public airport is located approximately 7.54 miles northwest of C02 Reach 23. The John Wayne public airport is located approximately 6.53 miles southeast of C04 Reach 22. The Fullerton Municipal public airport is located approximately 6.63 miles north of C04 Reach 22. Based on the above information, none of the reaches within the C02/C04 drainage channel system are located within a 2-mileradius of a public or private airstrip. Therefore, the project would not result in a direct, indirect, or long-term safety hazard or excessive noise for people residing or working in the project area.

C05/C06 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The channels within the C05/C06 drainage system are varying distances away from the region's private and public airports. For this analysis, the channel reach that is closest to an airport within the region is identified as well as the distance the channel is located from that particular airport. The Los Alamitos Air Force Base private airstrip is located approximately 4.57 miles north of C05 Reach 1. The Long Beach public airport is located approximately 8.74 miles northwest of C05 Reach 1. The John Wayne public airport is located approximately 4.19 miles southeast of C06 Reach 19. The Fullerton Municipal public airport is located approximately 8.21 miles north of C05 Reach 5. Based on the above information, none of the reaches within the C05/C06 drainage channel system are located within a 2-mile radius of a public or private airstrip. Therefore, the project would not result in a direct, indirect, or long-term safety hazard or excessive noise for people residing or working in the project area.

Diversion Channel

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The Los Alamitos Air Force Base private airstrip is located approximately 2.97 miles north of the proposed location for the diversion channel within the C04 system. The Long Beach public airport is located approximately 7.9 miles northwest of the proposed location for the diversion channel within the C04 system. The John Wayne public airport is located approximately 8.65 miles southeast of the proposed location for the diversion channel within the C04 system. The Fullerton Municipal public airport is located approximately 7.47 miles north of the proposed location for the diversion channel within the C04 system. Based on the above information, the diversion channel would not be located within a 2-mile radius of a public or private airstrip. Therefore, the project would not result in a direct, indirect, or long-term safety hazard or excessive noise for people residing or working in the project area.

Level of Impact for the LPP

No Impact. There are no public or private airstrips within a 2-mile radius of the proposed project, therefore, the project would result in a safety hazard or excessive noise for people residing or working in the project area.

5.12.4.6 IMPACT HAZ-6: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

ALTERNATIVE: NO ACTION

Under the No Action Alternative no project would be implemented or constructed that would impair or interfere with an adopted emergency response plan or emergency evacuation plan. Reasonably foreseeable conditions include the continued risk of flooding within the Westminster watershed. Widespread overtopping within the area would continue to occur between the 10% and 4% ACE events. The continued risk of flooding within the area could impair and/or physically interfere with an adopted emergency response plan or emergency evacuation plan depending on the duration and severity of the flooding experienced. Therefore, under the No Action Plan this would be a potential significant adverse impact.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

The modification of the Warner Avenue Bridge would require lane closures during construction activities, which are anticipated to last approximately 14 ½ months. The construction would be phased to allow traffic in both directions. The first phase would be extending the bridge on the left hand side which would require closing the two vehicle lanes and one bike lane conveying traffic east. The two lanes conveying traffic to the west would be divided to have a single lane conveying traffic west and a single lane conveying traffic east. The second phase would be extending the bridge on the right hand side which would require closing the two vehicle lanes and one bike lane conveying traffic west. The two lanes conveying traffic to the east would be divided to have a single lane conveying traffic west and a single lane conveying traffic east. Therefore, approximately half of the Warner Avenue Bridge will be closed at different stages during construction, with traffic remaining open at all times to allow traffic in both directions. Since traffic would be reduced to from two lanes in either direction to a single lane in either direction during construction, a bottleneck would be created that could potentially interfere with the implementation of an adopted emergency response plan or emergency evacuation plan, causing a significant adverse impact. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-HAZ-5 and MM-HAZ-6 would be implemented. MM-HAZ-5 includes the preparation of an Emergency Evacuation Plan while MM-HAZ-6 includes the preparation of a Traffic Control Plan. The plans would include alternative emergency evacuation routes as well as detour routes to minimize induced traffic congestion while construction activities are occurring as well as notification of emergency services of the alternate routes. The preparation and implementation of both of these plans during construction activities is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-HAZ-5 and MM-HAZ-6, the potential

temporary adverse impact to the implementation or interference with an emergency response plan or emergency evacuation plan would be reduced to less than significant.

Indirect Impacts

The modification of the Warner Avenue Bridge would require lane closures during construction activities, which are anticipated to last approximately one year and two and a half months. Although the bridge would remain open at all times to allow traffic in both directions, the normal four lane bridge would be reduced to two lanes while construction is occurring. This could potentially indirectly impact nearby roads that also allow access to the inland part of Orange County off of the PCH as residents become used to the closure and potentially take alternate routes. The closest major road to the north of Warner Avenue Bridge is Seal Beach Boulevard which is approximately 2.84 miles away and is a six lane road providing three lanes of traffic in each direction. The closest major road to the south of Warner Avenue Bridge is Goldenwest Street which is approximately 4.0 miles away and is a six lane road providing three lanes of traffic in each direction. The construction of Warner Avenue Bridge and the temporary lane closures could create more traffic on these nearby major inlet roads that could potentially indirectly interfere with the implementation of an adopted emergency response plan or emergency evacuation plan. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-HAZ-5 and MM-HAZ-6 would be implemented. MM-HAZ-5 includes the preparation of an Emergency Evacuation Plan while MM-HAZ-6 includes the preparation of a Traffic Control Plan. The plans would include alternative emergency evacuation routes as well as detour routes to minimize induced traffic congestion while construction activities are occurring as well as notification of emergency services of the alternate routes. The preparation and implementation of both of these plans during construction activities is expected to minimize the temporary indirect impacts created by construction activities. Therefore, with the implementation of MM-HAZ-5 and MM-HAZ-6, the potential temporary adverse indirect impact to the implementation or interference with an emergency response plan or emergency evacuation plan would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. The aforementioned maintenance activities would be temporary in nature and short in duration. They would likely not require a full lane closure, but temporary closure of a small area where the maintenance activities are occurring. These temporary closures due to maintenance would not be expected to substantially impact the implementation of an adopted emergency response plan or emergency evacuation route. Therefore, the project would have a less than significant long-term impact.

Tide Gates

Direct Impacts

The permanent removal of the tide gates on C05 Reach 1 and replacement with a new access bridge would require temporary closure of the bike/walking path crossing during construction activities, which are anticipated to last approximately five months. The crossing does provide access for emergency response vehicles from the south to the channel maintenance road on the north in case there is an emergency within the flood control channels or within the BCER. The closest crossing that would provide access to the north bank maintenance road from the south is the oil field bridge which is located approximately 0.58 miles east of the tide gate location. Since access to the north bank maintenance road

would not be prevented during implementation of this measure, and the detour crossing is located less than a mile from the impacted crossing, a less than significant impact is expected.

Indirect Impacts

The permanent removal of the tide gates and replacement with a new access bridge is not expected to have any indirect impacts to the implementation of an adopted emergency response plan or emergency evacuation plan. The tide gate crossing is primarily a recreational crossing that is only used occasionally by emergency response vehicles responding to an emergency within the flood control channels.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new access bridge would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. The aforementioned maintenance activities would be temporary in nature and short in duration. Due to the size of the span bridge, any maintenance activities would like require closing of the bridge, but the closure would likely be no longer than 24 hours. Therefore, the project would have a less than significant long-term impact.

Channels C02/C04

Direct Impacts

The majority of the modifications within the C02/C04 flood control channels would not require temporary lane closures during construction activities, which are anticipated to last a combined total of approximately six years and ten months. The primary impact would be along channels that do not have sufficient right-of-ways for staging and/or few alternative staging area options outside of the channel right-of-ways. C04 Reach 20 is one such channel where staging is limited, therefore, a traffic lane from adjacent roadways would need to be taken temporarily for staging. Roadways that would be impacted are Edinger Avenue, Springdale Street, and Bolsa Avenue. Construction activities for C04 Reach 20 would be phased so that lanes on the aforementioned roads are not impacted the entire total construction period. The first phase would be the portion of C04 Reach 20 extending from Bolsa Chica Street to McFadden Avenue. Construction is anticipated to take approximately three years. During this time, a single lane from the westbound traffic side of Edinger Avenue, from Bolsa Chica Street east to Springdale Street, would be temporarily closed to allow for construction staging. One lane of traffic on the westbound side would still remain open during construction to allow through traffic. In addition, a single lane from the southbound traffic side of Springdale Street, from Edinger Avenue north to McFadden Avenue, would be temporarily closed to allow for construction staging. One lane of traffic on the southbound side would still remain open during construction to allow through traffic. The second phase would be the portion of C04 Reach 20 extending from McFadden Avenue to just south of where the channel goes under Bolsa Avenue. Construction is anticipated to take approximately 12 ½ months. During this time, a single lane from the northbound traffic side of Springdale Street, from McFadden Avenue to Engineer Drive, would be temporarily closed to allow for construction staging. One lane of traffic on the northbound side would still remain open during construction to allow through traffic. Lastly, the third phase would be the portion of C04 Reach 20 extending from north of where the channel goes under Bolsa Avenue to west of Edwards Street. Construction is anticipated to take approximately 29 weeks. During this time, a single lane from the westbound traffic side of Bolsa Avenue, from where Bolsa Avenue crosses the channel to Edwards Street, would be temporarily closed to allow for construction staging. Two lanes of traffic on the westbound side would still remain open during construction to allow through traffic. The remaining channels to be modified (i.e., C02 Reach 23, C04 Reach 22) are not expected to require the temporary

closure of a traffic lane for staging. This measure also does not include any crossing construction which would require temporary lane closures.

Since traffic would be reduced from two westbound lanes to one on Edinger, two southbound lanes to one on Springdale Street, two northbound lanes to one on Springdale Street, and three westbound lanes to two on Bolsa Avenue, a bottleneck would be created that could potentially interfere with the implementation of an adopted emergency response plan or emergency evacuation plan, causing a significant adverse impact. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-HAZ-5 and MM-HAZ-6 would be implemented. MM-HAZ-5 includes the preparation of an Emergency Evacuation Plan while MM-HAZ-6 includes the preparation of a Traffic Control Plan. The plans would include alternative emergency evacuation routes as well as detour routes to minimize induced traffic congestion while construction activities are occurring as well as notification of emergency services of the alternate routes. The preparation and implementation of both of these plans during construction activities is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-HAZ-5 and MM-HAZ-6, the potential temporary adverse impact to the implementation or interference with an emergency response plan or emergency evacuation plan would be reduced to less than significant.

Indirect Impacts

The modification of the flood control channels within the C02/C04 system would require temporary lane closures during construction activities for staging of equipment. Construction activities for C04 Reach 20, which will require temporary lane closures, are anticipated to last between 29 weeks and 3 years for the various phases of construction. Although the impacted roadways would remain open at all times to allow traffic in both directions, there would be the temporary loss of a single lane in one direction. This could potentially indirectly impact nearby roads as residents become used to the closures and potentially take alternate routes. Nearby roads similar in size to those that would have temporarily lane closures and could be used as alternative routes include Edwards Street, Goldenwest Street, McFadden Avenue, and Heil Avenue. The modification of the flood control channels and the associated temporary lane closures could create additional traffic on these nearby major roads that could potentially indirectly interfere with the implementation of an adopted emergency response plan or emergency evacuation plan. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-HAZ-5 and MM-HAZ-6 would be implemented. MM-HAZ-5 includes the preparation of an Emergency Evacuation Plan while MM-HAZ-6 includes the preparation of a Traffic Control Plan. The plans would include alternative emergency evacuation routes as well as detour routes to minimize induced traffic congestion while construction activities are occurring as well as notification of emergency services of the alternate routes. The preparation and implementation of both of these plans during construction activities is expected to minimize the temporary indirect impacts created by construction activities. Therefore, with the implementation of MM-HAZ-5 and MM-HAZ-6, the potential temporary adverse indirect impact to the implementation or interference with an emergency response plan or emergency evacuation plan would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The aforementioned maintenance activities would be temporary in nature and short in duration. They would likely not require any lane closures. Therefore, this

measure is not expected to have any long-term impacts to the implementation of an adopted emergency response plan or emergency evacuation plan.

Channels C05/C06

Direct Impacts

The modifications within the C05/C06 flood control channels are not expected to require temporary lane closures during construction activities, which are anticipated to last a combined total of approximately 11 years and four months. The primary reason temporary lane closures would be expected with implementation of this alternative would be due to insufficient staging space for construction equipment within the channel right-of-ways and/or few alternative staging options outside of the channel right-of-ways. However, sufficient staging areas have been identified within the C05/C06 system so that using a lane for staging is not required. In addition, this measure does not include any crossing construction which would require temporary lane closures. Therefore, a less than significant direct impact to the implementation of an adopted emergency response plan or emergency evacuation plan is expected with the implementation of this measure.

Indirect Impacts

The modification of the flood control channels within the C05/C06 system are not expected to require any temporary lane closures during construction activities for staging of equipment. Roadways are expected to remain open at all times to allow traffic to continue in both directions. Therefore, this measure is not expected to have any indirect impacts to the implementation of an adopted emergency response plan or emergency evacuation plan.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The aforementioned maintenance activities would be temporary in nature and short in duration. They would likely not require any lane closures. Therefore, this measure is not expected to have any long-term impacts to the implementation of an adopted emergency response plan or emergency evacuation plan.

Level of Impact for the NED Plan

Less than Significant Impact With Mitigation Incorporated. During construction, there could be direct and indirect impacts due to temporary lane closures for staging of equipment, especially regarding construction activities associated with the modification of Warner Avenue Bridge and the modification of the C02/C04 drainage channels. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-HAZ-5 and MM-HAZ-6 would be implemented. MM-HAZ-5 includes the preparation of an Emergency Evacuation Plan while MM-HAZ-6 includes the preparation of a Traffic Control Plan. The plans would include alternative emergency evacuation routes as well as detour routes to minimize induced traffic congestion while construction activities are occurring as well as notification of emergency services of the alternate routes. The preparation and implementation of both of these plans during construction activities is expected to minimize the temporary indirect impacts created by construction activities. Therefore, with the implementation of MM-HAZ-5 and MM-HAZ-6, the potential temporary adverse indirect impact to the implementation or interference with an emergency response plan or emergency evacuation plan would be reduced to less than significant.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measure is the same as described for the NED Plan, therefore, the level of impact would be the same for the LPP as discussed for the NED Plan.

Tide Gates

This measure is the same as described for the NED Plan, therefore, the level of impact would be the same for the LPP as discussed for the NED Plan.

Channels C02/C04

Direct Impacts

The majority of the modifications within the C02/C04 flood control channels would not require temporary lane closures during construction activities, which are anticipated to last a combined total of approximately seven years and six months. The primary impact would be along channels that do not have sufficient right-of-ways for staging and/or few alternative staging area options outside of the channel right-of-ways. C04 Reach 20 is one such channel where staging is limited, therefore, a traffic lane from adjacent roadways would need to be taken temporarily for staging. Roadways that would be impacted are Edinger Avenue, Springdale Street, and Bolsa Avenue. Construction activities for C04 Reach 20 would be phased so that lanes on the aforementioned roads are not impacted the entire total construction period. The first phase would be the portion of C04 Reach 20 extending from Bolsa Chica Street to McFadden Avenue. Construction is anticipated to take approximately 18 months. During this time, a single lane from the westbound traffic side of Edinger Avenue, from Bolsa Chica Street east to Springdale Street, would be temporarily closed to allow for construction staging. One lane of traffic on the westbound side would still remain open during construction to allow through traffic. In addition, a single lane from the southbound traffic side of Springdale Street, from Edinger Avenue north to McFadden Avenue, would be temporarily closed to allow for construction staging. One lane of traffic on the southbound side would still remain open during construction to allow through traffic. The second phase would be the portion of C04 Reach 20 extending from McFadden Avenue to just south of where the channel goes under Bolsa Avenue. Construction is anticipated to take approximately just under 18 months. During this time, a single lane from the northbound traffic side of Springdale Street, from McFadden Avenue to Engineer Drive, would be temporarily closed to allow for construction staging. One lane of traffic on the northbound side would still remain open during construction to allow through traffic. Lastly, the third phase would be the portion of C04 Reach 20 extending from north of where the channel goes under Bolsa Avenue to west of Edwards Street. Construction is anticipated to take approximately 23 weeks. During this time, a single lane from the westbound traffic side of Bolsa Avenue, from where Bolsa Avenue crosses the channel to Edwards Street, would be temporarily closed to allow for construction staging. Two lanes of traffic on the westbound side would still remain open during construction to allow through traffic. The remaining channels to be modified (i.e., C02 Reach 23, C04 Reach 22) are not expected to require the temporary closure of a traffic lane for staging.

In addition to the aforementioned temporary lane closures due to staging of equipment for channel modifications, this measure also includes the modification of approximately 15 crossings. For C04 Reach 20 the following crossings would be modified to allow for the rectangular shaped channels:

- McFadden Avenue Crossing

- Bolsa Avenue Crossing
- Edwards Street Crossing

The bridge crossings would be modified in two to three phases depending on size in order to continue to allow traffic in both directions; however, temporary lane closures would be required. Construction would likely occur so that half of the crossing is modified, allowing single lanes of traffic in either direction to continue over the crossing. The second phase would allow construction of the remaining half of the crossing, allowing single lanes of traffic in either direction to continue over the crossing.

For C04 Reach 22, the following crossings would be modified to allow for the rectangular shaped channels:

- Pedestrian Crossing (northeast of Beach Boulevard and West Hazard Avenue intersection)
- Newland Street Crossing
- Magnolia Street Crossing
- Brookhurst Street Crossing
- Ward Street Crossing
- Westminster Avenue Crossing
- Ranney Avenue Crossing
- Blake Street Crossing
- Woodbury Road Crossing
- Teal Drive Crossing
- Mallard Avenue Crossing

The Newland Street, Magnolia Street, Brookhurst Street, Ward Street, and Westminster Avenue crossings would be modified in two to three phases depending on size in order to continue to allow traffic in both directions; however, temporary lane closures would be required. Construction would likely occur so that half of the crossing is modified, allowing single lanes of traffic in either direction to continue over the crossing. The second phase would allow construction of the remaining half of the crossing, allowing single lanes of traffic in either direction to continue over the crossing. The pedestrian crossing near the intersection of Beach Boulevard and West Hazard Avenue would likely be closed completely during construction. Lastly, the Ranney Avenue, Blake Street, Woodbury Road, Teal Drive, and Mallard Avenue crossings would likely be closed, but the closures would be phase so that the access into the neighborhood provided by these crossings is maintained. For example, Ranney Avenue and the Blake Street crossings would likely be completely closed to allow for modification of these two crossings; however, access to the residences in this area would still be provided by Woodbury Road, Teal Drive, and Mallard Avenue. One modification of these crossings is complete, then Woodbury Road, Teal Drive, and Mallard Avenue crossings would likely be completely closed to allow for modification of these three crossings; however, access to the residences in this area would still be provided by Ranney Avenue and Blake Street.

Overall, since traffic would be reduced from two westbound lanes to one on Edinger, two southbound lanes to one on Springdale Street, two northbound lanes to one on Springdale Street, and three westbound lanes to two on Bolsa Avenue, a bottleneck would be created. In addition, bottlenecks would be created due to modification of crossings that would result in the temporary reduction in lanes for a crossing or

restrict traffic completely. The bottlenecks that would be created could potentially interfere with the implementation of an adopted emergency response plan or emergency evacuation plan causing a significant adverse impact. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-HAZ-5 and MM-HAZ-6 would be implemented. MM-HAZ-5 includes the preparation of an Emergency Evacuation Plan while MM-HAZ-6 includes the preparation of a Traffic Control Plan. The plans would include alternative emergency evacuation routes as well as detour routes to minimize induced traffic congestion while construction activities are occurring as well as notification of emergency services of the alternate routes. The preparation and implementation of both of these plans during construction activities is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-HAZ-5 and MM-HAZ-6, the potential temporary adverse impact to the implementation or interference with an emergency response plan or emergency evacuation plan would be reduced to less than significant.

Indirect Impacts

The modification of the flood control channels within the C02/C04 system would require temporary lane closures during construction activities for staging of equipment. Construction activities for C04 Reach 20, which will require temporary lane closures, are anticipated to last between 23 weeks and 18 months for the various phases of construction. Although the impacted roadways would remain open at all times to allow traffic in both directions, there would be the temporary loss of a single lane in one direction. This could potentially indirectly impact nearby roads as residents become used to the closures and potentially take alternate routes. Nearby roads similar in size to those that would have temporarily lane closures and could be used as alternative routes include Edwards Street, Goldenwest Street, McFadden Avenue, and Heil Avenue. The modification of the flood control channels and the associated temporary lane closures could create additional traffic on these nearby major roads that could potentially indirectly interfere with the implementation of an adopted emergency response plan or emergency evacuation plan.

In addition, modification of the channels, specifically within C04 Reach 20 and C04 Reach 22, will require the modification of approximately 14 crossings to accommodate the rectangular shaped channels. The majority of the impacted crossings would remain open at all times to allow traffic in both directions, however, there would be a reduction in the number of lanes while construction is occurring. Five crossings and a pedestrian only crossing would be completely closed while they are being modified. The reduction in lanes and temporary closures could potentially indirectly impact nearby roads and associated crossings as residents become used to the closures and potentially take alternate routes. To minimize the temporary adverse impacts created during construction activities, mitigation measures MM-HAZ-5 and MM-HAZ-6 would be implemented. MM-HAZ-5 includes the preparation of an Emergency Evacuation Plan while MM-HAZ-6 includes the preparation of a Traffic Control Plan. The plans would include alternative emergency evacuation routes as well as detour routes to minimize induced traffic congestion while construction activities are occurring as well as notification of emergency services of the alternate routes. The preparation and implementation of both of these plans during construction activities is expected to minimize the temporary indirect impacts created by construction activities. Therefore, with the implementation of MM-HAZ-5 and MM-HAZ-6, the potential temporary adverse indirect impact to the implementation or interference with an emergency response plan or emergency evacuation plan would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels and modified crossings would be no different than maintenance activities that are undertaken currently for the existing channels and crossings. Typical maintenance activities would include vegetation control, rodent control, levee and

channel repair, and sediment removal from within the channels if needed. The aforementioned maintenance activities would be temporary in nature and short in duration. They would likely not require a full lane closure, but temporary closure of a small area where the maintenance activities are occurring. These temporary closures due to maintenance would not be expected to substantially impact the implementation of an adopted emergency response plan or emergency evacuation route. Therefore, the project would have a less than significant long-term impact.

Channels C05/C06

Direct Impacts

The modifications within the C05/C06 flood control channels are not expected to require temporary lane closures during construction activities, which are anticipated to last a combined total of approximately 13 years and five months. The primary reason temporary lane closures would be expected with implementation of this alternative would be due to insufficient staging space for construction equipment within the channel right-of-ways and/or few alternative staging options outside of the channel right-of-ways. However, sufficient staging areas have been identified within the C05/C06 system so that using a lane for staging is not required.

Although no temporary lane closures due to staging of equipment for channel modifications are anticipated, this measure also includes the modification of approximately 30 crossings. For C05 the following crossings would be modified to allow for the rectangular shaped channels:

- Oil Field Bridge (Reach 1)
- Springdale Street Crossing (Reach 1)
- Edwards Street Crossing (Reach 1)
- Goldenwest Street Crossing (Reach 2)
- Pedestrian Bridge Crossing (Reach 3 – upstream of confluence of C05/C06)
- Beach Boulevard/Heil Avenue Crossing (Reach 3)
- Magnolia Street/Edinger Avenue Crossing (Reach 4)
- Pedestrian Bridge (Reach 4 – southwest of Bushard Street Crossing)
- Bushard Street Crossing (Reach 4)
- McFadden Avenue/Brockhurst Street Crossing (Reach 5)
- Pedestrian Bridge (Reach 5 – northeast of McFadden Ave./Brookhurst St. Crossing)
- Ward Street Crossing (Reach 5)
- South Deming Street Crossing (Reach 5)
- South Euclid Street Crossing (Reach 5)
- Bolsa Avenue Crossing (Reach 5)
- West Fifth Street Crossing (Reach 6)
- West Hazard Avenue/North New Hope Street Crossing (Reach 7)
- West Fay Circle Crossing (Reach 8)

- Morningside Avenue Crossing (Reach 8)
- Westminster Avenue Crossing (Reach 8)
- OCTD Yard Crossing (Reach 9)
- Harbor Boulevard Crossing (Reach 9)
- Pedestrian Bridge (Reach 9 – southwest of Trask Avenue Crossing)
- Trask Avenue Crossing (Reach 9)
- Pearce Street Crossing (Reach 9)
- Upstream of Garden Grove Boulevard Crossing (Reach 10)
- Downstream of Aspenwood Crossing (Reach 10)

For C06, the following crossings would be modified to accommodate the rectangular shaped channels:

- Beach Boulevard Crossing (Reach 13)
- Newland Street Crossing (Reach 13)
- Bushard Street Crossing (Reach 17)

The bridge crossings would be modified in two to three phases depending on size in order to continue to allow traffic in both directions; however, temporary lane closures would be required. Construction would likely occur so that half of the crossing is modified, allowing single lanes of traffic in either direction to continue over the crossing. The second phase would allow construction of the remaining half of the crossing, allowing single lanes of traffic in either direction to continue over the crossing. The pedestrian crossings would likely be closed completely while being constructed.

Overall, although there are no temporary road closures required due to staging, the modification of associated crossings would result in the temporary reduction in lanes for a crossing or restrict traffic completely which would cause a bottleneck in these areas. The bottlenecks that would be created could potentially interfere with the implementation of an adopted emergency response plan or emergency evacuation plan causing a significant adverse impact. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-HAZ-5 and MM-HAZ-6 would be implemented. MM-HAZ-5 includes the preparation of an Emergency Evacuation Plan while MM-HAZ-6 includes the preparation of a Traffic Control Plan. The plans would include alternative emergency evacuation routes as well as detour routes to minimize induced traffic congestion while construction activities are occurring as well as notification of emergency services of the alternate routes. The preparation and implementation of both of these plans during construction activities is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-HAZ-5 and MM-HAZ-6, the potential temporary adverse impact to the implementation or interference with an emergency response plan or emergency evacuation plan would be reduced to less than significant.

Indirect Impacts

The modification of the channels within the C05/C06 system will require the modification of approximately 30 crossings to accommodate the rectangular shaped channels. The majority of the impacted crossings would remain open at all times to allow traffic in both directions, however, there would be a reduction in the number of lanes while construction is occurring. Four pedestrian crossings would be completely closed while they are being modified. The reduction in lanes and temporary closures

could potentially indirectly impact nearby roads and associated crossings as residents become used to the closures and potentially take alternate routes. The modification of the crossings and the associated reduction in lanes and temporary closures could potentially interfere with the implementation of an adopted emergency response plan or emergency evacuation plan, causing an adverse indirect impact. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-HAZ-5 and MM-HAZ-6 would be implemented. MM-HAZ-5 includes the preparation of an Emergency Evacuation Plan while MM-HAZ-6 includes the preparation of a Traffic Control Plan. The plans would include alternative emergency evacuation routes as well as detour routes to minimize induced traffic congestion while construction activities are occurring as well as notification of emergency services of the alternate routes. The preparation and implementation of both of these plans during construction activities is expected to minimize the temporary indirect impacts created by construction activities. Therefore, with the implementation of MM-HAZ-5 and MM-HAZ-6, the potential temporary adverse indirect impact to the implementation or interference with an emergency response plan or emergency evacuation plan would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels and modified crossings would be no different than maintenance activities that are undertaken currently for the existing channels and crossings. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The aforementioned maintenance activities would be temporary in nature and short in duration. They would likely not require a full lane closure, but temporary closure of a small area where the maintenance activities are occurring. These temporary closures due to maintenance would not be expected to substantially impact the implementation of an adopted emergency response plan or emergency evacuation route. Therefore, the project would have a less than significant long-term impact.

Diversion Channel

Direct Impacts

The construction of the diversion channel is not anticipated to require temporary lane closures during construction activities, which are anticipated to last approximately two years. The primary reason temporary lane closures would be expected with implementation of this alternative would be due to insufficient staging space for construction equipment within the channel right-of-ways and/or few alternative staging options outside of the channel right-of-ways. However, sufficient staging areas have been identified within the vicinity of where the diversion channel would be constructed so that using a traffic lane for staging is not required.

Indirect Impacts

The construction of the diversion channel is not anticipated to require temporary lane closures during construction activities. However, due to a portion of the diversion channel being constructed adjacent to Edwards Street, between the abandoned railroad right-of-way south to Bolsa Avenue, vehicles using Edwards Street may potentially avoid this area due to the presence of construction equipment and vehicles. Vehicles avoiding this area while construction is occurring on the diversion channel could potentially indirectly impact nearby roads such as McFadden Avenue to the west and Goldenwest Street to the east if they are used as a detour. Therefore, the construction of the diversion channel could potentially interfere with the implementation of an adopted emergency response plan or emergency evacuation plan, causing an adverse indirect impact. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-HAZ-5 and MM-HAZ-6 would be implemented.

MM-HAZ-5 includes the preparation of an Emergency Evacuation Plan while MM-HAZ-6 includes the preparation of a Traffic Control Plan. The plans would include alternative emergency evacuation routes as well as detour routes to minimize induced traffic congestion while construction activities are occurring as well as notification of emergency services of the alternate routes. The preparation and implementation of both of these plans during construction activities is expected to minimize the temporary indirect impacts created by construction activities. Therefore, with the implementation of MM-HAZ-5 and MM-HAZ-6, the potential temporary adverse indirect impact to the implementation or interference with an emergency response plan or emergency evacuation plan would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the diversion channel would be no different than maintenance activities that are undertaken currently for the existing channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The aforementioned maintenance activities would be temporary in nature and short in duration. They would likely not require a full lane closure, but temporary closure of a small area where the maintenance activities are occurring. These temporary closures due to maintenance would not be expected to substantially impact the implementation of an adopted emergency response plan or emergency evacuation route. Therefore, the project would have a less than significant long-term impact.

Level of Impact for the LPP

Less than Significant Impact With Mitigation Incorporated. During construction, there could be direct and indirect impacts due to temporary lane closures for staging of equipment, especially regarding construction activities associated with the modification of Warner Avenue Bridge, modification of the C02/C04 and C05/C06 drainage channels, and modification of relevant crossings within the C02/C04 and C05/C06 systems. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-HAZ-5 and MM-HAZ-6 would be implemented. MM-HAZ-5 includes the preparation of an Emergency Evacuation Plan while MM-HAZ-6 includes the preparation of a Traffic Control Plan. The plans would include alternative emergency evacuation routes as well as detour routes to minimize induced traffic congestion while construction activities are occurring as well as notification of emergency services of the alternate routes. The preparation and implementation of both of these plans during construction activities is expected to minimize the temporary indirect impacts created by construction activities. Therefore, with the implementation of MM-HAZ-5 and MM-HAZ-6, the potential temporary adverse indirect impact to the implementation or interference with an emergency response plan or emergency evacuation plan would be reduced to less than significant.

5.12.4.7 IMPACT HAZ-6: Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no project would be implemented or constructed that would expose people or structures to a significant loss of injury or death involving wildland fires. Per the California Department of Forestry and Fire Protection, the Westminster watershed is not located in an area designated as a fire hazard severity zone (Figure 44). Therefore, under the No Action Plan no impact is expected.

ALTERNATIVE: NED PLAN

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The proposed project is not located in an area designated as being subject to wildland fires (Figure 44). The project includes work within the vicinity of Warner Avenue Bridge, the tide gates at the downstream end of C05, and within the channel right-of-ways for the C02/C04 and C05/C06 flood control channels. While the project includes increasing the span of Warner Avenue Bridge, replacing the tide gates with an access bridge, and modification of the existing flood control channels, it does not propose the construction of habitable structures. Therefore, implementation of this measure would not directly or indirectly expose people or structures to a significant risk of loss, injury, or death involving wildland fires.

Level of Impact for NED Plan

No Impact. The proposed project is not located in an area designated as being subject to wildland fires (Figure 44), therefore, the project would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires.

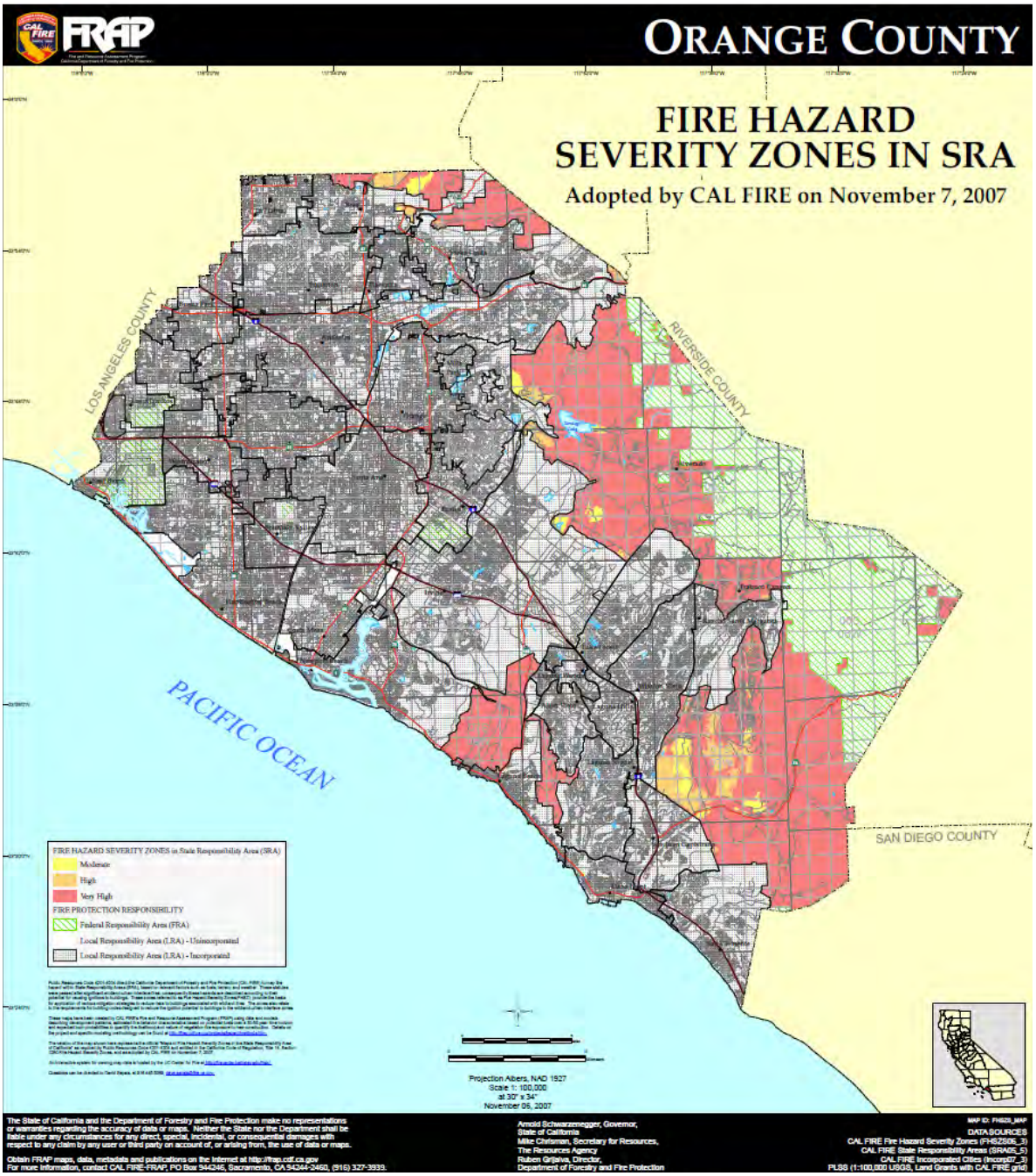


Figure 44: Orange County Fire Hazard Severity Zones in State Responsibility Areas (SRA) (Source: California Department of Forestry & Fire Protection 2007)

ALTERNATIVE: LPP

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The proposed project is not located in an area designated as being subject to wildland fires (Figure 44). The project includes work within the vicinity of Warner Avenue Bridge, the tide gates at the downstream end of C05, within the channel right-of-ways for the C02/C04 and C05/C06 flood control channels, and the proposed diversion channel along C04. While the project includes increasing the span of Warner Avenue Bridge, replacing the tide gates with an access bridge, modification of the existing flood control channels, and construction of the diversion channel, it does not propose the construction of habitable structures. Therefore, implementation of this measure would not directly or indirectly expose people or structures to a significant risk of loss, injury, or death involving wildland fires.

Level of Impact for the LPP

No Impact. The proposed project is not located in an area designated as being subject to wildland fires (Figure 44), therefore, the project would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires.

5.13 Land Use and Planning/Recreation

5.13.1 Regulatory Framework

Land use in the study area is managed according to Federal, state, regional, and local policies. Because these policies create land use patterns in the study area, they are described in detail in the Affected Environment in Section 2.0.

5.13.2 Impact Significance Criteria

The impact criteria below were taken from Appendix G of the CEQA Guidelines and are also being adopted for NEPA. For purposes of this analysis, the No Action Plan, NED Plan, and LPP would have a significant impact related to Land Use and Planning or Recreation if it would:

IMPACT LUP-1: Physically divide an established community.

IMPACT LUP-2: Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

IMPACT REC-1: Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

IMPACT REC-2: Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

5.13.3 Mitigation Measures

No mitigation measures are proposed for implementation with the NED Plan or LPP.

5.13.4 Land Use and Planning Impacts

5.13.4.1 IMPACT LUP-1: Physically divide an established community.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no federal project would be constructed. Therefore, there would be no project implemented that would physically divide an established community. The current level of risk would remain for flooding of communities within the Westminster watershed. Widespread overtopping within the area would still occur between 10% and 4% ACE events, which could physically divide an established community. However, the impact would only be temporary, lasting only as long as flooding is occurring. Since this would only be a temporary impact under the No Action Plan, it would be considered less than significant.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

The project site for this measure is the existing Warner Avenue Bridge which spans the waters where OBB meets Huntington Harbour. Warner Avenue Bridge is located in the City of Huntington Beach in an area that is fully developed, including local roadways, BCER, private residences, and businesses. Because the proposed project would be conducted within the OBB channel that passes under Warner Avenue Bridge, portions of the adjacent upland area located on the left descending bank of OBB, and Warner Avenue, the proposed project would not physically divide the residential community located northwest and northeast of Warner Avenue, and no component of the proposed project would physically divide an established community. Therefore, there would be no direct impact.

Indirect Impacts

Implementation of the proposed project at Warner Avenue Bridge would not indirectly physically divide an established community.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Since maintenance activities and long-term operation would be no different than what occurs currently at the bridge, these activities would not physically divide an established community.

Tide Gates

Direct Impacts

The project site for this measure is the downstream end of C05 Reach 1 where it outlets into OBB and where the tide gates are located. The portion of C05 Reach 1 where the tide gates are located is within the BCER. Since the proposed project is fully located within the BCER and would be conducted within the

channel rights-of-way, the proposed project would not physically divide an established community. Therefore, there would be no direct impact.

Indirect Impacts

Permanent removal of the tide gates and replacement with a new access bridge would not indirectly physically divide an established community.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new span bridge would be no different than maintenance activities that are undertaken currently for the other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Since maintenance activities and long-term operation would be no temporary and duration and would occur entirely within the BCER and channel right-of-way, these activities would not be expected to physically divide an established community.

C02/C04 Channels

Direct Impacts

The proposed project site is the existing C02/C04 flood control channel reaches as defined in *Section 3.6.2 Minimum Channel Modifications Plan*. C02 Reach 23 is located in the City of Huntington Beach in an area that is fully developed, including local roadways, Seal Beach Naval Weapons Station, SBNWR, private residences, and local businesses. C04 Reach 20 is located in the City of Huntington Beach and the City of Westminster in an area that is fully developed, including local roadways, private residences, light industrial use, and local businesses. Lastly, C04 Reach 22 is located in the City of Westminster and City of Garden Grove in an area that is fully developed, including local roadways, private residences, light industrial use, and local businesses. Because all project activities would be conducted within the existing channels, the proposed project would not physically divide the residential communities within the area, and no component of the proposed project would physically divide an established community. Therefore, there would be no direct impact.

Indirect Impacts

The modification of the flood control channels within the C02/C04 system would not indirectly physically divide an established community.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Since maintenance activities and long-term operation would be no different than what occurs currently for the existing channels, these activities would not be expected to physically divide an established community.

C05/C06 Channels

Direct Impacts

The proposed project site is the existing C05/C06 flood control channel reaches as defined in *Section 3.6.3 Maximum Channel Modifications Plan*. C05 Reach 1 is located in the City of Huntington Beach in an area that is fully developed, including local roadways, BCER, private residences, and local businesses. C05 Reach 2 is located in the City of Huntington Beach in an area that is fully developed, including local roadways, private residences, light industrial use, and local businesses. C05 Reach 3 is located in the City of Huntington Beach and the City of Westminster in an area that is fully developed, including local roadways, private residences, and local businesses. C05 Reach 4 is located in the City of Westminster in an area that is fully developed, including local roadways, private residences, and local businesses. C05 Reach 5 is located in the City of Westminster and the City of Santa Ana in an area that is fully developed, including local roadways, private residences, light industrial use, and local businesses.

C06 Reach 13 is located in the City of Huntington Beach in an area that is fully developed, including local roadways, private residences, light industrial use, and local businesses. C06 Reach 19 is located in the City of Fountain Valley in an area that is fully developed, including local roadways and private residences. Because all project activities within C05/C06 would be conducted within the existing channels, the proposed project would not physically divide the residential communities within the area, and no component of the proposed project would physically divide an established community. Therefore, there would be no direct impact.

Indirect Impacts

The modification of the flood control channels within the C05/C06 system would not indirectly physically divide an established community.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Since maintenance activities and long-term operation would be no different than what occurs currently for the existing channels, these activities would not be expected to physically divide an established community.

Level of Impact for the NED Plan

No Impact. The proposed project would primarily be conducted within channel rights-of-way and would therefore would not physically divide an established community.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

The proposed project site is the existing C02/C04 flood control channel reaches as defined in *Section 3.6.2 Minimum Channel Modifications Plan*. C02 Reach 23 is located in the City of Huntington Beach in an area that is fully developed, including local roadways, Seal Beach Naval Weapons Station, SBNWR, private residences, and local businesses. C04 Reach 20 is located in the City of Huntington Beach and the City of Westminster in an area that is fully developed, including local roadways, private residences, light industrial use, and local businesses. Lastly, C04 Reach 22 is located in the City of Westminster and City of Garden Grove in an area that is fully developed, including local roadways, private residences, light industrial use, and local businesses. Because all project activities would be conducted within the existing channels and portions of crossings that span the channel (refer to *Section 5.11.4.6 IMPACT HAZ-6* for list of crossings), the proposed project would not physically divide the residential communities within the area, and no component of the proposed project would physically divide an established community. Therefore, there would be no direct impact.

Indirect Impacts

The modification of the flood control channels within the C02/C04 system would not indirectly physically divide an established community.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Since maintenance activities and long-term operation would be no different than what occurs currently for the existing channels, these activities would not be expected to physically divide an established community.

C05/C06 Channels

Direct Impacts

The proposed project site is the existing C05/C06 flood control channel reaches as defined in *Section 3.6.3 Maximum Channel Modifications Plan*. C05 Reach 1 is located in the City of Huntington Beach in an area that is fully developed, including local roadways, BCER, private residences, and local businesses. C05 Reach 2 is located in the City of Huntington Beach in an area that is fully developed, including local roadways, private residences, light industrial use, and local businesses. C05 Reach 3 is located in the City of Huntington Beach and the City of Westminster in an area that is fully developed, including local roadways, private residences, and local businesses. C05 Reach 4 is located in the City of Westminster in an area that is fully developed, including local roadways, private residences, and local businesses. C05 Reach 5 is located in the City of Westminster and the City of Santa Ana in an area that is fully developed, including local roadways, private residences, light industrial use, and local businesses.

C06 Reach 13 is located in the City of Huntington Beach in an area that is fully developed, including local roadways, private residences, light industrial use, and local businesses. C06 Reach 19 is located in the City of Fountain Valley in an area that is fully developed, including local roadways and private residences. Because all project activities within C05/C06 would be conducted within the existing channels and portions of crossings that span the channel (refer to *Section 5.11.4.6 IMPACT HAZ-6* for list of crossings), the proposed project would not physically divide the residential communities within the area, and no component of the proposed project would physically divide an established community. Therefore, there would be no direct impact.

Indirect Impacts

The modification of the flood control channels within the C05/C06 system would not indirectly physically divide an established community.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Since maintenance activities and long-term operation would be no different than what occurs currently for the existing channels, these activities would not be expected to physically divide an established community.

Diversion Channel

Direct Impacts

The proposed project site is an abandoned railroad right-of-way and area adjacent to Edwards Street, between the abandoned railroad right-of-way south to Bolsa Avenue, as detailed in *Section 3.6.3 Maximum Channel Modifications Plan*. The proposed diversion channel is located in the City of Westminster in an area that is fully developed, including local roadways, the Westminster Mall, and private residences. Because all project activities would be conducted within the abandoned railroad right-of-way and the area adjacent to Edwards Street, the proposed project would not physically divide the residential communities located to the south and west, and no component of the proposed project would physically divide an established community. Therefore, there would be no direct impact.

Indirect Impacts

The construction of the diversion channel within the C02/C04 system would not indirectly physically divide an established community.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the diversion channel would be no different than maintenance activities that are undertaken currently for the existing flood control channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Since maintenance activities and long-term operation would be no different than what occurs currently for the existing flood control channels within the C02/C04 system, these activities would not be expected to physically divide an established community.

Level of Impact for the LPP

No Impact. The proposed project would primarily be conducted within channel right-of-ways and would therefore would not physically divide an established community.

5.13.4.2 IMPACT LUP-2: Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no federal project would be constructed. Therefore, there would be no project implemented that would physically divide an established community. The current level of risk would remain for flooding within the Westminster watershed. Widespread overtopping within the area would still occur between 10% and 4% ACE events. Continued flooding would not conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect, therefore, the No Action Plan would have no impact.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

The Warner Avenue Bridge is located within the City of Huntington Beach. The bridge is designated as a right-of-way in the City of Huntington Beach General Plan (Huntington Beach 2017). The upstream constriction point adjacent to the left descending bank of OBB is part of the BCER and is not included in the City of Huntington Beach General Plan other than being designated as a “conserve” area (Huntington Beach 2017). “Conserve” areas include open space and recreational areas that provide valuable natural habitat or parkland and support the community recreational and aesthetic needs (Huntington Beach 2017). The proposed project component of increasing the span of the bridge to the west would not alter the existing land use since the area modified would be Warner Avenue which is designated as a right-of-way. The proposed project component of excavating the constriction point would not alter the existing land use which is designated as open space. However, excavating the constriction point would alter the type of open space that is currently there. The portion of land to be excavated has several walking paths that lead down to the water’s edge for views of OBB. With the removal of the constriction point, the area of OBB would be increased and the walking paths down to the water’s edge would be shortened in length. Subsequently, the area would remain within the designation of open space, the type of open space would just be modified where the constriction point is concerned. Overall, following acquisition of the necessary licenses/indentures and/or easements, this impact would be less than significant.

Indirect Impacts

The modification of the Warner Avenue Bridge is not anticipated to have any indirect impacts due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Since maintenance activities and long-term operation would be no different than what occurs currently at the bridge, these activities would not be anticipated to cause a significant environmental impact due to conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Tide Gates

Direct Impacts

The tide gates are located at the downstream end of C05 Reach 1 within the BCER. The BCER is not included in the City of Huntington Beach General Plan other than being designated as a “conserve” area (Huntington Beach 2017). “Conserve” areas include open space and recreational areas that provide valuable natural habitat or parkland and support the community recreational and aesthetic needs (Huntington Beach 2017). The proposed project component of permanently removing the tide gates would not alter the existing land use since the area would remain open space. In addition, the proposed project component of constructing a small span bridge where the tide gates were located would also not alter the existing land use. The existing tide gates are currently used as a recreational crossing to trails within the BCER as well as a bridge for emergency response vehicles accessing the channel maintenance roads. Signage and temporary detour pathways will be employed during the construction period in areas accessible to the public and utilized by recreational users. The construction of the small span bridge would continue to provide the aforementioned uses that the tide gates formerly provided. Overall, following the acquisition of the necessary licenses/indentures and/or easements, this impact would be less than significant.

Indirect Impacts

The permanent removal of the tide gates and replacement with a small span bridge is not anticipated to have any indirect impacts due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new span bridge would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Since maintenance activities and long-term operation would be no different than what occurs currently at other bridges, these activities would not be anticipated to cause a significant environmental impact due to conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

C02/C04 Channels

Direct Impacts

The flood control channels within the C02/C04 system are located within the City of Huntington Beach, City of Westminster, and City of Garden Grove. The proposed project is designated flood control channel and right-of-way in the City of Huntington Beach, City of Westminster, and City of Garden Grove General Plans (City of Huntington Beach 2017, City of Westminster 2016, and City of Garden Grove 2008). Project components are located within the existing flood control channels and would not alter the existing use. The OCPW would be required to obtain licenses/indentures and/or easements from the Cities to construct the proposed project. Following acquisition of the necessary licenses/indentures and/or easements, this impact is less than significant.

Indirect Impacts

The modification of the flood control channels within the C02/C04 system is not anticipated to have any indirect impacts due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing flood control channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Since maintenance activities and long-term operation would be no different than what occurs currently for the existing flood control channels, these activities would not be expected to cause a significant environmental impact due to conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

C05/C06 Channels

Direct Impacts

The flood control channels within the C05/C06 system are located within the City of Huntington Beach, City of Westminster, City of Fountain Valley, and City of Santa Ana. The proposed project is designated flood control channel and right-of-way in the City of Huntington Beach, City of Westminster, City of Fountain Valley, and City of Santa Ana General Plans (City of Huntington Beach 2017, City of Westminster 2016, City of Fountain Valley 1995, and City of Santa Ana 1982). Project components are located within the existing flood control channels and would not alter the existing use. The OCPW would be required to obtain licenses/indentures and/or easements from the Cities to construct the proposed project. Following acquisition of the necessary licenses/indentures and/or easements, this impact is less than significant.

Indirect Impacts

The modification of the flood control channels within the C05/C06 system is not anticipated to have any indirect impacts due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing flood control channels. Typical

maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Since maintenance activities and long-term operation would be no different than what occurs currently for the existing flood control channels, these activities would not be expected to cause a significant environmental impact due to conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Level of Impact for the NED Plan

Less than Significant Impact. The proposed project would be conducted primarily within designated flood control channels and flood control channel right-of-ways. Land use designations due to implementation of the proposed project are not anticipated to change from what they currently are. Therefore, the proposed project is not expected to cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

The flood control channels within the C02/C04 system are located within the City of Huntington Beach, City of Westminster, and City of Garden Grove. The proposed project is designated flood control channel and right-of-way in the City of Huntington Beach, City of Westminster, and City of Garden Grove General Plans (City of Huntington Beach 2017, City of Westminster 2016, and City of Garden Grove 2008). The project component including modification of the flood control channels is located within the existing flood control channels and would not alter the existing use. The project component including modification of crossings due to altering the shape of the channels (i.e., from trapezoidal to rectangular) (refer to *Section 5.11.4.6 IMPACT HAZ-6* for list of crossings) would encroach upon the roadways during construction, but would not be incompatible with the existing land use since 1) traffic will still be allowed to use the crossings during construction although there will be temporary reductions in the number of lanes, and 2) once construction is complete on the crossing the existing use of the crossings and roadways will not be altered. The OCPW would be required to obtain licenses/indentures and/or easements from the Cities to construct the proposed project. Following acquisition of the necessary licenses/indentures and/or easements, this impact is less than significant.

Indirect Impacts

The modification of the flood control channels within the C02/C04 system is not anticipated to have any indirect impacts due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing flood control channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Since maintenance activities and long-term operation would be no different than what occurs currently for the existing flood control channels, these activities would not be expected to cause a significant environmental impact due to conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

C05/C06 Channels

Direct Impacts

The flood control channels within the C05/C06 system are located within the City of Huntington Beach, City of Westminster, City of Fountain Valley, and City of Santa Ana. The proposed project is designated flood control channel and right-of-way in the City of Huntington Beach, City of Westminster, City of Fountain Valley, and City of Santa Ana General Plans (City of Huntington Beach 2017, City of Westminster 2016, City of Fountain Valley 1995, and City of Santa Ana 1982). The project component including modification of the flood control channels is located within the existing flood control channels and would not alter the existing use. The project component including modification of crossings due to altering the shape of the channels (i.e., from trapezoidal to rectangular) (refer to *Section 5.11.4.6 IMPACT HAZ-6* for list of crossings) would encroach upon the roadways during construction, but would not be incompatible with the existing land use since 1) traffic will still be allowed to use the crossings during construction although there will be temporary reductions in the number of lanes, and 2) once construction is complete on the crossing the existing use of the crossings and roadways will not be altered. The OCPW would be required to obtain licenses/indentures and/or easements from the Cities to construct the proposed project. Following acquisition of the necessary licenses/indentures and/or easements, this impact is less than significant.

Indirect Impacts

The modification of the flood control channels within the C05/C06 system is not anticipated to have any indirect impacts due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing flood control channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Since maintenance activities and long-term operation would be no different than what occurs currently for the existing flood control channels, these activities would not be expected to cause a significant environmental impact due to conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Diversion Channel

Direct Impacts

The proposed location for the diversion channel is located within the City of Westminster. The proposed project is designated as park/open space where the diversion channel would be constructed within the abandoned railroad right-of-way, and as mixed use Westminster Mall where the diversion channel would be constructed adjacent to Edwards Street, between the abandoned railroad right-of-way south to Bolsa Avenue, in the City of Westminster General Plan (City of Westminster 2016). Park/Open Space are areas designated for parks, open space, linear parks, trails, and other similar recreational uses. These facilities may occur within utility corridors. In the City's zoning code, publicly owned and maintained parks and open spaces may be classified as public facilities or open space (Westminster 2016). Mixed use areas are intended to provide economic vitality and flexibility in land use options to promote growth and development in strategic locations. The project component that includes construction of the diversion channel in the abandoned railroad right-of-way would change the current designation of park/open space to flood control channel. However, the area is not a publicly owned or maintained park open space, but is instead an abandoned railroad right-of-way that bisects an industrial area. The project component that includes construction of the diversion channel adjacent to Edwards Street would change a small portion of the current designation of mixed use Westminster Mall to flood control channel. However, the area is currently a grass-lined drainage ditch for the roadway and would not encroach upon the actual Westminster Mall structure. Overall, the change in land use designation due to the construction of the diversion channel would be insubstantial. Therefore, following the acquisition of the necessary licenses/indentures and/or easements OCPW would be required to obtain from the City, this impact would be less than significant.

Indirect Impacts

The construction of the diversion channel within the C02/C04 system is not anticipated to have any indirect impacts due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the diversion channel would be no different than maintenance activities that are undertaken currently for the existing flood control channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channel if needed. Since maintenance activities and long-term operation would be no different than what occurs currently for the existing flood control channels, these activities would not be expected to cause a significant environmental impact due to conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Level of Impact for the LPP

Less than Significant Impact. The proposed project would be conducted primarily within designated flood control channels and flood control channel right-of-ways. Land use designations due to implementation of the proposed project are not anticipated to change substantially from what they currently are. Therefore, the proposed project is not expected to cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

5.13.5 Recreation Impacts

5.13.5.1 IMPACT REC-1: Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no federal project would be constructed. Therefore, there would be no project implemented that would potentially increase the use of existing neighborhood and regional parks such that substantial physical deterioration of the facility would occur or be accelerated. The current level of risk would remain for flooding within the Westminster watershed, including regional parks and recreational facilities that are adjacent to the drainage channels. Widespread overtopping within the project area would still occur between the 10% and 4% ACE events. Depending on the location, severity, and duration of the flooding, the location and extent of damage and impacts on existing parks and recreational facilities could range from minor to extensive. The continued risk of flooding within the study area would cause long-term impacts by increasing the maintenance required to maintain parks and recreational facilities adjacent to the channel system. Therefore, under the No Action Plan there could be a significant adverse impact.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

Modification of the Warner Avenue Bridge and staging of equipment to be used for the project (refer to Figure 43) would not affect access to the BCER in such a way during construction that recreation users would be inclined to use alternative regional parks or recreational facilities. In addition, the project is the modification of existing infrastructure and does not include the construction of housing, businesses, or extension of infrastructure. Since the proposed project does not include features that might stimulate an increase in the population of the surrounding community, no impacts to recreational facilities due to increased use as a result of surrounding community population change would occur.

Indirect Impacts

The modification of the Warner Avenue Bridge is not anticipated to have any indirect impacts that would increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Since maintenance activities and long-term operation would be no different than what occurs currently at the bridge, these activities would not be anticipated to cause an increase in the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

Tide Gates

Direct Impacts

Permanent removal of the tide gates, construction of a new access bridge to replace the access provided by the tide gates, and staging of equipment to be used for the project (refer to Figure 44) would not affect access to the BCER in such a way during construction that recreation users would be inclined to use alternative regional parks or recreational facilities. In addition, the project does not include the construction of housing, businesses, or extension of infrastructure. Since the proposed project does not include features that might stimulate an increase in the population of the surrounding community, no impacts to recreational facilities due to increased use as a result of surrounding community population change would occur.

Indirect Impacts

The permanent removal of the tide gates and replacement with a new access bridge is not anticipated to have any indirect impacts that would increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new access bridge would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Since maintenance activities and long-term operation would be no different than what occur currently at other bridges, these activities would not be anticipated to cause an increase in the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

C02/C04 Channels

Direct Impacts

Modification of the flood control channels within the C02/C04 system and staging of equipment to be used for the project (refer to *Section 5.11.4.6 IMPACT HAZ-6* for detailed discussion of staging areas) would not affect access to area parks and/or recreational facilities. In addition, the project does not include the construction of housing, businesses, or extension of infrastructure. Since the proposed project does not include features that might stimulate an increase in the population of the surrounding community, no impacts to recreational facilities due to increased use as a result of surrounding community population change would occur.

Indirect Impacts

The modification of the flood control channels is not anticipated to have any indirect impacts that would increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing flood control channels. Typical

maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channel if needed. Since maintenance activities and long-term operation would be no different than what occurs currently for the existing flood control channels, these activities would not be anticipated to cause an increase in the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

C05/C06 Channels

Direct Impacts

Modification of the flood control channels within the C05/C06 system and staging of equipment to be used for the project (refer to *Section 5.11.4.6 IMPACT HAZ-6* for detailed discussion of staging areas) would not affect access to area parks and/or recreational facilities. In addition, the project does not include the construction of housing, businesses, or extension of infrastructure. Since the proposed project does not include features that might stimulate an increase in the population of the surrounding community, no impacts to recreational facilities due to increased use as a result of surrounding community population change would occur.

Indirect Impacts

The modification of the flood control channels is not anticipated to have any indirect impacts that would increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing flood control channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channel if needed. Since maintenance activities and long-term operation would be no different than what occurs currently for the existing flood control channels, these activities would not be anticipated to cause an increase in the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

Level of Impact for the NED Plan

No Impact. The proposed project would be conducted primarily within designated flood control channels and flood control channel rights-of-way. In addition, the project does not include the construction of housing, businesses, or extension of infrastructure which may result drive an increase in the population of the surrounding community. Therefore, since the proposed project does not include features that might stimulate an increase in the population of the surrounding community, no impacts to recreational facilities due to increased use as a result of surrounding community population change would occur.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

Modification of the flood control channels and selective crossings (refer to *Section 5.11.4.6 IMPACT HAZ-6* for a list of crossings to be modified) within the C02/C04 system and staging of equipment to be used for the project (refer to *Section 5.11.4.6 IMPACT HAZ-6* for detailed discussion of staging areas) would not affect access to area parks and/or recreational facilities. In addition, the project does not include the construction of housing, businesses, or extension of infrastructure. Since the proposed project does not include features that might stimulate an increase in the population of the surrounding community, no impacts to recreational facilities due to increased use as a result of surrounding community population change would occur.

Indirect Impacts

The modification of the flood control channels and associated crossings is not anticipated to have any indirect impacts that would increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing flood control channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channel if needed. Since maintenance activities and long-term operation would be no different than what occurs currently for the existing flood control channels, these activities would not be anticipated to cause an increase in the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

C05/C06 Channels

Direct Impacts

Modification of the flood control channels and selective crossings (refer to *Section 5.11.4.6 IMPACT HAZ-6* for a list of crossings to be modified) within the C05/C06 system and staging of equipment to be used for the project (refer to *Section 5.11.4.6 IMPACT HAZ-6* for detailed discussion of staging areas) would not affect access to area parks and/or recreational facilities. In addition, the project does not include the construction of housing, businesses, or extension of infrastructure. Since the proposed project

does not include features that might stimulate an increase in the population of the surrounding community, no impacts to recreational facilities due to increased use as a result of surrounding community population change would occur.

Indirect Impacts

The modification of the flood control channels and associated crossings is not anticipated to have any indirect impacts that would increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing flood control channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channel if needed. Since maintenance activities and long-term operation would be no different than what occurs currently for the existing flood control channels, these activities would not be anticipated to cause an increase in the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

Diversion Channel

Direct Impacts

Construction of the diversion channel within the within the C02/C04 system and staging of equipment to be used for the project (refer to *Section 5.11.4.6 IMPACT HAZ-6* for detailed discussion of staging areas) would not affect access to area parks and/or recreational facilities. In addition, although the project does not include the construction of housing or businesses, the project does propose the extension of existing infrastructure. Although the project would construct a new flood control channel, the area surrounding where the diversion channel would be constructed is entirely built-up with private residences, light industrial, and the Westminster Mall. Overall, the construction of the diversion channel is not expected to stimulate an increase in the population of the surrounding community that might subsequently result in an increased use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated.

Indirect Impacts

The construction of the diversion channel is not anticipated to have any indirect impacts that would increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the diversion channel would be no different than maintenance activities that are undertaken currently for the existing flood control channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channel if needed. Since maintenance activities and long-term operation would be no different than what occurs currently for the existing flood control channels, these activities would not be anticipated to cause an increase in the use of existing neighborhood and regional parks or other

recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

Level of Impact for the LPP

No Impact. The proposed project would be conducted primarily within designated flood control channels and flood control channel right-of-ways. In addition, the project does not include the construction of housing or businesses which may drive an increase in the population of the surrounding community. Therefore, since the proposed project does not include features that might stimulate an increase in the population of the surrounding community, no impacts to recreational facilities due to increased use as a result of surrounding community population change would occur.

5.13.5.2 IMPACT REC-2: Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no federal project would be constructed. Therefore, there would be no project implemented that would include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment. The current level of risk would remain for flooding within the Westminster watershed, including regional parks and recreational facilities that are adjacent to the drainage channels. Widespread overtopping within the area would still occur between the 10% and 4% ACE events. Depending on the location, severity, and duration of the flooding, the location and extent of damage and impacts on existing parks and recreational facilities could range from minor to extensive. The continued risk of overtopping within the study area would cause long-term impacts by increasing the maintenance required to maintain parks and recreational facilities adjacent to the channel system. Therefore, under the No Action Plan there could be a significant adverse impact.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The Warner Avenue Bridge is not a recreational facility. In addition, the proposed project does not include the construction or expansion of recreational facilities. Therefore, no direct, indirect, or long-term impacts related to the construction or expansion of recreational facilities would occur as a result of the proposed project.

Tide Gates

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The tide gates that are being removed and the construction of a new span bridge to replace the access provided by the tide gates are not recreational facilities. In addition, the proposed project does not include

the construction or expansion of recreational facilities. Therefore, no direct, indirect, or long-term impacts related to the construction or expansion of recreational facilities would occur as a result of the proposed project.

C02/C04 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The flood control channels within the C02/C04 system that would be modified are not recreational facilities. In addition, the proposed project does not include the construction or expansion of recreational facilities. Therefore, no direct, indirect, or long-term impacts related to the construction or expansion of recreational facilities would occur as a result of the proposed project.

C05/C06 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The flood control channels within the C05/C06 system that would be modified are not recreational facilities. In addition, the proposed project does not include the construction or expansion of recreational facilities. Therefore, no direct, indirect, or long-term impacts related to the construction or expansion of recreational facilities would occur as a result of the proposed project.

Level of Impact for the NED Plan

No Impact. The proposed project does not include recreational facilities. In addition, the proposed project does not include the construction or expansion of recreational facilities. Therefore, no direct, indirect, or long-term impacts related to the construction or expansion of recreational facilities would occur as a result of the proposed project.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The flood control channels within the C02/C04 system and the associated crossings (refer to *Section 5.11.4.6 IMPACT HAZ-6* for a list of crossings to be modified) that would be modified as part of the proposed project are not recreational facilities. In addition, the proposed project does not include the construction or expansion of recreational facilities. Therefore, no direct, indirect, or long-term impacts

related to the construction or expansion of recreational facilities would occur as a result of the proposed project.

C05/C06 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The flood control channels within the C05/C06 system and the associated crossings (refer to *Section 5.11.4.6 IMPACT HAZ-6* for a list of crossings to be modified) that would be modified as part of the proposed project are not recreational facilities. In addition, the proposed project does not include the construction or expansion of recreational facilities. Therefore, no direct, indirect, or long-term impacts related to the construction or expansion of recreational facilities would occur as a result of the proposed project.

Diversion Channel

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The proposed project does not include the construction or expansion of recreational facilities. The new diversion channel would not be a recreational facility. Therefore, no direct, indirect, or long-term impacts related to the construction or expansion of recreational facilities would occur as a result of the proposed project.

Level of Impact for the LPP

No Impact. The proposed project does not include recreational facilities. In addition, the proposed project does not include the construction or expansion of recreational facilities. Therefore, no impacts related to the construction or expansion of recreational facilities would occur as a result of the proposed project.

5.14 Aesthetics

5.14.1 Regulatory Framework

5.14.1.1 State

State Scenic Highway: The State Scenic Highway Program was established to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to State highways. A scenic highway is designated under this program when a local jurisdiction adopts a scenic corridor protection program, applies to the California Department of Transportation for scenic highway approval, and receives notification from the California Department of Transportation that the highway has been designated as a Scenic Highway.

5.14.2 Impact Significance Criteria

The impact criteria below were taken from Appendix G of the CEQA guidelines and are also being adopted for NEPA. The impacts on aesthetics associated with the No Action Plan, NED Plan, or LPP would be considered significant if one or more of the conditions described below were to occur as a result of implementation of the project.

IMPACT A-1: Have a substantial adverse effect on a scenic vista.

IMPACT A-2: Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.

IMPACT A-3: Substantially degrade the existing visual character or quality of public views of the site and its surroundings (public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

IMPACT A-4: Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

5.14.3 Mitigation Measures

The following measures would minimize impacts on aesthetic quality within the vicinity of construction activities while construction is occurring and would return temporarily disturbed areas to pre-project conditions. The following mitigation measures would be implemented for both the NED Plan and LPP.

MM-A-1 Work and staging areas would be kept orderly and free of trash and debris.

MM-A-2 Screen construction areas including borrow sites, staging areas, access roads, and work areas from public view.

MM-A-3 Construction lighting fixtures would be shielded by providing side flaps on lights. Onsite construction lighting would be arranged so that direct rays would not shine in or produce glares to nearby residential uses.

MM-A-4 If the onsite construction lighting creates a lighting or glare problem for residential properties, OCPW would implement corrective measures to resolve the problem. Such corrective measures would include raising the height of temporary construction walls or providing other shielding for lighting such as shielding on the light fixtures or relocating light fixtures.

5.14.4 Aesthetics Impacts

5.14.4.1 IMPACT A-1: Have a substantial adverse effect on a scenic vista.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no federal project would be implemented. Therefore, no impacts to existing scenic vistas would occur. Existing views surrounding the study area would not change. The current level of risk would remain for flooding within the Westminster watershed. Widespread overtopping within the study area would still occur between the 10% and 4% ACE events. Future flooding would not degrade the physical appearance of features which contribute to scenic vistas within the study area. Although these areas would be impacted following flooding, they would retain their undeveloped appearance which contributes to the scenic views. Flooding would not affect a scenic vista, substantially damage scenic resources, substantially degrade existing visual character of the site, or create a new source of light or glare.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

Construction associated with lengthening of the Warner Avenue Bridge and removal of the upstream constriction would not be expected to substantially impact a scenic vista. Scenic vistas provide visual access or panoramic views to a large geographic area. The field of view from a vista location can be wide and extend into the distance. Panoramic views are usually associated with vantage points looking out over a section of urban or natural areas that provide a geographic orientation not commonly available. Examples of panoramic views might include an urban skyline, valley, mountain range, the ocean, or other water bodies. Both the Huntington Beach (City of Huntington Beach 2017) and County of Orange (OCPW 2005) General Plans were reviewed for the presence of scenic vistas within the vicinity of the proposed project. Although no scenic vistas were specifically mentioned in either general plan, Huntington Harbour to the north, BCER to the south, and the Pacific Ocean to the west may all be considered open spaces with scenic views.

Visitors to the BCER that utilize the north parking lot by the Bolsa Chica Conservancy, at the southeast corner of the intersection of Warner Avenue with PCH, would be within 100 feet of the construction activities occurring at Warner Avenue Bridge. However, visitors at the north parking lot viewing the BCER would be looking south and not at the bridge which is located northeast from the parking lot. Visitors at the north parking lot looking east towards the Bolsa Chica Mesa could have their view impaired during construction activities if they are looking directly east; however, views looking south east towards the mesa would not be impaired during construction. Visitors at scenic overlook #1 (Figure 43) would be more than approximately 600 feet away from the construction activities at Warner Avenue Bridge. If visitors were to look north towards the bridge, their view of Huntington Harbour may be slightly impacted, although the distance of the scenic overlook from Huntington Harbour would already limit views. Views of the BCER south of scenic overlook #1 and west towards the Pacific Ocean would not be impaired during construction. The remaining scenic overlooks (Figure 45) are more than approximately 1,500 feet away from the construction activities at Warner Avenue Bridge, therefore, due to the distance it is unlikely views would be impaired.

The potential staging area for construction equipment is shown on Figure 45. The staging area is located north of the bridge and is currently a parking lot. Equipment staged at this location during construction activities associated with the modification of the bridge would not impair views of the BCER, Huntington Harbour, or the Pacific Ocean. Even though views would not be significantly impaired during construction activities, mitigation measures MM-A-1 and MM-A-2 would be implemented to ensure potential impacts to scenic vistas due to the presence of construction equipment and construction activities are minimized. These mitigation measures include the screening of construction equipment from public view as well as maintaining a trash free construction site. Overall, there would be no impacts to scenic vistas with implementation of this measure.

Figure 45: Location of Scenic Overlooks within the Bolsa Chica Ecological Reserve

Indirect Impacts

Modification of the Warner Avenue Bridge would not be expected to have any indirect impacts to scenic vistas. The proposed measure is lengthening the existing bridge and would not involve the construction of a new bridge, a wider bridge, or new features that might indirectly obstruct or impair scenic views. Therefore, there would be no indirect impacts to scenic vistas.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Maintenance activities would be short-term often occurring within a day, therefore, no impact to scenic vistas would be expected due to long-term operation or maintenance activities.

Tide Gates

Direct Impacts

Construction associated with the permanent removal of the tide gates on C05 Reach 1 and replacement with a small span bridge would not be expected to substantially impact a scenic vista. Both the Huntington Beach (City of Huntington Beach 2017) and County of Orange (OCPW 2005) General Plans were reviewed for the presence of scenic vistas within the vicinity of the proposed project. Although no scenic vistas were specifically mentioned in either general plan, Huntington Harbour to the north, BCER to the south, and the Pacific Ocean to the west may all be considered open spaces with scenic views.

Visitors to the BCER that utilize the south parking lot located off of the PCH, would be over 3,000 feet south of construction activities occurring at the tide gates. While visitors at the parking lot would likely be able to tell that there are construction activities occurring, they would not substantially obstruct or impair views at this distance. Visitors at scenic overlooks #4, #5, and #6 are the closest to the tide gates and would be within 150 to 700 feet of the construction activities (Figure 44). Visitors at scenic overlook #4 would most likely be looking north towards OBB and the Bolsa Chica Mesa. With the tide gates being located south of the overlook, scenic views of OBB and the Bolsa Chica Mesa would not be impacted during construction activities. Visitors at scenic overlook #5 would most likely be looking east towards the muted tidal pocket. With the tide gates located southwest of the overlook, scenic views of the muted tidal pocket would not be impacted during construction activities. Lastly, visitors at scenic overlook #6 would most likely be looking southeast and southwest towards the full tidal pocket and Inner Bolsa Bay, respectively. With the tide gates being located northwest of the overlook, scenic views of the full tidal pocket and Inner Bolsa Bay would not be impacted during construction activities.

The potential staging area for construction equipment is shown on Figure 44. The staging area is located approximately 4,600 feet east of where the tide gates are located on C05 Reach 1. Equipment staged at this location during construction activities associated with the permanent removal of the tide gates would not impair views of the BCER, since the staging area is located outside of the reserve. Even though views would not be significantly impaired during construction activities, mitigation measures MM-A-1 and MM-A-2 would be implemented to ensure potential impacts to scenic vistas due to the presence of construction equipment and construction activities are minimized. These mitigation measures include the screening of construction equipment from public view as well as maintaining a trash free construction site. Overall, there would be no impacts to scenic vistas with implementation of this measure.

Figure 46: Location of Scenic Overlooks within the Bolsa Chica Ecological Reserve

Indirect Impacts

Permanent removal of the tide gates on C05 Reach 1 and replacement with a small span bridge would not be expected to have any indirect impacts to scenic vistas. The replacement span bridge would be small and would not occupy a footprint much larger than the tide gates did. Therefore, the construction of the replacement bridge would not be expected to obstruct or impair scenic views more than the former tide gates did. Overall, no indirect impacts to scenic vistas would occur.

Long-Term Operation and Maintenance Impacts

Although the tide gates are being removed, there would be maintenance activities associated with the new span bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Maintenance activities would be short-term often occurring within a day, therefore, no impact to scenic vistas would be expected due to long-term operation or maintenance activities.

C02/C04 Channels

Direct Impacts

Construction activities associated with the flood control channel modifications would not be expected to substantially impact a scenic vista. The Huntington Beach (City of Huntington Beach 2017), Westminster (PlaceWorks and Fehr & Peers Transportation Consultants 2016), Garden Grove (City of Garden Grove 2008) and County of Orange (OCPW 2005) General Plans were reviewed for the presence of scenic vistas within the vicinity of the proposed project. No scenic vistas were specifically mentioned in any of the general plans. The only potential scenic vista within the C02/C04 flood control system is the SBNWR which is located to the north of C02 Reach 23. There are no scenic overlooks or access points to SBNWR within the vicinity of C02 Reach 23 where construction activities would be occurring. Since there are no access points or overlooks, there would be no impact to scenic vistas due to construction activities within C02 Reach 23. The remainder of the proposed project would occur along reaches of the C04 flood control channels. The C04 flood control channel is in an urban area surrounded by development. There are no scenic vistas along reaches of C04. Additionally, all of the proposed modifications to the channel would occur at or below the surrounding grade. Staging areas for construction equipment would be located within the channel right-of-way or immediately adjacent to the channel right-of-way. None of the staging areas are vantage points for scenic vistas. Overall, no impacts to scenic vistas would occur.

Indirect Impacts

Modification of the flood control channels would not be expected to have any substantial indirect impacts on scenic vistas. As described above for direct impacts, there are no scenic vistas within the vicinity of the flood control channels, except for SBNWR located to the north of C02 Reach 23. However, the modifications would not alter the existing grade of the channels or create features that might obstruct or impair scenic views. Therefore, no indirect impacts to scenic vistas would occur.

Long-term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) currently occur within the existing channels,

therefore, the long-term operation and maintenance activities for the flood control channels are expected to have no impact on scenic vistas.

C05/C06 Channels

Direct Impacts

Construction activities associated with the flood control channel modifications would not be expected to substantially impact a scenic vista. The Huntington Beach (City of Huntington Beach 2017), Fountain Valley (City of Fountain Valley 1995), Garden Grove (City of Garden Grove 2008), Santa Ana (City of Santa Ana 1982), and County of Orange (OCPW 2005) General Plans were reviewed for the presence of scenic vistas within the vicinity of the proposed project. The Santa Ana General Plan was the only plan that specifically mentioned the SAR, Santiago Creek, and Centennial Regional Park as important open space corridors. These open space corridors provide visual access or panoramic views to a large geographic area. In addition, even though not specifically mentioned in a general plan, the BCER would be a scenic vista within the vicinity of C05.

In regards to the BCER, approximately 2,600 feet of C05 Reach 1 from the tide gates upstream is surrounded by the reserve. Visitors to the BCER that utilize the south parking lot located off of the PCH, would be over 3,000 feet south of construction activities occurring along C05 Reach 1. While visitors at the parking lot would likely be able to tell that there are construction activities occurring, they would not substantially obstruct or impair views at this distance. Visitors at scenic overlooks #4, #5, #6, #7 are the closest to C05 Reach 1 and would be within 150 to 700 feet of the construction activities (Figure 44). Visitors at scenic overlook #4 would most likely be looking north towards OBB and the Bolsa Chica Mesa. With C05 Reach 1 being located south of the overlook, scenic views of OBB and the Bolsa Chica Mesa would not be impacted during construction activities. Visitors at scenic overlook #5 would most likely be looking east towards the muted tidal pocket. With C05 Reach 1 being located southwest of the overlook, scenic views of the muted tidal pocket would not be impacted during construction activities. Visitors at scenic overlook #6 would most likely be looking southeast and southwest towards the full tidal pocket and Inner Bolsa Bay, respectively. With C05 Reach 1 being located northwest of the overlook, scenic views of the full tidal pocket and Inner Bolsa Bay would not be impacted during construction activities. Lastly, visitors at scenic overlook #7 would most likely be looking south and southwest towards the full tidal pocket and Inner Bolsa Bay, respectively. With C05 Reach 1 being located north of the overlook, scenic views of the full tidal pocket and Inner Bolsa Bay would not be impacted during construction activities.

In regards to the SAR, Santiago Creek, and Centennial Regional Park, all of these sites are located outside the project footprint and would not have their scenic vistas impacted by construction activities within the channels. The closest the proposed project comes to the SAR is C06 Reach 19, which is located approximately 2,700 feet northwest of the river. The upper reaches of C05 are located over 5,000 feet east/southeast of the SAR. The closest the proposed project comes to Santiago Creek is C05 Reach 9, which is located over approximately 6,000 feet west of the creek. Lastly, the closest the proposed project comes to Centennial Regional Park is C06 Reach 19, which is located approximately 6,000 feet southwest of the park. Additionally, all of the proposed modifications to the channels would occur at or below the surrounding grade.

The potential staging area for construction equipment for C05 Reach 1 is shown on Figure 44. The staging area is located approximately east of the portion of C05 Reach 1 that is located within the BCER. Equipment staged at this location during construction activities associated with the modification of the channel would not impair views of the BCER, since the staging area is located outside of the reserve.

Staging areas for the remaining reaches within C05 and C06 would be located within the channel right-of-way or immediately adjacent to the channel right-of-way. None of the staging areas are vantage points for scenic vistas. Overall, no impacts to scenic vistas would occur.

Indirect Impacts

Modification of the flood control channels would not be expected to have any substantial indirect impacts on scenic vistas. As described above for direct impacts, there are no scenic vistas within the proposed project footprint, except for the BCER located to the north and south of approximately 2,600 feet of C05 Reach 1. However, the modifications would not alter the existing grade of the channels or create features that might obstruct or impair scenic views. Therefore, no indirect impacts to scenic vistas would occur.

Long-term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) currently occur within the existing channels, therefore, the long-term operation and maintenance activities for the flood control channels are expected to have no impact on scenic vistas.

Level of Impact for the NED Plan

No Impact. Construction activities are not expected to have any short-term impacts to scenic vistas. Construction and maintenance activities would not have any long-term direct or indirect impacts on existing scenic vistas, site quality, or visual character within the area of the proposed project.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

Construction activities associated with the flood control channel modifications would not be expected to substantially impact a scenic vista. The Huntington Beach (City of Huntington Beach 2017), Westminster (PlaceWorks and Fehr& Peers Transportation Consultants 2016), Garden Grove (City of Garden Grove 2008) and County of Orange (OCPW 2005) General Plans were reviewed for the presence of scenic vistas within the vicinity of the proposed project. No scenic vistas were specifically mentioned in any of the general plans. The only potential scenic vista within the C02/C04 flood control system is the SBNWR which is located to the north of C02 Reach 23. There are no scenic overlooks or access points to SBNWR

within the vicinity of C02 Reach 23 where construction activities would be occurring. Since there are no access points or overlooks, there would be no impact to scenic vistas due to construction activities within C02 Reach 23. The remainder of the proposed project would occur along reaches of the C04 flood control channels. The C04 flood control channel is in an urban area surrounded by development. There are no scenic vistas along reaches of C04. Additionally, all of the proposed modifications to the channel would occur at or below the surrounding grade. Staging areas for construction equipment would be located within the channel right-of-way or immediately adjacent to the channel right-of-way. None of the staging areas are vantage points for scenic vistas. Overall, no impacts to scenic vistas would occur.

Indirect Impacts

Modification of the flood control channels would not be expected to have any substantial indirect impacts on scenic vistas. As described above for direct impacts, there are no scenic vistas within the vicinity of the flood control channels, except for SBNWR located to the north of C02 Reach 23. However, the modifications would not alter the existing grade of the channels or create features that might obstruct or impair scenic views. Therefore, no indirect impacts to scenic vistas would occur.

Long-term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) currently occur within the existing channels, therefore, the long-term operation and maintenance activities for the flood control channels are expected to have no impact on scenic vistas.

C05/C06 Channels

Direct Impacts

Construction activities associated with the flood control channel modifications would not be expected to substantially impact a scenic vista. The Huntington Beach (City of Huntington Beach 2017), Fountain Valley (City of Fountain Valley 1995), Garden Grove (City of Garden Grove 2008), Santa Ana (City of Santa Ana 1982), and County of Orange (OCPW 2005) General Plans were reviewed for the presence of scenic vistas within the vicinity of the proposed project. The Santa Ana General Plan was the only plan that specifically mentioned the SAR, Santiago Creek, and Centennial Regional Park as important open space corridors. These open space corridors provide visual access or panoramic views to a large geographic area. In addition, even though not specifically mentioned in a general plan, the BCER would be a scenic vista within the vicinity of C05.

In regards to the BCER, approximately 2,600 feet of C05 Reach 1 from the tide gates upstream is surrounded by the reserve. Visitors to the BCER that utilize the south parking lot located off of the PCH, would be over 3,000 feet south of construction activities occurring along C05 Reach 1. While visitors at the parking lot would likely be able to tell that there are construction activities occurring, they would not substantially obstruct or impair views at this distance. Visitors at scenic overlooks #4, #5, #6, #7 are the closest to C05 Reach 1 and would be within 150 to 700 feet of the construction activities (Figure 44). Visitors at scenic overlook #4 would most likely be looking north towards OBB and the Bolsa Chica Mesa. With C05 Reach 1 being located south of the overlook, scenic views of OBB and the Bolsa Chica Mesa would not be impacted during construction activities. Visitors at scenic overlook #5 would most likely be looking east towards the muted tidal pocket. With C05 Reach 1 being located southwest of the overlook, scenic views of the muted tidal pocket would not be impacted during construction activities. Visitors at scenic overlook #6 would most likely be looking southeast and southwest towards the full tidal

pocket and Inner Bolsa Bay, respectively. With C05 Reach 1 being located northwest of the overlook, scenic views of the full tidal pocket and Inner Bolsa Bay would not be impacted during construction activities. Lastly, visitors at scenic overlook #7 would most likely be looking south and southwest towards the full tidal pocket and Inner Bolsa Bay, respectively. With C05 Reach 1 being located north of the overlook, scenic views of the full tidal pocket and Inner Bolsa Bay would not be impacted during construction activities.

In regards to the SAR, Santiago Creek, and Centennial Regional Park, all of these sites are located outside the project footprint and would not have their scenic vistas impacted by construction activities within the channels. The closest the proposed project comes to the SAR is C06 Reach 19, which is located approximately 2,700 feet northwest of the river. The upper reaches of C05 are located over 5,000 feet east/southeast of the SAR. The closest the proposed project comes to Santiago Creek is C05 Reach 9, which is located over approximately 6,000 feet west of the creek. Lastly, the closest the proposed project comes to Centennial Regional Park is C06 Reach 19, which is located approximately 6,000 feet southwest of the park. Additionally, all of the proposed modifications to the channels would occur at or below the surrounding grade.

The potential staging area for construction equipment for C05 Reach 1 is shown on Figure 44. The staging area is located approximately east of the portion of C05 Reach 1 that is located within the BCER. Equipment staged at this location during construction activities associated with the modification of the channel would not impair views of the BCER, since the staging area is located outside of the reserve. Staging areas for the remaining reaches within C05 and C06 would be located within the channel right-of-way or immediately adjacent to the channel right-of-way. None of the staging areas are vantage points for scenic vistas. Overall, no impacts to scenic vistas would occur.

Indirect Impacts

Modification of the flood control channels would not be expected to have any substantial indirect impacts on scenic vistas. As described above for direct impacts, there are no scenic vistas within the proposed project footprint, except for the BCER located to the north and south of approximately 2,600 feet of C05 Reach 1. However, the modifications would not alter the existing grade of the channels or create features that might obstruct or impair scenic views. Therefore, no indirect impacts to scenic vistas would occur.

Long-term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) currently occur within the existing channels, therefore, the long-term operation and maintenance activities for the flood control channels are expected to have no impact on scenic vistas.

Diversion Channel

Direct Impacts

Construction activities associated with the construction of the diversion channel would not be expected to substantially impact a scenic vista. The Westminster (PlaceWorks and Fehr& Peers Transportation Consultants 2016) and County of Orange (OCPW 2005) General Plans were reviewed for the presence of scenic vistas within the vicinity of the proposed project. The closest scenic vista would likely be the SBNWR which is located over 2.5 miles southwest of where the diversion channel would be constructed. Staging areas for construction equipment would be located within channel right-of-ways for C04 Reach

20, C04 Reach 21, or along the area where the diversion channel would be constructed. None of the staging areas are vantage points for scenic vistas. Overall, no impacts to scenic vistas would occur.

Indirect Impacts

Construction of the diversion channel would not be expected to have any substantial indirect impacts on scenic vistas. As described above for direct impacts, there are no scenic vistas within the proposed project footprint. Additionally, the diversion channel would be constructed below grade. Therefore, no indirect impacts to scenic vistas would occur.

Long-term Operation and Maintenance Impacts

Maintenance activities for the diversion channel would be the same as those that currently occur within the existing channels. Activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channel if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) would have no impact on scenic vistas.

Level of Impact for the LPP

No Impact. Construction activities are not expected to have any short-term impacts to scenic vistas. Construction and maintenance activities would not have any long-term direct or indirect impacts on existing scenic vistas, site quality, or visual character within the area of the proposed project.

5.14.4.2 IMPACT A-2: Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no federal project would be constructed. Therefore, no project would be implemented that could potentially damage scenic resources. The current level of risk would remain for flooding within the Westminster watershed. Widespread overtopping within the area would still occur between the 10% and 4% ACE events. Future flooding would not substantially damage scenic resources vistas within the area. Although these areas would potentially be inundated during flooding, they would likely not be substantially impacted. The exception would be any historic buildings within the area that could be inundated. Inundation of historic buildings would substantially damage these scenic resources resulting in a significant adverse impact.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

Warner Avenue and Warner Avenue Bridge are not designated as part of a state scenic highway. Warner Avenue does connect to the PCH, however, the portion of the PCH within the vicinity of the proposed project has not been officially designated as a State Scenic Highway although it is eligible for designation. The status of a proposed state scenic highway changes from eligible to officially designated when the local governing body applies to Caltrans for scenic highway approval, adopts a Corridor

Protection Program, and receives notification that the highway has been officially designated a Scenic Highway. The nearest designated State Scenic Highway is SR-91 (Riverside Freeway). The proposed project at Warner Avenue Bridge is approximately 0.12 miles east of the eligible for designation portion of the PCH in Orange County, and over approximately 16 miles southwest of the designated State Scenic Highway portion of SR-91.

Although not designated a State Scenic Highway by Caltrans, the portion of the PCH that traverses through Orange County is listed as a viewscape corridor in the Orange County General Plan (OCPW 2005). A viewscape corridor is a route which traverses a corridor within which unique or unusual scenic resources and aesthetic values are found. This designation is intended to minimize the impact of the highway and land development upon the significant resources along the route (OCPW 2005). As noted above, the proposed project at Warner Avenue Bridge is approximately 0.12 miles east of the PCH designated viewscape corridor in Orange County. Since construction activities would be temporary and would be restricted to the immediate vicinity of the Warner Avenue Bridge and would not extend to the PCH, the proposed project would have no impact to scenic resources within a state scenic highway.

Indirect Impacts

Modification of the Warner Avenue Bridge would also include the removal of the upstream constriction which is listed as approximately 0.6 acre of nonnative grassland in the Orange County General Plan (OCPW 2005). Removal of this 0.6 acre of nonnative grassland would not be expected to indirectly impact scenic resources along the eligible for designation PCH. Users of the highway would most likely be looking at Inner and OBB and not 0.6 acre of nonnative grassland. In addition, the removal of the approximately 0.6 acre of upland habitat would create more open water area within OBB. Ultimately, there would be no indirect impacts to scenic resources within a state scenic highway due to implementation of this measure.

Long-term Operation and Maintenance Impacts

Maintenance activities associated with Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Maintenance activities would be short-term and would be restricted to the bridge, therefore, long-term operation and maintenance of the Warner Avenue Bridge would have no impacts to scenic resources within a state scenic highway.

Tide Gates

Direct Impacts

The location where the tide gates would be removed and replaced with a new access bridge is not adjacent to any state scenic highways. The PCH is located approximately 0.1 mile west of the tide gates locale and is eligible for designation. The nearest designated State Scenic Highway is SR-91 which is located over approximately 16 miles northeast of the tide gates locale. Although not designated a State Scenic Highway by Caltrans, the portion of the PCH that traverses through Orange County is listed as a viewscape corridor in the Orange County General Plan (OCPW 2005). As noted above, the PCH is located approximately 0.1 mile west of the tide gates locale. Since construction activities for removal of the tide gates and replacement with a small span bridge would be temporary and would be restricted to the

immediate vicinity of the tide gates footprint and would not extend to the PCH, the proposed project would have no impact to scenic resources within a state scenic highway.

Indirect Impacts

The permanent removal of the tide gates and replacement with a new access bridge is not expected to have any indirect impacts to scenic resources within a state scenic highway since construction is restricted to the immediate vicinity of where the tide gates are located. While construction is occurring, users of the PCH would still be able to see scenic resources within the BCER. Ultimately, there would be no indirect impacts to scenic resources within a state scenic highway due to implementation of this measure.

Long-Term Operation and Maintenance Impacts

Although the tide gates would be permanently removed, they would be replaced by the construction of a new access bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Maintenance activities would be short-term and would be restricted to the bridge, therefore, long-term operation and maintenance of the new span bridge would have no impacts to scenic resources within a state scenic highway.

C02/C04 Channels

Direct Impacts

The C02/C04 channels are not adjacent to any state scenic highways. C02 Reach 23 is the most downstream reach within the C02/C04 channel system and is located approximately 0.5 mile east of the portion of the PCH eligible for designation. The most upstream reach within the C02/C04 channel system is C04 Reach 22 which is located over approximately 8 miles northeast of the PCH. The nearest designated state scenic highway is SR-91 which is located over approximately 16 miles northeast of C02 Reach 23 and approximately 8 miles northeast of C04 Reach 22. Although not designated a state scenic highway by Caltrans, the portion of the PCH that traverses through Orange County is listed as a viewscape corridor in the Orange County General Plan (OCPW 2005). As noted above, C02 Reach 23 is located approximately 0.5 mile east of the PCH, and C04 Reach 22 is located approximately 8 miles northeast of the PCH. Since construction activities for the modification of the drainage channels within the C02/C04 system would be temporary and would be restricted to the drainage channel right-of-way and would not extend within the vicinity of PCH or SR-91, the proposed project would have no impact to scenic resources within a state scenic highway.

Indirect Impacts

The modification of the flood control channels within the C02/C04 system is not expected to have any indirect impacts to scenic resources within a state scenic highway since the proposed measure is restricted to the flood control channel right-of-ways which are not considered scenic resources and are not located within the vicinity of a designated State Scenic Highway. Ultimately, there would be no indirect impacts to scenic resources within a state scenic highway due to implementation of this measure.

Long-term Operation and Maintenance Impacts

Maintenance activities for the flood control channels would be the same as maintenance activities that occur currently. Maintenance activities would include vegetation control, rodent control, levee and

channel repair, and sediment removal from within the channels if needed. The flood control channels do not occur within the vicinity of a state scenic highway; therefore, long-term operation and maintenance activities related to the channels would have no impact to scenic resources within a state scenic highway.

C05/C06 Channels

Direct Impacts

The C05/C06 channels are not adjacent to any state scenic highways. C05 Reach 1 is the most downstream reach within the C05/C06 channel system and is located approximately 0.1 mile east of the portion of the PCH eligible for designation. The most upstream reaches within the C05/C06 channel system are C05 Reach 12 and C06 Reach 19 which are located over approximately 10 miles northeast and 7 miles east of the PCH, respectively. The nearest designated state scenic highway is SR-91 which is located over approximately 16 miles northeast of C05 Reach 1. SR-91 is located over approximately 5 and 10 miles northeast of C05 Reach 12 and C06 Reach 19, respectively. Since construction activities for the modification of the flood control channels within the C05/C06 system would be temporary and would be restricted to the drainage channel right-of-way and would not extend within the vicinity of PCH or SR-91, the proposed project would have no impact to scenic resources within a state scenic highway.

Indirect Impacts

The modification of the flood control channels within the C05/C06 system is not expected to have any indirect impacts to scenic resources within a state scenic highway since the proposed measure is restricted to the flood control channel right-of-ways which are not considered scenic resources and are not located within the vicinity of a designated State Scenic Highway. Ultimately, there would be no indirect impacts to scenic resources within a state scenic highway due to implementation of this measure.

Long-term Operation and Maintenance Impacts

Maintenance activities for the flood control channels would be the same as maintenance activities that occur currently. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The flood control channels do not occur within the vicinity of a state scenic highway; therefore, long-term operation and maintenance activities related to the channels would have no impact to scenic resources within a state scenic highway.

Level of Impact for the NED Plan

No impact. The proposed project does not occur within the vicinity of a state scenic highway nor would it impact resources within the vicinity of a state scenic highway; therefore, construction, operation, and maintenance activities associated with the project would have no impact to scenic resources within a state scenic highway.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

The C02/C04 channels are not adjacent to any state scenic highways. C02 Reach 23 is the most downstream reach within the C02/C04 channel system and is located approximately 0.5 mile east of the portion of the PCH eligible for designation. The most upstream reach within the C02/C04 channel system is C04 Reach 22 which is located over approximately 8 miles northeast of the PCH. The nearest designated state scenic highway is SR-91 which is located over approximately 16 miles northeast of C02 Reach 23 and approximately 8 miles northeast of C04 Reach 22. Although not designated a state scenic highway by Caltrans, the portion of the PCH that traverses through Orange County is listed as a viewscape corridor in the Orange County General Plan (OCPW 2005). As noted above, C02 Reach 23 is located approximately 0.5 mile east of the PCH, and C04 Reach 22 is located approximately 8 miles northeast of the PCH. Since construction activities for the modification of the drainage channels within the C02/C04 system would be temporary and would be restricted to the drainage channel right-of-way and would not extend within the vicinity of PCH or SR-91, the proposed project would have no impact to scenic resources within a state scenic highway.

Indirect Impacts

The modification of the flood control channels within the C02/C04 system is not expected to have any indirect impacts to scenic resources within a state scenic highway since the proposed measure is restricted to the flood control channel right-of-ways which are not considered scenic resources and are not located within the vicinity of a designated State Scenic Highway. Ultimately, there would be no indirect impacts to scenic resources within a state scenic highway due to implementation of this measure.

Long-term Operation and Maintenance Impacts

Maintenance activities for the flood control channels would be the same as maintenance activities that occur currently. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The flood control channels do not occur within the vicinity of a state scenic highway; therefore, long-term operation and maintenance activities related to the channels would have no impact to scenic resources within a state scenic highway.

C05/C06 Channels

Direct Impacts

The C05/C06 channels are not adjacent to any state scenic highways. C05 Reach 1 is the most downstream reach within the C05/C06 channel system and is located approximately 0.1 mile east of the portion of the PCH eligible for designation. The most upstream reaches within the C05/C06 channel system are C05 Reach 12 and C06 Reach 19 which are located over approximately 10 miles northeast and 7 miles east of the PCH, respectively. The nearest designated state scenic highway is SR-91 which is located over approximately 16 miles northeast of C05 Reach 1. SR-91 is located over approximately 5 and 10 miles northeast of C05 Reach 12 and C06 Reach 19, respectively. Although not designated a state scenic highway by Caltrans, the portion of the PCH that traverses through Orange County is listed as a viewscape corridor in the Orange County General Plan (OCPW 2005). As noted above, C05 Reach 1 is

located approximately 0.1 mile east of the PCH, C05 Reach 12 is located over approximately 10 miles northeast of the PCH, and C06 Reach 19 is located over approximately 7 miles east of the PCH. Since construction activities for the modification of the flood control channels within the C05/C06 system would be temporary and would be restricted to the drainage channel right-of-way and would not extend within the vicinity of PCH or SR-91, the proposed project would have no impact to scenic resources within a state scenic highway.

Indirect Impacts

The modification of the flood control channels within the C05/C06 system is not expected to have any indirect impacts to scenic resources within a state scenic highway since the proposed measure is restricted to the flood control channel right-of-ways which are not considered scenic resources and are not located within the vicinity of a designated State Scenic Highway. Ultimately, there would be no indirect impacts to scenic resources within a state scenic highway due to implementation of this measure.

Long-term Operation and Maintenance Impacts

Maintenance activities for the flood control channels would be the same as maintenance activities that occur currently. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The flood control channels do not occur within the vicinity of a state scenic highway; therefore, long-term operation and maintenance activities related to the channels would have no impact to scenic resources within a state scenic highway.

Diversion Channel

Direct Impacts

The proposed site for the diversion channel is not adjacent to any state scenic highways. The most downstream location of the diversion channel is located over approximately 3 miles northeast of the portion of the PCH eligible for designation. The nearest designated state scenic highway is SR-91 which is located over approximately 11 miles northeast of the most upstream location of the diversion channel. Although not designated a state scenic highway by Caltrans, the portion of the PCH that traverses through Orange County is listed as a viewscape corridor in the Orange County General Plan (OCPW 2005). As noted above, the most downstream location of the diversion channel is located over approximately 3 miles northeast of the PCH. Since activities for the construction of the diversion channel would be temporary and would not extend within the vicinity of PCH or SR-91, the proposed project would have no impact to scenic resources within a state scenic highway.

Indirect Impacts

The construction of the diversion channel is not expected to have any indirect impacts to scenic resources within a state scenic highway since the proposed measure is not located in an area considered a scenic resources nor is it located within the vicinity of a designated State Scenic Highway. Ultimately, there would be no indirect impacts to scenic resources within a state scenic highway due to implementation of this measure.

Long-term Operation and Maintenance Impacts

Maintenance activities for the diversion channel would be the same as maintenance activities that occur currently within the flood control channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The diversion channel does not occur within the vicinity of a state scenic highway; therefore, long-term

operation and maintenance activities related to the channels would have no impact to scenic resources within a state scenic highway.

Level of Impact for the LPP

No impact. The proposed project does not occur within the vicinity of a state scenic highway nor would it impact resources within the vicinity of a state scenic highway; therefore, construction, operation, and maintenance activities associated with the project would have no impact to scenic resources within a state scenic highway.

5.14.4.3 IMPACT A-3: Substantially degrade the existing visual character or quality of public views of the site and its surroundings (public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no federal project would be constructed. Therefore, no impacts to existing visual character or quality of public views would occur. The current level of risk would remain for flooding within the Westminster watershed. Widespread overtopping within the study area would still occur between the 10% and 4% ACE events. Future flooding would not degrade the physical appearance of features which contribute to the visual character or quality of public views within the study area. Although these areas would be impacted following flooding, they would retain their undeveloped appearance which contributes to their existing visual character and quality.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

The project design proposes the modification of the existing Warner Avenue Bridge. The proposed construction involves leaving the existing bridge in place and adding extensions in order to lengthen the bridge in a westerly direction. The bridge does separate the waters of OBB to the south from the waters of Huntington Harbour to the north which are considered visual resources within the area. The proposed project would include temporary construction activities. Temporary construction views would include construction equipment, staging area, fencing, and soil stockpile. This impact would be short-term and terminate upon completion of construction. The potential staging area is located north of the bridge (Figure 43) and is currently a parking lot. Equipment staged at this location during construction activities would not substantially degrade the visual character or quality of views of OBB or Huntington Harbour. Overall, modification of the Warner Avenue Bridge would not substantially degrade the visual nature of the area, therefore, there would be a less than significant impact.

Indirect Impacts

The modification of Warner Avenue Bridge would not indirectly change or alter the visual character associated with the area where the bridge is located. There is already an existing bridge and the proposed

design would only increase the span of the bridge. Therefore, the modification of the bridge would not indirectly impact the visual nature of the area.

Long-term Operation and Maintenance Impacts

Maintenance activities associated with Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Maintenance activities would be short-term and would be restricted to the bridge, therefore, long-term operation and maintenance of the Warner Avenue Bridge would have no long-term impacts to the visual nature of the area.

Tide Gates

Direct Impacts

The project design proposes the permanent removal of the tide gates and replacement with a new access bridge that would accommodate recreational users and emergency response vehicles. The tide gates are at the downstream end of C05 Reach 1 and separate the flood control channel from OBB. The proposed project would include temporary construction activities. Temporary construction views would include construction equipment, staging area, fencing, and soil stockpile. This impact would be short-term and terminate upon completion of construction. The potential staging area is located approximately 4,600 feet east of the tide gates (Figure 44) and is currently an access road. Equipment staged at this located during construction would not substantially degrade the visual character or quality of views of OBB or the surrounding area. Overall, this measure would not substantially degrade the visual nature of the area, therefore, there would be a less than significant impact.

Indirect Impacts

The proposed measure would not indirectly change or alter the visual character associated with the area where the tide gates are currently located. The tide gates are currently there, and once they are removed, a bridge would replace them to continue to permit access to recreational users of the BCER as well as emergency response vehicles. Therefore, the proposed measure would not indirectly impact the visual nature of the area.

Long-term Operation and Maintenance Impacts

Although the tide gates would be removed, maintenance activities would be required for the new bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Maintenance activities would be short-term and would be restricted to the bridge, therefore, long-term operation and maintenance of the bridge would have no long-term impacts to the visual nature of the area.

C02/C04 Channels

Direct Impacts

The C02/C04 channels are characterized by earthen/riprap/concrete channel structures, algae growths, slow-flowing shallow water, and tufts of vegetation growing from sediment deposits. Modifications associated with the design of this measure would be similar to existing structures and would not change the visual character associated with the surrounding area. Therefore, these modifications would not permanently alter the existing viewshed. The modifications would include temporary construction activities. Temporary construction views would include construction equipment, staging areas, fencing, and soil stockpiles. This impact would be short-term and terminate upon completion of construction.

Staging areas for construction equipment would be located within the channel right-of-way or immediately adjacent to the channel right-of-way. Overall, this measure would not substantially degrade the visual nature of the area, therefore, there would be a less than significant impact.

Indirect Impacts

The modifications to the C02/C04 channels would not indirectly change or alter the visual character associated with the area. The flood control channels already exist and have been present in some form since the 1950's/1960's. Therefore, the modification of the flood control channels would not indirectly impact the visual nature of the area.

Long-term Operation and Maintenance Impacts

Maintenance activities for the flood control channels would be the same as maintenance activities that occur currently. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Maintenance activities would be short-term and would be restricted to within the flood control channel right-of-ways, therefore, long-term operation and maintenance of the channels would have no long-term impacts to the visual nature of the area.

C05/C06 Channels

Direct Impacts

The C05/C06 channels are characterized by earthen/riprap/concrete channel structures, algae growths, slow-flowing shallow water, and tufts of vegetation growing from sediment deposits. Modifications associated with the design of this measure would be similar to existing structures and would not change the visual character associated with the surrounding area. Therefore, these modifications would not permanently alter the existing viewshed. The modifications would include temporary construction activities. Temporary construction views would include construction equipment, staging areas, fencing, and soil stockpiles. This impact would be short-term and terminate upon completion of construction.

Staging areas for construction equipment would be located within the channel right-of-way or immediately adjacent to the channel right-of-way. Overall, this measure would not substantially degrade the visual nature of the area, therefore, there would be a less than significant impact.

Indirect Impacts

The modifications to the C05/C06 channels would not indirectly change or alter the visual character associated with the area. The flood control channels already exist and have been present in some form

since the 1950's/1960's. Therefore, the modification of the flood control channels would not indirectly impact the visual nature of the area.

Long-term Operation and Maintenance Impacts

Maintenance activities for the flood control channels would be the same as maintenance activities that occur currently. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Maintenance activities would be short-term and would be restricted to within the flood control channel right-of-ways, therefore, long-term operation and maintenance of the channels would have no long-term impacts to the visual nature of the area.

Level of Impact for the NED Plan

Less than Significant. The proposed project would have short-term temporary views of construction equipment and activities while the project is being implemented. However, this impact would terminate upon completion of construction. There would be no indirect, long-term, or impacts associated with maintenance activities. Overall, the impact would be less than significant to the visual nature of the area.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

The C02/C04 channels are characterized by earthen/riprap/concrete channel structures, algae growths, slow-flowing shallow water, and tufts of vegetation growing from sediment deposits. Modifications associated with the design of this measure would be similar to existing structures and would not change the visual character associated with the surrounding area. Therefore, these modifications would not permanently alter the existing viewshed. The modifications would include temporary construction activities. Temporary construction views would include construction equipment, staging areas, fencing, and soil stockpiles. This impact would be short-term and terminate upon completion of construction.

Staging areas for construction equipment would be located within the channel right-of-way or immediately adjacent to the channel right-of-way. Overall, this measure would not substantially degrade the visual nature of the area, therefore, there would be a less than significant impact.

Indirect Impacts

The modifications to the C02/C04 channels would not indirectly change or alter the visual character associated with the area. The flood control channels already exist and have been present in some form since the 1950's/1960's. Therefore, the modification of the flood control channels would not indirectly impact the visual nature of the area.

Long-term Operation and Maintenance Impacts

Maintenance activities for the flood control channels would be the same as maintenance activities that occur currently. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Maintenance activities would be short-term and would be restricted to within the flood control channel right-of-ways, therefore, long-term operation and maintenance of the channels would have no long-term impacts to the visual nature of the area.

C05/C06 Channels

Direct Impacts

The C05/C06 channels are characterized by earthen/riprap/concrete channel structures, algae growths, slow-flowing shallow water, and tufts of vegetation growing from sediment deposits. Modifications associated with the design of this measure would be similar to existing structures and would not change the visual character associated with the surrounding area. Therefore, these modifications would not permanently alter the existing viewshed. The modifications would include temporary construction activities. Temporary construction views would include construction equipment, staging areas, fencing, and soil stockpiles. This impact would be short-term and terminate upon completion of construction.

Staging areas for construction equipment would be located within the channel right-of-way or immediately adjacent to the channel right-of-way. Overall, this measure would not substantially degrade the visual nature of the area, therefore, there would be a less than significant impact.

Indirect Impacts

The modifications to the C05/C06 channels would not indirectly change or alter the visual character associated with the area. The flood control channels already exist and have been present in some form since the 1950's/1960's. Therefore, the modification of the flood control channels would not indirectly impact the visual nature of the area.

Long-term Operation and Maintenance Impacts

Maintenance activities for the flood control channels would be the same as maintenance activities that occur currently. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Maintenance activities would be short-term and would be restricted to within the flood control channel right-of-ways, therefore, long-term operation and maintenance of the channels would have no long-term impacts to the visual nature of the area.

Diversion Channel

Direct Impacts

The area where the diversion channel will be constructed is characterized by abandoned railroad right-of-way, turf grass, and industrial use. The area does not provide any high quality public views of scenic or natural resources. Therefore, the construction of the diversion channel would not substantially alter the existing viewshed. The construction of the diversion channel would include temporary construction activities. Temporary construction views would include construction equipment, staging areas, fencing, and soil stockpiles. This impact would be short-term and terminate upon completion of construction. Staging areas for construction equipment would be located within channel right-of-ways for C04 Reach 20, C04 Reach 21, or along the area where the diversion channel would be constructed. None of the staging areas are publicly accessible vantage points for scenic areas. Overall, this measure would not substantially degrade the visual nature of the area, therefore, there would be a less than significant impact.

Indirect Impacts

The diversion channel would not indirectly substantially change or alter the visual character associated with the area. Flood control channels are already present within the vicinity and have been present in the area in some form since the 1950's/1960's. In addition, a majority of the area is bordered by industrial use and the diversion channel would be constructed along an abandoned railroad right-of-way. Therefore, the diversion channel would not indirectly impact the visual nature of the area.

Long-term Operation and Maintenance Impacts

Maintenance activities for the diversion channel would be the same as maintenance activities that occur currently within the existing flood control channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channel if needed. Maintenance activities would be short-term and would be restricted to within the diversion channel right-of-way, therefore, long-term operation and maintenance of the channel would have no long-term impacts to the visual nature of the area.

Level of Impact for the LPP

Less than Significant. The proposed project would have short-term temporary views of construction equipment and activities while the project is being implemented. However, this impact would terminate upon completion of construction. There would be no indirect, long-term, or impacts associated with maintenance activities. Overall, the impact would be less than significant to the visual nature of the area.

5.14.4.4 IMPACT A-4: Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no federal project would be constructed. Therefore, no project would be implemented that could potentially create a new source of substantial light or glare. The current level of risk would remain for flooding within the Westminster watershed. Widespread overtopping within the study area would still occur between the 10% and 4% ACE events. Future flooding would not be expected to cause new sources of light or glare that would adversely affect day or nighttime views in the area.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

Construction associated with the modification of the Warner Avenue Bridge may require nighttime security lighting at the staging area (Figure 43) which would cause additional light and glare that would be viewed from residences within the vicinity of the staging area. In addition, there may be temporary new sources of light or glare due to construction site lighting that may be required during early morning and early evening work activities. Construction activities are expected to occur Monday through Friday between the hours of 7:00 a.m. and 3:30 p.m. Thus, construction lighting would be limited to a few hours a day with most construction site lighting use occurring during hours when the sites are partially lighted by natural dawn/dusk conditions. Construction activities and new lighting sources for staging areas would be temporary in duration, lasting only as long as construction is occurring. The presence of a few lights within staging areas is not expected to create a new source of substantial light or glare, therefore, a less than significant impact is expected. Regardless, mitigation measures MM-A-3 and MM-A-4 would be implemented during construction activities to ensure that any potential temporary impacts due to the presence of construction lighting would be minimized. These mitigation measures include shielding light fixtures or other corrective measures to minimize light impacts. Overall, impacts to light or glare would be temporary, lasting only the duration of construction, and would be less than significant.

Indirect Impacts

The operation of heavy construction equipment during construction could reflect glare from the surfaces of the construction equipment, especially those with reflective surfaces. The impact would be confined to specific locations in the study area for a short period of time. Potential light or glare impacts would be less than significant.

Long-term Operation and Maintenance Impacts

Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Maintenance activities requiring construction equipment could reflect glare from the surfaces of the construction equipment, especially those with reflective surfaces. The impact would be confined to specific locations where maintenance activities are occurring and for a short period of time. Potential light or glare impacts from the long-term operation and maintenance activities associated with Warner Avenue Bridge would be less than significant.

Tide Gates

Direct Impacts

The removal of the tide gates and replacement with a new access bridge may require nighttime security lighting at staging areas (Figure 44) which could cause additional light and glare that would be viewed from residences within the vicinity of the staging areas used. In addition, there may be temporary new sources of light or glare due to construction site lighting that may be required during early morning and early evening work activities. Construction activities are expected to occur Monday through Friday between the hours of 7:00 a.m. and 3:30 p.m. Thus, construction lighting would be limited to a few hours

a day with most construction site lighting use occurring during hours when the sites are partially lighted by natural dawn/dusk conditions. Construction activities and new lighting sources for staging areas would be temporary in duration, lasting only as long as construction is occurring. The presence of a few lights within staging areas is not expected to create a new source of substantial light or glare, therefore, a less than significant impact is expected. Regardless, mitigation measures MM-A-3 and MM-A-4 would be implemented during construction activities to ensure that any potential temporary impacts due to the presence of construction lighting would be minimized. These mitigation measures include shielding light fixtures or other corrective measures to minimize light impacts. Overall, impacts to light or glare would be temporary, lasting only the duration of construction, and would be less than significant.

Indirect Impacts

The operation of heavy construction equipment during construction could reflect glare from the surfaces of the construction equipment, especially those with reflective surfaces. The impact would be confined to specific locations in the study area for a short period of time. Potential light or glare impacts would be less than significant.

Long-term Operation and Maintenance Impacts

The long-term operation of the new bridge would not require lighting. In regards to maintenance, typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Typical maintenance activities can entail the operation of support vehicles and equipment, pavement repair, and welding and grinding operations. Maintenance activities requiring construction equipment could reflect glare from the surfaces of the construction equipment, especially those with reflective surfaces. The impact would be confined to specific locations where maintenance activities are occurring and for a short period of time. Potential light or glare impacts from the long-term operation and maintenance activities associated with new span bridge at the downstream end of C05 Reach 1would be less than significant.

C02/C04 Channels

Direct Impacts

Construction activities associated with the modification of the channels may require nighttime security lighting at staging areas which would cause additional light and glare that would be viewed from residences within the vicinity of the staging areas. In addition, there may be temporary new sources of light or glare due to construction site lighting that may be required during early morning and early evening work activities. Construction activities are expected to occur Monday through Friday between the hours of 7:00 a.m. and 3:30 p.m. Thus, construction lighting would be limited to a few hours a day with most construction site lighting use occurring during hours when the sites are partially lighted by natural dawn/dusk conditions. Construction activities and new lighting sources for staging areas would be temporary in duration, lasting only as long as construction is occurring. The presence of a few lights within staging areas is not expected to create a new source of substantial light or glare, therefore, a less than significant impact is expected. Regardless, mitigation measures MM-A-3 and MM-A-4 would be implemented during construction activities to ensure that any potential temporary impacts due to the presence of construction lighting would be minimized. These mitigation measures include shielding light fixtures or other corrective measures to minimize light impacts. Overall, impacts to light or glare would be temporary, lasting only the duration of construction, and would be less than significant.

Indirect Impacts

The operation of heavy construction equipment during construction could reflect glare from the surfaces of the construction equipment, especially those with reflective surfaces. The impact would be confined to specific locations in the study area for a short period of time. Potential light or glare impacts would be less than significant.

Long-term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. All activities would occur during the day and would not require lighting. Operation of heavy equipment for levee and channel repair or sediment removal could indirectly result in a less than significant temporary glare impact.

C05/C06 Channels

Direct Impacts

Construction activities associated with the modification of the channels may require nighttime security lighting at staging areas which would cause additional light and glare that would be viewed from residences within the vicinity of the staging areas. In addition, there may be temporary new sources of light or glare due to construction site lighting that may be required during early morning and early evening work activities. Construction activities are expected to occur Monday through Friday between the hours of 7:00 a.m. and 3:30 p.m. Thus, construction lighting would be limited to a few hours a day with most construction site lighting use occurring during hours when the sites are partially lighted by natural dawn/dusk conditions. Construction activities and new lighting sources for staging areas would be temporary in duration, lasting only as long as construction is occurring. The presence of a few lights within staging areas is not expected to create a new source of substantial light or glare, therefore, a less than significant impact is expected. Regardless, mitigation measures MM-A-3 and MM-A-4 would be implemented during construction activities to ensure that any potential temporary impacts due to the presence of construction lighting would be minimized. These mitigation measures include shielding light fixtures or other corrective measures to minimize light impacts. Overall, impacts to light or glare would be temporary, lasting only the duration of construction, and would be less than significant.

Indirect Impacts

The operation of heavy construction equipment during construction could reflect glare from the surfaces of the construction equipment, especially those with reflective surfaces. The impact would be confined to specific locations in the study area for a short period of time. Potential light or glare impacts would be less than significant.

Long-term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. All activities would occur during the day and would not require lighting. Operation of heavy equipment for levee and channel repair or sediment removal could indirectly result in a less than significant temporary glare impact.

Level of Impact for the NED Plan

Less than Significant Impact. Construction and long-term operation and maintenance activities would not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

Construction activities associated with the modification of the channels may require nighttime security lighting at staging areas which would cause additional light and glare that would be viewed from residences within the vicinity of the staging areas. In addition, there may be temporary new sources of light or glare due to construction site lighting that may be required during early morning and early evening work activities. Construction activities are expected to occur Monday through Friday between the hours of 7:00 a.m. and 3:30 p.m. Thus, construction lighting would be limited to a few hours a day with most construction site lighting use occurring during hours when the sites are partially lighted by natural dawn/dusk conditions. Construction activities and new lighting sources for staging areas would be temporary in duration, lasting only as long as construction is occurring. The presence of a few lights within staging areas is not expected to create a new source of substantial light or glare, therefore, a less than significant impact is expected. Regardless, mitigation measures MM-A-3 and MM-A-4 would be implemented during construction activities to ensure that any potential temporary impacts due to the presence of construction lighting would be minimized. These mitigation measures include shielding light fixtures or other corrective measures to minimize light impacts. Overall, impacts to light or glare would be temporary, lasting only the duration of construction, and would be less than significant.

Indirect Impacts

The operation of heavy construction equipment during construction could reflect glare from the surfaces of the construction equipment, especially those with reflective surfaces. The impact would be confined to specific locations in the study area for a short period of time. Potential light or glare impacts would be less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. All activities would occur during the day and

would not require lighting. Operation of heavy equipment for levee and channel repair or sediment removal could indirectly result in a less than significant temporary glare impact.

C05/C05 Channels

Direct Impacts

Construction activities associated with the modification of the channels may require nighttime security lighting at staging areas which would cause additional light and glare that would be viewed from residences within the vicinity of the staging areas. In addition, there may be temporary new sources of light or glare due to construction site lighting that may be required during early morning and early evening work activities. Construction activities are expected to occur Monday through Friday between the hours of 7:00 a.m. and 3:30 p.m. Thus, construction lighting would be limited to a few hours a day with most construction site lighting use occurring during hours when the sites are partially lighted by natural dawn/dusk conditions. Construction activities and new lighting sources for staging areas would be temporary in duration, lasting only as long as construction is occurring. The presence of a few lights within staging areas is not expected to create a new source of substantial light or glare, therefore, a less than significant impact is expected. Regardless, mitigation measures MM-A-3 and MM-A-4 would be implemented during construction activities to ensure that any potential temporary impacts due to the presence of construction lighting would be minimized. These mitigation measures include shielding light fixtures or other corrective measures to minimize light impacts. Overall, impacts to light or glare would be temporary, lasting only the duration of construction, and would be less than significant.

Indirect Impacts

The operation of heavy construction equipment during construction could reflect glare from the surfaces of the construction equipment, especially those with reflective surfaces. The impact would be confined to specific locations in the study area for a short period of time. Potential light or glare impacts would be less than significant.

Long-term Operation and Maintenance Impacts

Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. All activities would occur during the day and would not require lighting. Operation of heavy equipment for levee and channel repair or sediment removal could indirectly result in a less than significant temporary glare impact.

Diversion Channel

Direct Impacts

Activities associated with the construction of the diversion channel may require nighttime security lighting at staging areas which would cause additional light and glare that would be viewed from residences within the vicinity of the staging areas. In addition, there may be temporary new sources of light or glare due to construction site lighting that may be required during early morning and early evening work activities. Construction activities are expected to occur Monday through Friday between the hours of 7:00 a.m. and 3:30 p.m. Thus, construction lighting would be limited to a few hours a day with most construction site lighting use occurring during hours when the sites are partially lighted by natural dawn/dusk conditions. Construction activities and new lighting sources for staging areas would be temporary in duration, lasting only as long as construction is occurring. The presence of a few lights within staging areas is not expected to create a new source of substantial light or glare, therefore, a less than significant impact is expected. Regardless, mitigation measures MM-A-3 and MM-A-4 would be

implemented during construction activities to ensure that any potential temporary impacts due to the presence of construction lighting would be minimized. These mitigation measures include shielding light fixtures or other corrective measures to minimize light impacts. Overall, impacts to light or glare would be temporary, lasting only the duration of construction, and would be less than significant.

Indirect Impacts

The operation of heavy construction equipment during construction could reflect glare from the surfaces of the construction equipment, especially those with reflective surfaces. The impact would be confined to specific locations in the study area for a short period of time. Potential light or glare impacts would be less than significant.

Long-term Operation and Maintenance Impacts

Maintenance activities for the diversion channel would include vegetation control, rodent control, levee and channel repair, and sediment removal if needed. All activities would occur during the day and would not require lighting. Operation of heavy equipment for levee and channel repair or sediment removal could indirectly result in a less than significant temporary glare impact.

Level of Impact for the LPP

Less than Significant Impact. Construction and long-term operation and maintenance activities would not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

5.15 Transportation

5.15.1 Regulatory Framework

Traffic operations are quantified through the determination of Level of Service (LOS). Level of Service is a qualified measure of traffic operating conditions, whereby a letter grade “A” through “F” is assigned to an infrastructure facility, such as an intersection, freeway mainline, or freeway ramp.

5.15.2 Impact Significance Criteria

The impact criteria below were taken from Appendix G of the CEQA guidelines and are also being adopted for NEPA. The impacts on traffic and circulation associated with the proposed alternatives would be considered significant if one or more of the conditions described below were to occur as a result of implementation of the No Action Plan, NED Plan, or LPP.

IMPACT TT-1: Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.

IMPACT TT-2: Conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b).

IMPACT TT-3: Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

IMPACT TT-4: Result in inadequate emergency access.

5.15.3 Mitigation Measures

MM-TT-1 The contractor shall prepare a *Traffic Safety Management Plan* (Plan) for the Proposed Project in coordination with the local jurisdictions having authority over specific roadways. The Plan would be submitted and approved by the various jurisdictions before any on-site construction commences. The Plan would include the following provisions:

- Temporary traffic control devices shall be identified in accordance with CalTrans' *California Manual on Uniform Traffic Control Devices.* This may include slow-moving-vehicle warning signs, barriers for separating construction and non-construction traffic, use of traffic control flagmen, and any additional measures required for safely passing non-construction traffic through and around construction areas and access points.
- Schedule construction truck traffic during non-peak traffic periods.
- Schedule worker shift changes to minimize existing background traffic peak periods if feasible.
- Bulk hauling of borrow material commence as soon as on-site storage and staging areas are developed minimizing impacts to existing facilities by spreading out the required import operation over a longer period of time.
- Establish procedures for coordinating with local emergency response agencies to ensure dissemination of information regarding emergency response vehicle routes affected by Project construction. Proper notification and coordination with the local emergency response agencies will be critical for these road closures to ensure that emergency vehicle access is not affected.
- Provide dedicated turn lanes for vehicles entering and exiting the Project site from local roadways to minimize impacts to vicinity traffic.

MM-TT-2 When possible, public streets would be kept operational, particularly during the morning and evening peak hours of traffic. If required, any lane closures would be minimized during peak traffic hours. Some construction activities would require road closures.

MM-TT-3 Haul routes shall be designed to minimize distances to the work site and avoid heavily congested areas or large residential communities to the maximum extent feasible.

MM-TT-4 If damage to roads occurs, the contractor shall coordinate repairs with the affected public agencies to ensure that any impacts to area roads are adequately repaired. Roads disturbed by trucks or equipment shall be properly restored to ensure long-term protection of road surfaces. Such repairs shall occur as part of the active construction period.

5.15.4 Transportation Impacts

5.15.4.1 IMPACT TT-1: Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative, construction of the project would not occur. The current level of risk would remain for flooding within the Westminster watershed. Widespread overtopping within the project area would still occur between the 10% and 4% ACE events. Depending on the location, severity, and duration of the flooding, there could be a substantial increase in traffic due to debris removal and clean-up. This would be a temporary increase, however, lasting only as long as clean-up efforts are required.

Therefore, the No Action Plan is not expected to significantly conflict with a program, plan, ordinance or policy addressing the circulation system.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

Roadways and Intersections: The Orange County Congestion Management Plan (CMP) (2017) is the applicable CMP for the proposed project. The CMP's goals are to support regional mobility objectives by reducing traffic congestion, to provide a mechanism for coordinating land use and development decisions that support the regional economy, and to support gas tax funding eligibility. Per review of the 2017 Orange County Congestion Management Plan, Warner Avenue is designated as part of the CMP Highway System. Per review of Appendix B-1 of the CMP, *Meeting CMP Traffic Impact Analysis Requirements*, a CMP traffic impact analysis is required for CMP segments where the proposed project would generate 2,400 of more daily trips. For projects which will directly access a CMP Highway System link, the threshold for requiring a traffic impact analysis should be reduced to 1,600 or more trips per day. Modification of the Warner Avenue Bridge would require approximately 24 haul trucks per day on maximum demolition days over the 15 month construction period. In addition, it is assumed that the modification of the bridge would require a maximum of 35 construction workers which could equate to 35 vehicle trips per day. Therefore, on a maximum demolition day, it is assumed that there would be a total of 118 vehicle trips per day (includes haul trucks and construction worker vehicles and assumes travel to the site and from the site). One-hundred eighteen (118) is well below the threshold of 1,600 trips per day that would trigger a traffic impact analysis.

Modification of the bridge is within the vicinity of the intersection of Warner Avenue with the PCH. For intersections, a three percent level of impact applied to the sum of critical volume (i.e., 1,700 vehicles per hour) would be 51 vehicles per hour. As stated above, on a maximum demolition day, it is assumed that there would be a total of 118 vehicle trips per day; therefore, the proposed project would not meet the three percent level of impact for the intersection.

Finally, the CMP explicitly excludes construction, rehabilitation, or maintenance of facilities that impact the system from deficiency determinations (i.e., deficiency plan identifies the cause of congestion, the modifications needed to solve the problem, and the cost and timing for implementing proposed modifications). Because construction related traffic is not targeted in the CMP to reduce congestion, no conflict with the CMP would occur with implementation of the proposed project. Overall, the proposed project would generate additional vehicle trips that would increase traffic, but would cause a less than significant impact.

In addition to the number of vehicle trips, the modification of the Warner Avenue Bridge would require temporary lane closures during the 15 month construction period. The construction would be phased to allow traffic to continue in both directions. The first phase would be extending the bridge on the left hand side which would require closing the two vehicle lanes and one bike lane conveying traffic east. The two lanes conveying traffic to the west would be divided to have a single lane conveying traffic west and a single lane conveying traffic east. The second phase would be extending the bridge on the right hand side which would require closing the two vehicle lanes and one bike lane conveying traffic west. The two lanes conveying traffic to the east would be divided to have a single lane conveying traffic west and a

single lane conveying traffic east. Therefore, approximately half of the Warner Avenue Bridge will be closed at different stages during construction, with traffic remaining open at all times to allow traffic in both directions. Since traffic would be reduced from two lanes in either direction to a single lane in either direction during construction, a bottleneck would be created that could potentially increase traffic congestion at the intersection of Warner Avenue and the PCH. The bottleneck that would be created could potentially cause temporary conflict with a program, plan, ordinance or policy addressing the circulation system. This impact would be temporary lasting only the duration of construction.

Bicycle Lanes: There are class II (striped and signed) bicycle lanes on Warner Avenue extending eastward from the PCH. During construction activities, the bicycle lanes would be closed and bicyclists would have to use the same lanes as vehicles. This impact would be temporary lasting only the duration of construction.

Sidewalks: There is a sidewalk along the north side of Warner Avenue extending eastward from the PCH. During construction activities, the sidewalk would be closed. This impact would be temporary lasting only the duration of construction.

Public Transit: Three OCTA bus routes cross the Warner Avenue Bridge:

- Route 21 crosses Warner Avenue Bridge through the study area, traveling between Sunset Beach (i.e., southbound) and Buena Park (i.e., northbound), operating Monday through Friday with no midday or weekend service.
- Route 70 crosses Warner Avenue Bridge through the study area, traveling between Sunset Beach (i.e., westbound) to Tustin (i.e., eastbound), operating 7-days per week.
- Route 72 crosses Warner Avenue Bridge through the study area, traveling between Sunset Beach (i.e., westbound) to Tustin (i.e., eastbound), operating 7-days per week.

Public transit would be able to continue through the area, since the bridge would continue to allow one lane of traffic in either direction during construction activities. Since traffic would be reduced from two lanes in either direction to a single lane in either direction during construction, a bottleneck would be created that could potentially increase traffic congestion at the intersection of Warner Avenue and the PCH which could in turn increase the frequency time for the above bus routes. This impact would be temporary lasting only the duration of construction.

In summary, project-related construction activities and lane closures would have a temporary adverse impact on the operation of the Warner Avenue roadway and intersection if controls are not in place. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the circulation system would be reduced to less than significant.

Indirect Impacts

The modification of the Warner Avenue Bridge would require lane closures during construction activities, which are anticipated to last approximately 15 months. Although the bridge would remain open at all times to allow traffic in both directions, the normal four lane bridge would be reduced to two lanes while construction is occurring. This could potentially indirectly impact nearby roads that also allow access to the inland part of Orange County off of the PCH as residents become used to the closure and potentially take alternate routes. The closest major road to the north of Warner Avenue Bridge is Seal Beach Boulevard which is approximately 2.84 miles away and is a six lane road providing three lanes of traffic in each direction. The closest major road to the south of Warner Avenue Bridge is Goldenwest Street which is approximately 4.0 miles away and is a six lane road providing three lanes of traffic in each direction. The construction of Warner Avenue Bridge and the temporary lane closures could create more traffic on these nearby major inlet roads that could potentially indirectly increase traffic congestion on these roads. To minimize the temporary indirect adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the circulation system would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. The aforementioned maintenance activities would be temporary in nature and short in duration. They would likely not require a full lane closure, but temporary closure of a small area where the maintenance activities are occurring. These temporary closures due to maintenance would not be expected to substantially impact the implementation of an adopted emergency response plan or emergency evacuation route. Therefore, the project would have a less than significant long-term impact.

Tide Gates

Direct Impacts

Roadways and Intersections: The Orange County Congestion Management Plan (CMP) (2017) is the applicable CMP for the proposed project. The CMP's goals are to support regional mobility objectives by reducing traffic congestion, to provide a mechanism for coordinating land use and development decisions that support the regional economy, and to support gas tax funding eligibility. The tide gates are accessible from maintenance roads via the PCH. Per review of the 2017 Orange County Congestion Management Plan, the PCH is designated as part of the CMP Highway System. Per review of Appendix B-1 of the CMP, *Meeting CMP Traffic Impact Analysis Requirements*, a CMP traffic impact analysis is required for CMP segments where the proposed project would generate 2,400 of more daily trips. For projects which will directly access a CMP Highway System link, the threshold for requiring a traffic impact analysis should be reduced to 1,600 or more trips per day. Removal of the tide gates and replacement with a new small bridge would require approximately 1 haul truck per day on maximum demolition days over the 15

month construction period. In addition, it is assumed that the proposed project would require a maximum of 35 construction workers which could equate to 35 vehicle trips per day. Therefore, on a maximum demolition day, it is assumed that there would be a total of 72 vehicle trips per day (includes haul trucks and construction worker vehicles and assumes travel to the site and from the site). Seventy-two (72) is well below the threshold of 1,600 trips per day that would trigger a traffic impact analysis.

The tide gates are not located within the vicinity of an intersection as they are located within the downstream reach of C05.

Finally, the CMP explicitly excludes construction, rehabilitation, or maintenance of facilities that impact the system from deficiency determinations (i.e., deficiency plan identifies the cause of congestion, the modifications needed to solve the problem, and the cost and timing for implementing proposed modifications). Because construction related traffic is not targeted in the CMP to reduce congestion, no conflict with the CMP would occur with implementation of the proposed project. Overall, the proposed project would generate additional vehicle trips that would increase traffic, but would cause a less than significant impact.

Bicycle Lanes: The tide gate crossing is utilized by bicyclists. This crossing would be closed during construction activities while the tide gates are being removed and replaced with a new small bridge. The closest crossing that would provide access to the north bank maintenance road from the south is the oil field bridge which is located approximately 0.58 miles east of the tide gate location. This impact would be temporary lasting only the duration of construction.

Sidewalks: The tide gate crossings is utilized by hikers within the BCER. This crossing would be closed during construction activities while the tide gates are being removed and replaced with a new small bridge. The closest crossing that would provide access to the north bank maintenance road from the south is the oil field bridge which is located approximately 0.58 miles east of the tide gate location. This impact would be temporary lasting only the duration of construction.

Public Transit: One OCTA bus route is within the vicinity of the proposed project:

- Route 1 travels along the PCH within the vicinity of the study area, traveling between Long Beach (i.e., northbound) to San Clemente (i.e., southbound), operating 7-days per week.

Public transit would not be substantially affected by construction activities. The proposed project is not anticipated to require more than 1 haul truck per day during maximum demolition days, which would not substantially affect traffic on PCH as the haul truck enters and exits the construction area.

Project-related construction activities would have a less than significant temporary impact on the operation of the PCH.

Indirect Impacts

The permanent removal of the tide gates and replacement with new access bridge is not expected to have any indirect impacts to roadways within the vicinity of the project site. The tide gate crossing is primarily a recreational crossing that is only used occasionally by maintenance and emergency response vehicles responding to an emergency within the flood control channels.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new span bridge to replace the tide gates would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. The aforementioned maintenance activities would be temporary in nature and short in duration. Due to the size of the span bridge, any maintenance activities would likely require closing of the bridge, but the closure would likely be no longer than 24 hours. Since the tide gate crossing is primarily a recreational crossing that is only used occasionally by maintenance and emergency response vehicles, the proposed project would have no long-term impact.

Channels C02/C04

Direct Impacts

Roadways and Intersections: The Orange County Congestion Management Plan (CMP) (2017) is the applicable CMP for the proposed project. The CMP's goals are to support regional mobility objectives by reducing traffic congestion, to provide a mechanism for coordinating land use and development decisions that support the regional economy, and to support gas tax funding eligibility. While there are several area roadways adjacent to the proposed project, Bolsa Avenue is the only roadway that is designated as part of the CMP Highway System and would be directly impacted during construction activities since a westbound land between approximately Springdale Street to Edwards Street would be required for construction equipment staging. Appendix B-1 of the CMP, *Meeting CMP Traffic Impact Analysis Requirements*, states that a CMP traffic impact analysis is required for CMP segments where the proposed project would generate 2,400 of more daily trips. For projects which will directly access a CMP Highway System link, the threshold for requiring a traffic impact analysis should be reduced to 1,600 or more trips per day. Modification of the C02/C04 channels would require approximately four (4) haul trucks per day on maximum demolition days over the 81 month construction period. In addition, it is assumed that the modification of the C02/C04 channels would require a maximum of 35 construction workers which would equate to 35 vehicle trips per day. Therefore, on a maximum demolition day, it is assumed that there would be a total of 78 vehicle trips per day (includes haul trucks and construction worker vehicles and assumes travel to the site and from the site). Seventy-eight (78) is well below the threshold of 1,600 trips per day that would trigger a traffic impact analysis.

Modification of the C02/C04 channels would have no impacts to intersections as all work would occur within the channels and adjacent right-of-ways.

Finally, the CMP explicitly excludes construction, rehabilitation, or maintenance of facilities that impact the system from deficiency determinations (i.e., deficiency plan identifies the cause of congestion, the modifications needed to solve the problem, and the cost and timing for implementing proposed modifications). Because construction related traffic is not targeted in the CMP to reduce congestion, no conflict with the CMP would occur with implementation of the proposed project. Overall, the proposed project would generate additional vehicle trips that would increase traffic, but would cause a less than significant impact.

In addition to the number of vehicle trips, the modification of the C02/C04 channels would require temporary lane closures for staging of construction equipment. The primary impact would be along channels that do not have sufficient right-of-ways for staging and/or few alternative staging area options outside of the channel right-of-ways. C04 Reach 20 is one such channel where staging is limited, therefore, a traffic lane from adjacent roadways would need to be taken temporarily for staging.

Roadways that would be impacted are Edinger Avenue, Springdale Street, and Bolsa Avenue (Table 76). Construction activities for C04 Reach 20 would be phased so that lanes on the aforementioned roads are not impacted the entire total construction period. The first phase would be the portion of C04 Reach 20 extending from Bolsa Chica Street to McFadden Avenue. Construction is anticipated to take approximately three years. During this time, a single lane from the westbound traffic side of Edinger Avenue, from Bolsa Chica Street east to Springdale Street, would be temporarily closed to allow for construction staging. One lane of traffic on the westbound side would still remain open during construction to allow through traffic. In addition, a single lane from the southbound traffic side of Springdale Street, from Edinger Avenue north to McFadden Avenue, would be temporarily closed to allow for construction staging. One lane of traffic on the southbound side would still remain open during construction to allow through traffic. The second phase would be the portion of C04 Reach 20 extending from McFadden Avenue to just south of where the channel goes under Bolsa Avenue. Construction is anticipated to take approximately 12 ½ months. During this time, a single lane from the northbound traffic side of Springdale Street, from McFadden Avenue to Engineer Drive, would be temporarily closed to allow for construction staging. One lane of traffic on the northbound side would still remain open during construction to allow through traffic. Lastly, the third phase would be the portion of C04 Reach 20 extending from north of where the channel goes under Bolsa Avenue to west of Edwards Street. Construction is anticipated to take approximately 29 weeks. During this time, a single lane from the westbound traffic side of Bolsa Avenue, from where Bolsa Avenue crosses the channel to Edwards Street, would be temporarily closed to allow for construction staging. Two lanes of traffic on the westbound side would still remain open during construction to allow through traffic. The remaining channels to be modified (i.e., C02 Reach 23, C04 Reach 22) are not expected to require the temporary closure of a traffic lane for staging. This measure also does not include any crossing construction that would require temporary lane closures.

Table 76: Roads adjacent to the C02/C04 Flood Control Channels that Could Experience Temporary Impacts during Construction.

Channel	Reach	Street	Lane Type	Lane Impacted by Construction	Duration of Impact
C02	23	*Edinger Avenue* Edinger Ave. Bridge east to Bolsa Chica St.	Primary Arterial Divided	-	-
C04	20	*Edinger Avenue* Bolsa Chica St. east to Springdale St.	Primary Arterial Divided	Westbound	3 years
		Springdale Street Edinger Ave. north to McFadden Ave.	Primary Arterial Divided	Southbound	
		Springdale Street McFadden Ave. north to Engineer Dr.	Primary Arterial Divided	Northbound	12.5 months
		Bolsa Avenue Channel crosses Bolsa Ave. east to Edwards St.	Major Arterial	Westbound	29 weeks
	21	*Hazard Avenue* Hoover Street east to Beach Blvd.	Primary Arterial Divided	-	-
	22	*Taft Street* Westminster Ave. north to Garden Grove Freeway	Collector Street (Undivided)	-	-

(-) Not applicable – either no lanes and/or no impact

Since traffic would be reduced from two westbound lanes to one on Edinger, two southbound lanes to one on Springdale Street, two northbound lanes to one on Springdale Street, and three westbound lanes to two on Bolsa Avenue, a bottleneck would be created that could potentially increase traffic congestion along these roadways. This impact would be temporary lasting only the duration of construction.

Bicycle Lanes: There are several class II (striped and signed) bicycle lanes on streets adjacent to reaches within the C02/C04 system(Table 77). As discussed above, a single lane of traffic on Edinger Avenue, Springdale Street, and Bolsa Avenue would be required during construction activities for staging of construction equipment. The temporary taking of these traffic lanes would affect adjacent bicycle lanes which would also be required for staging of construction equipment. The bicycle lanes impacted and the duration of the impact is shown in (Table 77). Overall, these impacts to the bicycle lanes presented in (Table 77) would be temporary lasting only the duration of construction.

Table 77: Location of Bicycle Lanes within the Vicinity of the Proposed Project.

Channel	Reach	Street	Bicycle Lane Type	Lane Impacted by Construction	Duration of Impact
C02	23	*Edinger Avenue* Edinger Ave. Bridge east to Bolsa Chica St.	Class II	-	-
C04	20	*Edinger Avenue* Bolsa Chica St. east to Springdale St.	Class II	Westbound	3 years
		Springdale Street Edinger Ave. north to McFadden Ave.	Class II	Southbound	
		Springdale Street McFadden Ave. north to Engineer Dr.	Class II	Northbound	12.5 months
		Bolsa Avenue Channel crosses Bolsa Ave. east to Edwards St.	Class II	Westbound	29 weeks
	21	*Hazard Avenue* Hoover Street east to Beach Blvd.	-	-	-
	22	*Taft Street* Westminster Ave. north to Garden Grove Freeway	-	-	-

(-) Not applicable – either no lanes and/or no impact

Sidewalks: There are generally sidewalks located on both sides of the roadways that are adjacent to reaches within the C02/C04 system (Table 78). As discussed above, a single lane of traffic on Edinger Avenue, Springdale Street, and Bolsa Avenue would be required during construction activities for staging of construction equipment. The temporary taking of these traffic lanes would affect adjacent sidewalks which would also be required for staging of construction equipment. The sidewalks impacted and the duration of the impact is shown in Table 78. Overall, these impacts to the sidewalks presented in Table 78 would be temporary lasting only the duration of construction.

Table 78: Location of Sidewalks within the Vicinity of the Proposed Project.

Channel	Reach	Street	Sidewalks	Sidewalk Impacted by Construction	Duration of Impact
C02	23	*Edinger Avenue* Edinger Ave. Bridge east to Bolsa Chica St.	Sidewalk on South Side	-	-
C04	20	*Edinger Avenue* Bolsa Chica St. east to Springdale St.	Sidewalks on North and South Sides	North Side	3 years
		Springdale Street Edinger Ave. north to McFadden Ave.	Sidewalks on East and West Sides	West Side	
		Springdale Street McFadden Ave. north to Engineer Dr.	Sidewalks on East and West Sides	East Side	12.5 months
		Bolsa Avenue Channel crosses Bolsa Ave. east to Edwards St.	Sidewalk on South Side	-	-
	21	*Hazard Avenue* Hoover Street east to Beach Blvd.	Sidewalks on North and South Sides	-	-
	22	*Taft Street* Westminster Ave. north to Garden Grove Freeway	Sidewalks on East and West Sides	-	-

(-) Not applicable – either no lanes and/or no impact

Public Transit: Two OCTA bus routes are within the vicinity of construction activities associated with the modification of the C02/C04 channels:

- Route 21 crosses Graham Street and Edinger Avenue within the vicinity of C04 Reach 20, traveling between Sunset Beach (i.e., southbound) and Buena Park (i.e., northbound), operating Monday through Friday with no midday or weekend service.
- Route 70 moves along Edinger Avenue between Bolsa Chica Road and Springdale Street within the vicinity of C04 Reach 20, traveling between Sunset Beach (i.e., westbound) to Tustin (i.e., eastbound), operating 7-days per week.

Table 79: Location of Sidewalks within the Vicinity of the Proposed Project.

Channel	Reach	OCTA Route	Peak Hour Frequency	Area of Impact	Duration of Impact
C04	20	21	Every hour	*Edinger Avenue* Bolsa Chica St. east to Graham St.	3 years
		70	14 minutes	*Edinger Avenue* Bolsa Chica St. east to Springdale St.	

(-) Not applicable – either no lanes and/or no impact

Public transit would be able to continue through the areas since modification of the C02/C04 channels would occur within the channels and adjacent right-of-ways. OCTA Routes 21 and 71 westbound on Bolsa Chica Street would experience a single lane closure (Table 79) during construction of C04 Reach 20; however, a single lane of westbound traffic would still be allowing through traffic.

In summary, project-related construction activities and lane closures would have a temporary adverse impact on the operation of area roadways and intersections during the 81 month construction period if controls are not in place. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the circulation system would be reduced to less than significant.

Indirect Impacts

The modification of the flood control channels within the C02/C04 system would require temporary lane closures during construction activities for staging of equipment. Construction activities for C04 Reach 20, which will require temporary lane closures, are anticipated to last up to 3 years. Although the impacted roadways would remain open at all times to allow traffic in both directions, there would be the temporary loss of a single lane in one direction. This could indirectly impact nearby roads as residents become used to the closures and potentially take alternate routes. Nearby roads similar in size to those that would have temporary lane closures and could be used as alternative routes include Edwards Street, Goldenwest Street, McFadden Avenue, and Heil Avenue. The modification of the flood control channels and the associated temporary lane closures could create additional traffic on these nearby arterial roads that could potentially indirectly increase traffic congestion. The increased traffic congestion could subsequently affect CMP roadways, intersection operation, public transit service or pedestrian and bicycle facilities. To minimize the temporary indirect adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary indirect adverse impact to the circulation system would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The aforementioned maintenance activities would be temporary in nature and short in duration. They would likely not require any lane closures. Therefore, the

long-term operation and maintenance of the flood control channels within the C02/C04 system would not affect CMP roadways, intersection operation, public transit service, or pedestrian and bicycle facilities.

Channels C05/C06

Direct Impacts

Roadways and Intersections: The Orange County Congestion Management Plan (CMP) (2017) is the applicable CMP for the proposed project. The CMP's goals are to support regional mobility objectives by reducing traffic congestion, to provide a mechanism for coordinating land use and development decisions that support the regional economy, and to support gas tax funding eligibility. While there are several area roadways adjacent to the proposed project, Bolsa Avenue, Warner Avenue, and Beach Boulevard are the only roadways that are designated as part of the CMP Highway System. Appendix B-1 of the CMP, Meeting CMP Traffic Impact Analysis Requirements, states that a CMP traffic impact analysis is required for CMP segments where the proposed project would generate 2,400 or more daily trips. For projects which will directly access a CMP Highway System link, the threshold for requiring a traffic impact analysis should be reduced to 1,600 or more trips per day. Modification of the C05/C06 channels would require approximately six (6) haul trucks per day on maximum demolition days over the 136 month construction period. In addition, it is assumed that the modification of the C05/C06 channels would require a maximum of 35 construction workers which would equate to 35 vehicle trips per day. Therefore, on a maximum demolition day, it is assumed that there would be a total of 82 vehicle trips per day (includes haul trucks and construction worker vehicles and assumes travel to the site and from the site). Eighty-two (82) is well below the threshold of 1,600 trips per day that would trigger a traffic impact analysis.

Modification of the C05/C06 channels would have no impacts to intersections as all work would occur within the channels and adjacent right-of-ways.

Finally, the CMP explicitly excludes construction, rehabilitation, or maintenance of facilities that impact the system from deficiency determinations (i.e., deficiency plan identifies the cause of congestion, the modifications needed to solve the problem, and the cost and timing for implementing proposed modifications). Because construction related traffic is not targeted in the CMP to reduce congestion, no conflict with the CMP would occur with implementation of the proposed project. Overall, the proposed project would generate additional vehicle trips that would increase traffic, but would cause a less than significant impact.

The modification of the C05/C06 channels is not expected to require temporary lane closures for staging of construction equipment, as sufficient staging areas have been identified within and/or adjacent to the channel right-of-ways.

Bicycle Lanes: The modification of the C05/C6 channels would have no impact to bicycle lanes as all work would occur within the channels and adjacent right-of-ways.

Sidewalks: The modification of the C05/C06 channels would have no impact to sidewalks as all work would occur within the channels and adjacent right-of-ways.

Public Transit: The modification of the C05/C06 channels would have no impact to public transportation as all work would occur within the channels and adjacent right-of-ways.

Overall, project-related construction activities are not expected to have a substantial impact on the operation of area roadways and intersections during the 136 month construction period. Although no substantial adverse impact is anticipated mitigation measures MM-TT-1 through MM-TT-4 would be implemented as BMPs. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the circulation system would be reduced to less than significant.

Indirect Impacts

The modification of the flood control channels within the C05/C06 system would not require any temporary lane closures during construction activities for staging of equipment. There would be additional traffic on area roadways due to equipment and materials being brought to and from the site, construction debris being hauled from the site, and construction personnel. The additional traffic could potentially indirectly impact nearby roads as residents become used to where construction activities are occurring and potentially use alternate routes to avoid these areas. The increased traffic on the alternate routes could subsequently affect intersection operation, public transit service, or pedestrian and bicycle facilities. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the circulation system would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The aforementioned maintenance activities would be temporary in nature and short in duration. They would likely not require any lane closures. Therefore, the long-term operation and maintenance of the flood control channels within the C05/C06 system would not affect CMP roadways, intersection operation, public transit service, or pedestrian and bicycle facilities.

Level of Impact for the NED Plan

Less than Significant Impact with Mitigation Incorporated. The proposed project would result in temporary direct and indirect adverse impacts to CMP roadways, intersection operation, public transit, or pedestrian and bicycle facilities while construction is occurring. These impacts would be temporary lasting only the duration of construction. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-

TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the circulation system would be reduced to less than significant.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Channels C02/C04

Direct Impacts

Roadways and Intersections: The Orange County Congestion Management Plan (CMP) (2017) is the applicable CMP for the proposed project. The CMP's goals are to support regional mobility objectives by reducing traffic congestion, to provide a mechanism for coordinating land use and development decisions that support the regional economy, and to support gas tax funding eligibility. While there are several area roadways adjacent to the proposed project, Bolsa Avenue is the only roadway that is designated as part of the CMP Highway System and would be directly impacted during construction activities since a westbound lane between approximately Springdale Street to Edwards Street would be required for construction equipment staging. Appendix B-1 of the CMP, *Meeting CMP Traffic Impact Analysis Requirements*, states that a CMP traffic impact analysis is required for CMP segments where the proposed project would generate 2,400 of more daily trips. For projects which will directly access a CMP Highway System link, the threshold for requiring a traffic impact analysis should be reduced to 1,600 or more trips per day. Modification of the C02/C04 channels would require approximately 20 haul trucks per day on maximum demolition days over the 197 month construction period. In addition, it is assumed that the modification of the C02/C04 channels would require a maximum of 35 construction workers which would equate to 35 vehicle trips per day. Therefore, on a maximum demolition day, it is assumed that there would be a total of 110 vehicle trips per day (includes haul trucks and construction worker vehicles and assumes travel to the site and from the site). Once-hundred ten (110) is well below the threshold of 1,600 trips per day that would trigger a traffic impact analysis.

The CMP also explicitly excludes construction, rehabilitation, or maintenance of facilities that impact the system from deficiency determinations (i.e., deficiency plan identifies the cause of congestion, the modifications needed to solve the problem, and the cost and timing for implementing proposed

modifications). Because construction related traffic is not targeted in the CMP to reduce congestion, no conflict with the CMP would occur with implementation of the proposed project. Overall, the proposed project would generate additional vehicle trips that would increase traffic, but would cause a less than significant impact.

In addition to the number of vehicle trips, the modification of the C02/C04 channels would require temporary lane closures for staging of construction equipment. The primary impact would be along channels that do not have sufficient right-of-ways for staging and/or few alternative staging area options outside of the channel right-of-ways. C04 Reach 20 is one such channel where staging is limited, therefore, a traffic lane from adjacent roadways would need to be taken temporarily for staging. Roadways that would be impacted are Edinger Avenue, Springdale Street, and Bolsa Avenue (Table 80). Construction activities for C04 Reach 20 would be phased so that lanes on the aforementioned roads are not impacted the entire total construction period. The first phase would be the portion of C04 Reach 20 extending from Bolsa Chica Street to McFadden Avenue. Construction is anticipated to take approximately three years. During this time, a single lane from the westbound traffic side of Edinger Avenue, from Bolsa Chica Street east to Springdale Street, would be temporarily closed to allow for construction staging. One lane of traffic on the westbound side would still remain open during construction to allow through traffic. In addition, a single lane from the southbound traffic side of Springdale Street, from Edinger Avenue north to McFadden Avenue, would be temporarily closed to allow for construction staging. One lane of traffic on the southbound side would still remain open during construction to allow through traffic. The second phase would be the portion of C04 Reach 20 extending from McFadden Avenue to just south of where the channel goes under Bolsa Avenue. Construction is anticipated to take approximately 12 ½ months. During this time, a single lane from the northbound traffic side of Springdale Street, from McFadden Avenue to Engineer Drive, would be temporarily closed to allow for construction staging. One lane of traffic on the northbound side would still remain open during construction to allow through traffic. Lastly, the third phase would be the portion of C04 Reach 20 extending from north of where the channel goes under Bolsa Avenue to west of Edwards Street. Construction is anticipated to take approximately 29 weeks. During this time, a single lane from the westbound traffic side of Bolsa Avenue, from where Bolsa Avenue crosses the channel to Edwards Street, would be temporarily closed to allow for construction staging. Two lanes of traffic on the westbound side would still remain open during construction to allow through traffic. The remaining channels to be modified (i.e., C02 Reach 23, C04 Reach 22) are not expected to require the temporary closure of a traffic lane for staging. This measure also does not include any crossing construction that would require temporary lane closures.

Table 80: Roads adjacent to the C02/C04 Flood Control Channels that may Experience Temporary Impacts during Construction.

Channel	Reach	Street	Lane Type	Lane Impacted by Construction	Duration of Impact
C02	23	*Edinger Avenue* Edinger Ave. Bridge east to Bolsa Chica St.	Primary Arterial Divided	-	-
C04	20	*Edinger Avenue* Bolsa Chica St. east to Springdale St.	Primary Arterial Divided	Westbound	3 years
		Springdale Street Edinger Ave. north to McFadden Ave.	Primary Arterial Divided	Southbound	

Channel	Reach	Street	Lane Type	Lane Impacted by Construction	Duration of Impact
		Springdale Street McFadden Ave. north to Engineer Dr.	Primary Arterial Divided	Northbound	12.5 months
		Bolsa Avenue Channel crosses Bolsa Ave. east to Edwards St.	Major Arterial	Westbound	29 weeks
	21	*Hazard Avenue* Hoover Street east to Beach Blvd.	Primary Arterial Divided	-	-
	22	*Taft Street* Westminster Ave. north to Garden Grove Freeway	Collector Street (Undivided)	-	-

(-) Not applicable – either no lanes and/or no impact

Modification of the C02/C04 channels would also require the replacement of approximately 15 crossings to accommodate the change in geometry of the channels from trapezoidal to rectangular. For C04 Reach 20 the following crossings would be modified to allow for the rectangular shaped channels:

- McFadden Avenue Crossing
- Bolsa Avenue Crossing
- Edwards Street Crossing

The bridge crossings would be modified in two to three phases depending on size in order to continue to allow traffic in both directions; however, temporary lane closures would be required. Construction would likely occur so that half of the crossing is modified, allowing single lanes of traffic in either direction to continue over the crossing. The second phase would allow construction of the remaining half of the crossing, allowing single lanes of traffic in either direction to continue over the crossing.

For C04 Reach 22, the following crossings would be modified to allow for the rectangular shaped channels:

- Pedestrian Crossing (northeast of Beach Boulevard and West Hazard Avenue intersection)
- Newland Street Crossing
- Magnolia Street Crossing
- Brookhurst Street Crossing
- Ward Street Crossing
- Westminster Avenue Crossing
- Ranney Avenue Crossing
- Blake Street Crossing
- Woodbury Road Crossing
- Teal Drive Crossing

- Mallard Avenue Crossing

The Newland Street, Magnolia Street, Brookhurst Street, Ward Street, and Westminster Avenue crossings would be modified in two to three phases depending on size in order to continue to allow traffic in both directions; however, temporary lane closures would be required. Construction would likely occur so that half of the crossing is modified, allowing single lanes of traffic in either direction to continue over the crossing. The second phase would allow construction of the remaining half of the crossing, allowing single lanes of traffic in either direction to continue over the crossing. The pedestrian crossing near the intersection of Beach Boulevard and West Hazard Avenue would likely be closed completely during construction. Lastly, the Ranney Avenue, Blake Street, Woodbury Road, Teal Drive, and Mallard Avenue crossings would likely be closed, but the closures would be phase so that the access into the neighborhood provided by these crossings is maintained. For example, Ranney Avenue and the Blake Street crossings would likely be completely closed to allow for modification of these two crossings; however, access to the residences in this area would still be provided by Woodbury Road, Teal Drive, and Mallard Avenue. One modification of these crossings is complete, then Woodbury Road, Teal Drive, and Mallard Avenue crossings would likely be completely closed to allow for modification of these three crossings; however, access to the residences in this area would still be provided by Ranney Avenue and Blake Street.

Overall, since traffic would be reduced from two westbound lanes to one on Edinger, two southbound lanes to one on Springdale Street, two northbound lanes to one on Springdale Street, and three westbound lanes to two on Bolsa Avenue, a bottleneck would be created. In addition, bottlenecks would be created due to modification of crossings that would result in the temporary reduction in lanes for a crossing or restrict traffic completely. The bottlenecks that would be created could potentially increase traffic congestion along these roadways. This impact would be temporary lasting only the duration of construction.

Bicycle Lanes: There are several class II (striped and signed) bicycle lanes on streets adjacent to reaches within the C02/C04 system (Table 81). As discussed above, a single lane of traffic on Edinger Avenue, Springdale Street, and Bolsa Avenue would be required during construction activities for staging of construction equipment. The temporary taking of these traffic lanes would affect adjacent bicycle lanes which would also be required for staging of construction equipment. The bicycle lanes impacted and the duration of the impact is shown in Table 81. In addition, as discussed above, 15 crossings would be replaced as part of the proposed project in order to accommodate the conversion from trapezoidal to rectangular shaped channels. Several of these crossings include bicycle lanes that would be impacted during construction activities. The intersections, whether or not a bicycle lane is present, and the duration of impact is shown in Table 82. Overall, these impacts to the bicycle lanes presented in Table 81 and Table 82 would be temporary lasting only the duration of construction.

Table 81: Bicycle Lanes within the Vicinity of the Proposed Project that would be Temporarily Impacted during Construction.

Channel	Reach	Street	Bicycle Lane Type	Lane Impacted by Construction	Duration of Impact
C02	23	*Edinger Avenue* Edinger Ave. Bridge east to Bolsa Chica St.	Class II	-	-
C04	20	*Edinger Avenue* Bolsa Chica St. east to Springdale St.	Class II	Westbound	3 years
		Springdale Street Edinger Ave. north to McFadden Ave.	Class II	Southbound	
		Springdale Street McFadden Ave. north to Engineer Dr.	Class II	Northbound	12.5 months
		Bolsa Avenue Channel crosses Bolsa Ave. east to Edwards St.	Class II	Westbound	29 weeks
	21	*Hazard Avenue* Hoover Street east to Beach Blvd.	-	-	-
	22	*Taft Street* Westminster Ave. north to Garden Grove Freeway	-	-	-

(-) Not applicable – either no lanes and/or no impact

Table 82: Bicycle Lanes along Crossings that would be Temporarily Impacted during Construction of the Proposed Project.

Channel	Reach	Intersection	Bicycle Lane Type	Duration of Impact
C04	20	*McFadden Avenue Crossing* Intersection of McFadden Ave. and Springdale St.	Class II	77 weeks
		Bolsa Avenue Crossing East of Bolsa Ave. and Springdale St. Intersection	Class II	29 weeks
		Edwards Street Crossing Intersection of Edwards St. and Bolsa Ave.	Class II	
	22	*Pedestrian Crossing* Northeast of Beach Blvd. and Hazard Ave. intersection	-	78 weeks
		Newland St. Crossing Between Jennrich Ave. and Oasis Ave.	Class III	
		Magnolia Street Crossing Between Jennrich Ave. and Oasis Ave.	Class III	
		Brookhurst Street Crossing Between Jennrich Ave. and Reading Ave.	Class III	38 weeks
		Ward Street Crossing Between Jennrich Ave. and Morningside Dr.	Class II	
		Westminster Ave. Crossing Intersection of Westminster Ave. and Taft St.	Class III	30 weeks
		Ranney Avenue Crossing Intersection of Ranney Ave. and Taft St.	-	
		Blake Street Crossing Intersection of Blake St. and Taft St.	-	
		Woodbury Road Crossing Intersection of Woodbury Rd. and Taft St.	-	
		Teal Drive Crossing Intersection of Teal Dr. and Taft St.	-	
		Mallard Avenue Crossing Intersection of Mallard Ave. and Taft St.	-	

(-) Not applicable – either no lanes and/or no impact

Sidewalks: There are generally sidewalks located on both sides of the roadways that are adjacent to reaches within the C02/C04 system (Table 83). As discussed above, a single lane of traffic on Edinger Avenue, Springdale Street, and Bolsa Avenue would be required during construction activities for staging of construction equipment. The temporary taking of these traffic lanes would affect adjacent sidewalks which would also be required for staging of construction equipment. The sidewalks impacted and the duration of the impact is shown in Table 83. In addition, as discussed above, 15 crossings would be replaced as part of the proposed project in order to accommodate the conversion from trapezoidal to rectangular shaped channels. All of these crossings include sidewalks that would be impacted during construction activities. The intersections, location of sidewalks, and the duration of impact is shown in

Table 84. Overall, these impacts to sidewalks presented in Table 83 and Table 84 would be temporary lasting only the duration of construction.

Table 83: Sidewalks within the Vicinity of the Proposed Project that would be Temporarily Impacted during Construction.

Channel	Reach	Street	Sidewalks	Sidewalk Impacted by Construction	Duration of Impact
C02	23	*Edinger Avenue* Edinger Ave. Bridge east to Bolsa Chica St.	Sidewalk on South Side	-	-
C04	20	*Edinger Avenue* Bolsa Chica St. east to Springdale St.	Sidewalks on North and South Sides	North Side	3 years
		Springdale Street Edinger Ave. north to McFadden Ave.	Sidewalks on East and West Sides	West Side	
		Springdale Street McFadden Ave. north to Engineer Dr.	Sidewalks on East and West Sides	East Side	12.5 months
		Bolsa Avenue Channel crosses Bolsa Ave. east to Edwards St.	Sidewalk on South Side	-	-
	21	*Hazard Avenue* Hoover Street east to Beach Blvd.	Sidewalks on North and South Sides	-	-
	22	*Taft Street* Westminster Ave. north to Garden Grove Freeway	Sidewalks on East and West Sides	-	-

(-) Not applicable – either no lanes and/or no impact

Table 84: Sidewalks along Crossings that would be Temporarily Impacted during Construction of the Proposed Project.

Channel	Reach	Street	Sidewalks	Sidewalk Impacted by Construction	Duration of Impact
C04	20	*McFadden Avenue Crossing* Intersection of McFadden Ave. and Springdale St.	Sidewalks on all sides	Sidewalks on all sides	77 weeks
		Bolsa Avenue Crossing East of Bolsa Ave. and Springdale St. Intersection	Sidewalk on South Side	Sidewalk on South Side	29 weeks
		Edwards Street Crossing Intersection of Edwards St. and Bolsa Ave.	Sidewalks on East and West Sides	Sidewalk on East and West Sides	
	22	*Pedestrian Crossing* Northeast of Beach Blvd. and Hazard Ave. intersection	Pedestrian Crossing	Pedestrian Crossing	78 weeks
		Newland St. Crossing Between Jennrich Ave. and Oasis Ave.	Sidewalks on East and West Sides	Sidewalk on East and West Sides	
		Magnolia Street Crossing Between Jennrich Ave. and Oasis Ave.	Sidewalks on East and West Sides	Sidewalk on East and West Sides	
		Brookhurst Street Crossing Between Jennrich Ave. and Reading Ave.	Sidewalks on East and West Sides	Sidewalk on East and West Sides	38 weeks
		Ward Street Crossing Between Jennrich Ave. and Morningside Dr.	Sidewalks on East and West Sides	Sidewalk on East and West Sides	
		Westminster Ave. Crossing Intersection of Westminster Ave. and Taft St.	Sidewalks on North and South Sides	Sidewalks on North and South Sides	30 weeks
		Ranney Avenue Crossing Intersection of Ranney Ave. and Taft St.	Sidewalks on North and South Sides	Sidewalks on North and South Sides	
		Blake Street Crossing Intersection of Blake St. and Taft St.	Sidewalks on North and South Sides	Sidewalks on North and South Sides	
		Woodbury Road Crossing Intersection of Woodbury Rd. and Taft St.	Sidewalks on North and South Sides	Sidewalks on North and South Sides	
		Teal Drive Crossing Intersection of Teal Dr. and Taft St.	Sidewalks on North and South Sides	Sidewalks on North and South Sides	
		Mallard Avenue Crossing Intersection of Mallard Ave. and Taft St.	Sidewalks on North and South Sides	Sidewalks on North and South Sides	

(-) Not applicable – either no lanes and/or no impact

Public Transit

Two OCTA bus routes are within the vicinity of construction activities associated with the modification of the C02/C04 channels:

Route 21 crosses Graham Street and Edinger Avenue within the vicinity of C04 Reach 20, traveling between Sunset Beach (i.e., southbound) and Buena Park (i.e., northbound), operating Monday through Friday with no midday or weekend service.

Route 70 moves along Edinger Avenue between Bolsa Chica Road and Springdale Street within the vicinity of C04 Reach 20, traveling between Sunset Beach (i.e., westbound) to Tustin (i.e., eastbound), operating 7-days per week.

Table 85: Public Transit Routes that may Experience Impacts during Construction of the Proposed Project.

Channel	Reach	OCTA Route	Peak Hour Frequency	Area of Impact	Duration of Impact
C04	20	21	Every hour	*Edinger Avenue* Bolsa Chica St. east to Graham St.	3 years
		70	14 minutes	*Edinger Avenue* Bolsa Chica St. east to Springdale St.	

(-) Not applicable – either no lanes and/or no impact

Public transit would be able to continue through the areas since modification of the C02/C04 channels would occur within the channels and adjacent right-of-ways. OCTA Routes 21 and 71 westbound on Bolsa Chica Street would experience a single lane closure (Table 85) during construction of C04 Reach 20; however, a single lane of westbound traffic would still be allowing through traffic.

In summary, project-related construction activities and lane closures would have a temporary adverse impact on the operation of area roadways and intersections during the 81 month construction period if controls are not in place. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the circulation system would be reduced to less than significant.

Indirect Impacts

The modification of the flood control channels within the C02/C04 system would require temporary lane closures during construction activities for staging of equipment. Construction activities for C04 Reach 20, which will require temporary lane closures, are anticipated to last up to 3 years. Although the impacted roadways would remain open at all times to allow traffic in both directions, there would be the temporary loss of a single lane in one direction. This could indirectly impact nearby roads as residents become used to the closures and potentially take alternate routes. Nearby roads similar in size to those that would have temporary lane closures and could be used as alternative routes include Edwards Street, Goldenwest Street, McFadden Avenue, and Heil Avenue. The modification of the flood control channels and the associated temporary lane closures could create additional traffic on these nearby arterial roads that could potentially indirectly increase traffic congestion. The increased traffic congestion could subsequently affect CMP roadways, intersection operation, public transit service or pedestrian and bicycle facilities. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the circulation system would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The aforementioned maintenance activities would be temporary in nature and short in duration. They would likely not require any lane closures. Therefore, the long-term operation and maintenance of the flood control channels within the C02/C04 system would not affect CMP roadways, intersection operation, public transit service, or pedestrian and bicycle facilities.

Channels C05/C06

Direct Impacts

Roadways and Intersections: The Orange County Congestion Management Plan (CMP) (2017) is the applicable CMP for the proposed project. The CMP's goals are to support regional mobility objectives by reducing traffic congestion, to provide a mechanism for coordinating land use and development decisions that support the regional economy, and to support gas tax funding eligibility. While there are several area roadways adjacent to the proposed project, Bolsa Avenue, Warner Avenue, and Beach Boulevard are the only roadways that are designated as part of the CMP Highway System. Appendix B-1 of the CMP, Meeting CMP Traffic Impact Analysis Requirements, states that a CMP traffic impact analysis is required for CMP segments where the proposed project would generate 2,400 or more daily trips. For projects which will directly access a CMP Highway System link, the threshold for requiring a traffic impact analysis should be reduced to 1,600 or more trips per day. Modification of the C05/C06 channels would require approximately 40 haul trucks per day on maximum demolition days over the 324 month construction period. In addition, it is assumed that the modification of the C05/C06 channels would require a maximum of 35 construction workers which would equate to 35 vehicle trips per day. Therefore,

on a maximum demolition day, it is assumed that there would be a total of 150 vehicle trips per day (includes haul trucks and construction worker vehicles and assumes travel to the site and from the site). One-hundred fifty (150) is well below the threshold of 1,600 trips per day that would trigger a traffic impact analysis.

The CMP also explicitly excludes construction, rehabilitation, or maintenance of facilities that impact the system from deficiency determinations (i.e., deficiency plan identifies the cause of congestion, the modifications needed to solve the problem, and the cost and timing for implementing proposed modifications). Because construction related traffic is not targeted in the CMP to reduce congestion, no conflict with the CMP would occur with implementation of the proposed project. Overall, the proposed project would generate additional vehicle trips that would increase traffic, but would cause a less than significant impact.

The modification of the C05/C06 channels is not expected to require temporary lane closures for staging of construction equipment, as sufficient staging areas have been identified within and/or adjacent to the channel right-of-ways.

Although no temporary lane closures due to staging of equipment for channel modifications are anticipated, this measure would include the modification of approximately 30 crossings. For C05 the following crossings would be modified to allow for the rectangular shaped channels:

- Oil Field Bridge (Reach 1)
- Springdale Street Crossing (Reach 1)
- Edwards Street Crossing (Reach 1)
- Goldenwest Street Crossing (Reach 2)
- Pedestrian Bridge Crossing (Reach 3 – upstream of confluence of C05/C06)
- Beach Boulevard/Heil Avenue Crossing (Reach 3)
- Magnolia Street/Edinger Avenue Crossing (Reach 4)
- Pedestrian Bridge (Reach 4 – southwest of Bushard Street Crossing)
- Bushard Street Crossing (Reach 4)
- McFadden Avenue/Brockhurst Street Crossing (Reach 5)
- Pedestrian Bridge (Reach 5 – northeast of McFadden Ave./Brookhurst St. Crossing)
- Ward Street Crossing (Reach 5)
- South Deming Street Crossing (Reach 5)
- South Euclid Street Crossing (Reach 5)
- Bolsa Avenue Crossing (Reach 5)
- West Fifth Street Crossing (Reach 6)
- West Hazard Avenue/North New Hope Street Crossing (Reach 7)
- West Fay Circle Crossing (Reach 8)
- Morningside Avenue Crossing (Reach 8)

- Westminster Avenue Crossing (Reach 8)
- OCTD Yard Crossing (Reach 9)
- Harbor Boulevard Crossing (Reach 9)
- Pedestrian Bridge (Reach 9 – southwest of Trask Avenue Crossing)
- Trask Avenue Crossing (Reach 9)
- Pearce Street Crossing (Reach 9)
- Upstream of Garden Grove Boulevard Crossing (Reach 10)
- Downstream of Aspenwood Crossing (Reach 10)

For C06, the following crossings would be modified to accommodate the rectangular shaped channels:

- Beach Boulevard Crossing (Reach 13)
- Newland Street Crossing (Reach 13)
- Bushard Street Crossing (Reach 17)

The crossings would be modified in two to three phases depending on size in order to continue to allow traffic in both directions; however, temporary lane closures would be required. Construction would likely occur so that half of the crossing is modified, allowing single lanes of traffic in either direction to continue over the crossing. The second phase would allow construction of the remaining half of the crossing, allowing single lanes of traffic in either direction to continue over the crossing. The pedestrian crossings would likely be closed completely while being constructed.

Overall, although there are no temporary road closures required due to staging, the modification of associated crossings would result in the temporary reduction in lanes for a crossing or restrict traffic completely which would cause a bottleneck in these areas. The bottlenecks that would be created could potentially increase traffic congestion along the roadways associated with the crossings. This impact would be temporary lasting only the duration of construction.

Bicycle Lanes: As discussed above, 30 crossings would be replaced as part of the proposed project in order to accommodate the conversion from trapezoidal to rectangular shaped channels. Several of these crossings include bicycle lanes that would be impacted during construction activities. The intersections, whether or not a bicycle lane is present, and the duration of impact is shown in Table 86. Overall, these impacts to the bicycle lanes presented in Table 86 would be temporary lasting only the duration of construction.

Table 86: Bicycle Lanes along Crossings that would be Temporarily Impacted during Construction of the Proposed Project.

Channel	Reach	Intersection	Bicycle Lane Type	Duration of Impact
C05	1	*Oil Field Bridge* Bolsa Chica Ecological Reserve	Class I	63 weeks
		Springdale Street Crossing North of Warner Avenue	Class II	63 weeks
		Edwards Street Crossing North of Warner Avenue	Class II	
	2	*Goldenwest Street Crossing* North of Warner Avenue	Class II	45 weeks
	3	*Pedestrian Bridge Crossing* Upstream of C05/C06 confluence	Class I	43 weeks
		Beach Blvd./Heil Ave. Crossing Intersection of Beach Blvd. and Heil Ave.	Class II	
	4	*Magnolia St./Edinger Ave. Crossing* Intersection of Magnolia St. and Edinger Ave.	Class II	89 weeks
		Pedestrian Bridge Crossing Southwest of Bushard St. Crossing	Class I	
		Bushard Street Crossing Between Westwood Dr. and Stinson Ln.	Class II	
	5	*McFadden Ave./Brookhurst St. Crossing* Intersection of McFadden Ave. and Brookhurst St.	Class II	36 weeks
		Pedestrian Bridge Crossing Northeast of McFadden Ave./Brookhurst St. Crossing	Class I	
		Ward Street Crossing Between Tampion Ave. and Davit Ave.	Class II	
		South Deming Street Crossing Between Tampion Ave. and Davit Ave.	Class III	73 weeks
		South Euclid Street Crossing North of McFadden Ave./Euclid St. Intersection	Class III	
		Bolsa Avenue Crossing East of Bolsa Ave./Euclid St. Intersection	Class III	
	6	*West Fifth Street Crossing* Between Rosita St. and Jenkins St.	Class III	19 weeks
	7	*W. Hazard Ave./N. New Hope St. Crossing* Intersection of W. Hazard Ave. and N. New Hope St.	Class II	40 weeks
	8	*West Fay Circle Crossing* Between N. Gates St. and N. Hastings St.	Class III	
		Morningside Avenue Crossing Between N. Hastings St. and West St.	Class III	
		Westminster Avenue Crossing Between A Better Way and West St.	Class III	

Channel	Reach	Intersection	Bicycle Lane Type	Duration of Impact
	9	*OCTD Yard Crossing*	-	40 weeks
		Harbor Boulevard Crossing Cardinal Cir. And Harbor Blvd. Intersection	Class III	
		Pedestrian Bridge Crossing Southwest of Trask Avenue Crossing	-	
		Trask Avenue Crossing Between Laurel St. and Ranchero Way	Class II	
		Pearce Street Crossing Between Blackbird St. and Clinton St.	Class III	33 weeks
	10	*Upstream of Garden Grove Boulevard Crossing*	-	
		Downstream of Aspenwood Crossing	-	
C06	13	*Beach Boulevard Crossing* Between Damask Dr. and Warner Ave.	Class III	56 weeks
		Newland Street Crossing Between Arnett Dr. and Merle Cir.	Class III	
	17	*Bushard Street Crossing* Between Clover Ave. and Mariposa Ave.	Class II	33 weeks

(-) Not applicable – either no lanes and/or no impact

Sidewalks: As discussed above, 30 crossings would be replaced as part of the proposed project in order to accommodate the conversion from trapezoidal to rectangular shaped channels. All of these crossings include sidewalks that would be impacted during construction activities. The intersections, location of sidewalks, and the duration of impact is shown in Table 87. Overall, these impacts to sidewalks presented in Table 87 would be temporary lasting only the duration of construction.

Table 87: Sidewalks that would be Temporarily Impacted during Construction of the Proposed Project.

Channel	Reach	Intersection	Sidewalks	Sidewalk Impacted by Construction	Duration of Impact
C05	1	*Oil Field Bridge* Bolsa Chica Ecological Reserve	Pedestrian Crossing	Pedestrian Crossing	63 weeks
		Springdale Street Crossing North of Warner Avenue	Sidewalks on West and East Sides	Sidewalks on West and East Sides	63 weeks
		Edwards Street Crossing North of Warner Avenue	Sidewalks on West and East Sides	Sidewalks on West and East Sides	
	2	*Goldenwest Street Crossing* North of Warner Avenue	Sidewalks on West and East Sides	Sidewalks on West and East Sides	45 weeks
	3	*Pedestrian Bridge Crossing* Upstream of C05/C06 confluence	Pedestrian Crossing	Pedestrian Crossing	43 weeks

Channel	Reach	Intersection	Sidewalks	Sidewalk Impacted by Construction	Duration of Impact
		Beach Blvd./Heil Ave. Crossing Intersection of Beach Blvd. and Heil Ave.	Sidewalks on all Sides	Sidewalks on Southwest and Northeast Sides	
	4	*Magnolia St./Edinger Ave. Crossing* Intersection of Magnolia St. and Edinger Ave.	Sidewalks on all Sides	Sidewalks on Southwest and Northeast Sides	89 weeks
		Pedestrian Bridge Crossing Southwest of Bushard St. Crossing	Pedestrian Crossing	Pedestrian Crossing	
		Bushard Street Crossing Between Westwood Dr. and Stinson Ln.	Sidewalks on West and East Sides	Sidewalks on West and East Sides	
	5	*McFadden Ave./Brookhurst St. Crossing* Intersection of McFadden Ave. and Brookhurst St.	Sidewalks on all Sides	Sidewalks on Southwest and Northeast Sides	36 weeks
		Pedestrian Bridge Crossing Northeast of McFadden Ave./Brookhurst St. Crossing	Pedestrian Crossing	Pedestrian Crossing	
		Ward Street Crossing Between Tampion Ave. and Davit Ave.	Sidewalks on West and East Sides	Sidewalks on West and East Sides	
		South Deming Street Crossing Between Tampion Ave. and Davit Ave.	Sidewalks on West and East Sides	Sidewalks on West and East Sides	73 weeks
		South Euclid Street Crossing North of McFadden Ave./Euclid St. Intersection	Sidewalks on West and East Sides	Sidewalks on West and East Sides	
		Bolsa Avenue Crossing East of Bolsa Ave./Euclid St. Intersection	Sidewalks on North and South Sides	Sidewalks on North and South Sides	
	6	*West Fifth Street Crossing* Between Rosita St. and Jenkins St.	Sidewalks on North and South Sides	Sidewalks on North and South Sides	19 weeks
	7	*W. Hazard Ave./N. New Hope St. Crossing* Intersection of W. Hazard Ave. and N. New Hope St.	Sidewalks on all Sides	Sidewalks on Southwest and Northeast Sides	40 weeks
	8	*West Fay Circle Crossing* Between N. Gates St. and N. Hastings St.	Sidewalks on Southwest and Northeast Sides	Sidewalks on Southwest and Northeast Sides	

Channel	Reach	Intersection	Sidewalks	Sidewalk Impacted by Construction	Duration of Impact
		Morningside Avenue Crossing Between N. Hastings St. and West St.	Sidewalks on North and South Sides	Sidewalks on North and South Sides	
		Westminster Avenue Crossing Between A Better Way and West St.	Sidewalks on North and South Sides	Sidewalks on North and South Sides	
	9	*OCTD Yard Crossing*	-	-	40 weeks
		Harbor Boulevard Crossing Cardinal Cir. And Harbor Blvd. Intersection	Sidewalks on West and East Sides	Sidewalks on West and East Sides	
		Pedestrian Bridge Crossing Southwest of Trask Avenue Crossing	Pedestrian Crossing	Pedestrian Crossing	
		Trask Avenue Crossing Between Laurel St. and Ranchero Way	Sidewalks on Southwest and Northeast Sides	Sidewalks on Southwest and Northeast Sides	
		Pearce Street Crossing Between Blackbird St. and Clinton St.	Sidewalks on North and South Sides	Sidewalks on North and South Sides	33 weeks
	10	*Upstream of Garden Grove Boulevard Crossing*	-	-	
		Downstream of Aspenwood Crossing	-	-	
C06	13	*Beach Boulevard Crossing* Between Damask Dr. and Warner Ave.	Sidewalks on West and East Sides	Sidewalks on West and East Sides	56 weeks
		Newland Street Crossing Between Arnett Dr. and Merle Cir.	Sidewalks on West and East Sides	Sidewalks on West and East Sides	
	17	*Bushard Street Crossing* Between Clover Ave. and Mariposa Ave.	Sidewalks on West and East Sides	Sidewalks on West and East Sides	33 weeks

(-) Not applicable – either no lanes and/or no impact

Public Transit: Six OCTA bus routes are within the vicinity of construction activities associated with the modification of the C05/C06 channels:

- Route 25 crosses Goldenwest Street within the vicinity of C05 Reach 2, traveling between Fullerton (i.e., northbound) to Huntington Beach (i.e., southbound), operating 7-days per week.
- Route 29 crosses Beach Boulevard within the vicinity of C05 Reach 3, traveling between La Habra (i.e., northbound) to Huntington Beach (i.e., southbound), operating 7-days per week.

- Route 33 crosses Magnolia and Edinger Crossing within the vicinity of C05 Reach 4, traveling between Fullerton (i.e., northbound) to Huntington Beach (i.e., southbound), operating 7-days per week.
- Route 35 crosses Brookhurst and McFadden Crossing within the vicinity of C05 Reach 5, traveling between Fullerton (i.e., northbound) to Cost Mesa (i.e., southbound), operating 7-days per week.
- Route 37 crosses Euclid Street Crossing within the vicinity of C05 Reach 5, traveling between La Habra (i.e., northbound) to Fountain Valley (i.e., southbound), operating 7-days per week.
- Route 43 crosses Harbor Boulevard Crossing within the vicinity of C05 Reach 9, traveling between Fullerton (i.e., northbound) to Costa Mesa (i.e., southbound), operating 7-days per week.

Public transit would be able to continue through the areas since modification of the C05/C06 channels would occur within the channels and adjacent right-of-ways. OCTA Routes listed in Table 88) would experience single lane closures during replacement of the stated crossings; however, at least one lane in either direction would continue to remain open during the duration of construction.

Table 88: Public Transit Routes that may Experience Impacts during Construction of the Proposed Project.

Channel	Reach	OCTA Route	Peak Hour Frequency	Area of Impact	Duration of Impact
C05	2	25	1hr	*Goldenwest Street Crossing* North of Warner Avenue	45 weeks
	3	29	20 minutes	*Beach Blvd./Heil Ave. Crossing* Intersection of Beach Blvd. and Heil Ave.	43 weeks
	4	33	40 minutes	*Magnolia St./Edinger Ave. Crossing* Intersection of Magnolia St. and Edinger Ave.	89 weeks
	5	35	20 minutes	*McFadden Ave./Brookhurst St. Crossing* Intersection of McFadden Ave. and Brookhurst St.	36 weeks
		37	15 minutes	*South Euclid Street Crossing* North of McFadden Ave./Euclid St. Intersection	73 weeks
	9	43	16 minutes	*Harbor Boulevard Crossing* Cardinal Cir. And Harbor Blvd. Intersection	40 weeks
C06	13	29	20 minutes	*Beach Boulevard Crossing* Between Damask Dr. and Warner Ave.	56 weeks

(-) Not applicable – either no lanes and/or no impact

In summary, project-related construction activities and temporary lane closures on crossings would have a temporary adverse impact on the operation of area roadways and intersections during the 324 month construction period if controls are not in place. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the

implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the circulation system would be reduced to less than significant.

Indirect Impacts

The modification of the flood control channels within the C05/C06 system would require temporary lane closures over crossings during construction activities. Although the impacted crossings would remain open at all times to allow traffic in both directions, there would be the temporary loss of a single lane in one direction. This could indirectly impact nearby roads as residents become used to the closures and potentially take alternate routes. The modification of the flood control channels, crossings, and the associated temporary lane closures could create additional traffic on nearby arterial roads that could potentially indirectly increase traffic congestion. The increased traffic congestion could subsequently affect CMP roadways, intersection operation, public transit service or pedestrian and bicycle facilities. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the circulation system would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The aforementioned maintenance activities would be temporary in nature and short in duration. They would likely not require any lane closures. Therefore, the long-term operation and maintenance of the flood control channels within the C05/C06 system would not affect CMP roadways, intersection operation, public transit service, or pedestrian and bicycle facilities.

Diversion Channel

Direct Impacts

Roadways and Intersections: The Orange County Congestion Management Plan (CMP) (2017) is the applicable CMP for the proposed project. The CMP's goals are to support regional mobility objectives by reducing traffic congestion, to provide a mechanism for coordinating land use and development decisions that support the regional economy, and to support gas tax funding eligibility. The downstream end of the diversion channel would be located within the vicinity of Bolsa Avenue. Per review of the 2017 Orange County Congestion Management Plan, Bolsa Avenue is designated as part of the CMP Highway System. Per review of Appendix B-1 of the CMP, *Meeting CMP Traffic Impact Analysis Requirements*, a CMP

traffic impact analysis is required for CMP segments where the proposed project would generate 2,400 of more daily trips. For projects which will directly access a CMP Highway System link, the threshold for requiring a traffic impact analysis should be reduced to 1,600 or more trips per day. Construction of the diversion channel would require approximately 19 haul trucks per day on maximum demolition days over the 23 month construction period. In addition, it is assumed that the construction of the diversion channel would require a maximum of 35 construction workers which would equate to 35 vehicle trips per day. Therefore, on a maximum demolition day, it is assumed that there would be a total of 108 vehicle trips per day (includes haul trucks and construction worker vehicles and assumes travel to the site and from the site). One-hundred eight (108) is well below the threshold of 1,600 trips per day that would trigger a traffic impact analysis.

In addition, the CMP explicitly excludes construction, rehabilitation, or maintenance of facilities that impact the system from deficiency determinations (i.e., deficiency plan identifies the cause of congestion, the modifications needed to solve the problem, and the cost and timing for implementing proposed modifications). Because construction related traffic is not targeted in the CMP to reduce congestion, no conflict with the CMP would occur with implementation of the proposed project. Overall, the proposed project would generate additional vehicle trips that would increase traffic, but would cause a less than significant impact.

Bicycle Lanes: There are three roadways that are within the vicinity of where the diversion channel would be constructed. Edwards Street is located adjacent to where the diversion channel would be constructed, while Goldenwest Street and Chestnut Street have crossings over where the diversion channel would be constructed. Edwards Street is the only roadway with a bicycle lane and the bicycle lane is a Class II. Construction of the diversion channel would not extend into Edwards Street, but would just be adjacent. Therefore, no impacts to the bicycle lanes present on Edwards Street during construction of the diversion channel are expected.

Sidewalks: As discussed above there are three roadways that are within the vicinity of where the diversion channel would be constructed. Sidewalks are present on all three roadways, however, only sidewalks on Goldenwest Street and Chestnut Street would be temporarily impacted during construction of the diversion channel (Table 89). The sidewalks along Edwards Street would not be impacted during construction activities. Overall, impacts to sidewalks presented in Table 89 would be temporary lasting only the duration of construction.

Table 89: Sidewalks within the Vicinity of the Proposed Project that would be Temporarily Impacted during Construction.

Channel	Street	Sidewalks	Sidewalk Impacted by Construction	Duration of Impact
Diversion Channel	*Edwards Street* Bolsa Ave. to abandoned railway right-of-way	Sidewalks on West and East Sides	Sidewalks on West and East Sides	100 weeks
	Goldenwest Street Between Santee Ave. and Hazard Ave.	Sidewalks on West and East Sides	Sidewalks on West and East Sides	
	Chestnut Street Between Santee Ave. and Hazard Ave.	Sidewalks on West and East Sides	-	-

(-) Not applicable – either no lanes and/or no impact

Public Transit: One OCTA bus route is within the vicinity of the proposed project:

- Route 25 crosses Goldenwest Street within the vicinity of where the diversion channel would be constructed, traveling between Fullerton (i.e., northbound) to Huntington Beach (i.e., southbound), operating 7-days per week. Peak operation time is one (1) hour.

OCTA Route 25 would experience single lane closures during replacement of the Goldenwest Street crossing between Santee Avenue and Hazard Avenue; however, at least one lane in either direction would continue to remain open during the duration of construction of the diversion channel.

In summary, project-related construction activities and temporary lane closures on the Goldenwest Street crossing could have a temporary adverse impact on the operation of area roadways and intersections during the 100 week construction period if controls are not in place. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the circulation system would be reduced to less than significant.

Indirect Impacts

The construction of the diversion channel would require temporary lane closures over crossings during construction activities. Although the impacted crossings would remain open at all times to allow traffic in both directions, there would be the temporary loss of a single lane in one direction. This could indirectly impact nearby roads as residents become used to the closures and potentially take alternate routes. The modification of the flood control channels, crossings, and the associated temporary lane closures could create additional traffic on nearby arterial roads that could potentially indirectly increase traffic congestion. The increased traffic congestion could subsequently affect CMP roadways, intersection operation, public transit service or pedestrian and bicycle facilities. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the circulation system would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the diversion channel would be no different than maintenance activities that are undertaken currently for the existing channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The aforementioned maintenance activities would be temporary in nature and

short in duration. They would likely not require any lane closures. Therefore, the long-term operation and maintenance of the diversion channel would not affect CMP roadways, intersection operation, public transit service, or pedestrian and bicycle facilities.

Level of Impact for the LPP

Less than Significant Impact with Mitigation Incorporated. The proposed project would result in temporary direct and indirect adverse impacts to CMP roadways, intersection operation, public transit, or pedestrian and bicycle facilities while construction is occurring. These impacts would be temporary lasting only the duration of construction. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the circulation system would be reduced to less than significant.

5.15.4.2 IMPACT TT-2: Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3 subdivision (b).

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative, construction of the project would not occur. The current level of risk would remain for flooding of communities within the project area. Widespread overtopping within the project area would still occur between the 10% and 4% ACE events. Depending on the location, severity, and duration of the flooding, there could be a substantial increase in traffic due to debris removal and clean-up. This would be a temporary increase, however, lasting only as long as clean-up efforts are required. Therefore, the No Action Plan is not expected to be inconsistent with CEQA Guidelines section 15064.3 subdivision (b).

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct, Indirect, and Long-term Operation and Maintenance Impacts

A qualitative analysis of construction traffic was conducted to analyze whether or not the proposed project would be consistent with CEQA Guidelines section 15064.3 subdivision (b). The threshold that was used to determine whether or not impacts would occur is if the project would generate 2,400 or more daily trips. This threshold comes from the Orange County CMP (2017) which requires a traffic impact analysis if the proposed project would generate 2,400 or more daily trips on the CMP Highway System. It was assumed that if the project were to generate 2,400 or more daily trips and a traffic impact analysis was required, that the project would have a significant transportation impact. If the project were to

generate less than 2,400 daily trips and a traffic impact analyses was not required, then the project would have a less than significant transportation impact.

Modification of the Warner Avenue Bridge would require approximately 24 haul trucks per day on maximum demolition days over the 15 month construction period. In addition, it is assumed that the modification of the bridge would require a maximum of 35 construction workers which could equate to 35 vehicle trips per day. Therefore, on a maximum demolition day, it is assumed that there would be a total of 118 vehicle trips per day (i.e., includes haul trucks and construction worker vehicles and assumes travel to and from the site). One-hundred eighteen (118) is well below the threshold of 2,400 trips per day that would trigger a traffic impact analysis. Therefore, since the proposed project would not require a traffic impacts analysis, it was determined that the project would have a less than significant direct, indirect, and long-term transportation impact.

Tide Gates

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

A qualitative analysis of construction traffic was conducted to analyze whether or not the proposed project would be consistent with CEQA Guidelines section 15064.3 subdivision (b). The threshold that was used to determine whether or not impacts would occur is if the project would generate 2,400 or more daily trips. This threshold comes from the Orange County CMP (2017) which requires a traffic impact analysis if the proposed project would generate 2,400 or more daily trips on the CMP Highway System. It was assumed that if the project were to generate 2,400 or more daily trips and a traffic impact analysis was required, that the project would have a significant transportation impact. If the project were to generate less than 2,400 daily trips and a traffic impact analyses was not required, then the project would have a less than significant transportation impact.

Removal of the tide gates and replacement with a new small bridge would require approximately 1 haul truck per day on maximum demolition days over the 15 month construction period. In addition, it is assumed that the proposed project would require a maximum of 35 construction workers which could equate to 35 vehicle trips per day. Therefore, on a maximum demolition day, it is assumed that there would be a total of 72 vehicle trips per day (includes haul trucks and construction worker vehicles and assumes travel to the site and from the site). Seventy-two (72) is well below the threshold of 2,400 trips per day that would trigger a traffic impact analysis. Therefore, since the proposed project would not require a traffic impacts analysis, it was determined that the project would have a less than significant direct, indirect, and long-term transportation impact.

C02/C04 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

A qualitative analysis of construction traffic was conducted to analyze whether or not the proposed project would be consistent with CEQA Guidelines section 15064.3 subdivision (b). The threshold that was used to determine whether or not impacts would occur is if the project would generate 2,400 or more daily trips. This threshold comes from the Orange County CMP (2017) which requires a traffic impact analysis if the proposed project would generate 2,400 or more daily trips on the CMP Highway System. It was assumed that if the project were to generate 2,400 or more daily trips and a traffic impact analysis was required, that the project would have a significant transportation impact. If the project were to generate less than 2,400 daily trips and a traffic impact analyses was not required, then the project would have a less than significant transportation impact.

Modification of the C02/C04 channels would require approximately four (4) haul trucks per day on maximum demolition days over the 81 month construction period. In addition, it is assumed that the modification of the C02/C04 channels would require a maximum of 35 construction workers which would equate to 35 vehicle trips per day. Therefore, on a maximum demolition day, it is assumed that there would be a total of 78 vehicle trips per day (includes haul trucks and construction worker vehicles and assumes travel to the site and from the site). Seventy-eight (78) is well below the threshold of 2,400 trips per day that would trigger a traffic impact analysis. Therefore, since the proposed project would not require a traffic impact analysis, it was determined that the project would have a less than significant direct, indirect, and long-term transportation impact.

C05/C06 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

A qualitative analysis of construction traffic was conducted to analyze whether or not the proposed project would be consistent with CEQA Guidelines section 15064.3 subdivision (b). The threshold that was used to determine whether or not impacts would occur is if the project would generate 2,400 or more daily trips. This threshold comes from the Orange County CMP (2017) which requires a traffic impact analysis if the proposed project would generate 2,400 or more daily trips on the CMP Highway System. It was assumed that if the project were to generate 2,400 or more daily trips and a traffic impact analysis was required, that the project would have a significant transportation impact. If the project were to generate less than 2,400 daily trips and a traffic impact analyses was not required, then the project would have a less than significant transportation impact.

Modification of the C05/C06 channels would require approximately six (6) haul trucks per day on maximum demolition days over the 136 month construction period. In addition, it is assumed that the modification of the C05/C06 channels would require a maximum of 35 construction workers which would equate to 35 vehicle trips per day. Therefore, on a maximum demolition day, it is assumed that there would be a total of 82 vehicle trips per day (includes haul trucks and construction worker vehicles and assumes travel to the site and from the site). Eighty-two (82) is well below the threshold of 2,400 trips per day that would trigger a traffic impact analysis. Therefore, since the proposed project would not require a traffic impact analysis, it was determined that the project would have a less than significant direct, indirect, and long-term transportation impact.

Level of Impact for the NED Plan

Less than Significant Impact. During construction the proposed project would not generate enough vehicle trips per day to exceed the threshold triggering a traffic impact analysis. During construction is when the most vehicle trips would be generated. Long-term operation and maintenance is expected to generate no additional vehicle trips beyond what currently occurs for operation and maintenance of the existing channels. Therefore, since the proposed project would not require a traffic impact analysis, it was determined that the project would have a less than significant transportation impact.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

A qualitative analysis of construction traffic was conducted to analyze whether or not the proposed project would be consistent with CEQA Guidelines section 15064.3 subdivision (b). The threshold that was used to determine whether or not impacts would occur is if the project would generate 2,400 or more daily trips. This threshold comes from the Orange County CMP (2017) which requires a traffic impact analysis if the proposed project would generate 2,400 or more daily trips on the CMP Highway System. It was assumed that if the project were to generate 2,400 or more daily trips and a traffic impact analysis was required, that the project would have a significant transportation impact. If the project were to generate less than 2,400 daily trips and a traffic impact analyses was not required, then the project would have a less than significant transportation impact.

Modification of the C02/C04 channels would require approximately 20 haul trucks per day on maximum demolition days over the 197 month construction period. In addition, it is assumed that the modification of the C02/C04 channels would require a maximum of 35 construction workers which would equate to 35 vehicle trips per day. Therefore, on a maximum demolition day, it is assumed that there would be a total of 110 vehicle trips per day (includes haul trucks and construction worker vehicles and assumes travel to the site and from the site). Once-hundred ten (110) is well below the threshold of 2,400 trips per day that would trigger a traffic impact analysis. Therefore, since the proposed project would not require a traffic impact analysis, it was determined that the project would have a less than significant direct, indirect, and long-term transportation impact.

C05/C06 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

A qualitative analysis of construction traffic was conducted to analyze whether or not the proposed project would be consistent with CEQA Guidelines section 15064.3 subdivision (b). The threshold that was used to determine whether or not impacts would occur is if the project would generate 2,400 or more daily trips. This threshold comes from the Orange County CMP (2017) which requires a traffic impact analysis if the proposed project would generate 2,400 or more daily trips on the CMP Highway System. It was assumed that if the project were to generate 2,400 or more daily trips and a traffic impact analysis was required, that the project would have a significant transportation impact. If the project were to generate less than 2,400 daily trips and a traffic impact analyses was not required, then the project would have a less than significant transportation impact.

Modification of the C05/C06 channels would require approximately 40 haul trucks per day on maximum demolition days over the 324 month construction period. In addition, it is assumed that the modification of the C05/C06 channels would require a maximum of 35 construction workers which would equate to 35 vehicle trips per day. Therefore, on a maximum demolition day, it is assumed that there would be a total of 150 vehicle trips per day (includes haul trucks and construction worker vehicles and assumes travel to the site and from the site). One-hundred fifty (150) is well below the threshold of 2,400 trips per day that would trigger a traffic impact analysis. Therefore, since the proposed project would not require a traffic impact analysis, it was determined that the project would have a less than significant direct, indirect, and long-term transportation impact.

Level of Impact for the LPP

Less than Significant Impact. During construction the proposed project would not generate enough vehicle trips per day to exceed the threshold triggering a traffic impact analysis. During construction is when the most vehicle trips would be generated. Long-term operation and maintenance is expected to generate no additional vehicle trips beyond what currently occurs for operation and maintenance of the existing channels. Therefore, since the proposed project would not require a traffic impact analysis, it was determined that the project would have a less than significant transportation impact.

5.15.4.3 IMPACT TT-3: Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative, construction of the project would not occur. The current level of risk would remain for flooding of communities within the project area. Foreseeable future conditions would not involve the construction of any design features that would increase hazards or compatible uses. Therefore, no impact is expected under the No Action Plan.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

The modification of the Warner Avenue Bridge does not include any design features that would substantially increase hazards or create incompatibility for users. The modification of the Warner Avenue Bridge would require temporary lane closures during the 15 month construction period. The construction would be phased to allow traffic to continue in both directions. The first phase would be extending the bridge on the left hand side which would require closing the two vehicle lanes and one bike lane conveying traffic east. The two lanes conveying traffic to the west would be divided to have a single lane conveying traffic west and a single lane conveying traffic east. The second phase would be extending the bridge on the right hand side which would require closing the two vehicle lanes and one bike lane conveying traffic west. The two lanes conveying traffic to the east would be divided to have a single lane conveying traffic west and a single lane conveying traffic east. Therefore, approximately half of the Warner Avenue Bridge will be closed at different stages during construction, with traffic remaining open at all times to allow traffic in both directions.

Construction activities during modification of the bridge would temporarily increase hazards due to the presence of equipment and haul trucks entering and leaving the construction site. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the area roadways would be reduced to less than significant.

Indirect Impacts

As stated above, the modification of the Warner Avenue Bridge would require temporary lane closures during the 15 month construction period. The construction would be phased to allow traffic to continue in both directions; however, construction activities could temporarily increase hazards due to the presence of equipment and haul trucks entering the leaving the construction site. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the area roadways would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. The aforementioned maintenance activities would be temporary in nature and short in duration. They would likely not require a full lane closure, but temporary closure of a small area where the maintenance activities are occurring. These temporary closures due to maintenance would not be expected to substantially increase hazards or create incompatibility for users. Therefore, the project would have a less than significant long-term impact.

Tide Gates

Direct Impacts

The removal of the tide gates and replacement with a new access bridge does not include any design features that would substantially increase hazards or create incompatibility for users. The tide gates currently provide a crossing for recreational users, maintenance vehicles, and emergency response vehicles. During construction, the crossing would be inaccessible and users would have to use the Oil Field Bridge crossing which is located approximately 0.58 miles east of the tide gate location.

Construction activities during demolition of the tide gates and construction of the new crossing could temporarily increase hazards due to the presence of equipment and haul trucks entering and leaving the construction site. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the area roadways would be reduced to less than significant.

Indirect Impacts

As stated above, the removal of the tide gates and replacement with a new small bridge would require the temporary closure of the crossing. Construction activities could temporarily increase hazards to recreational users within the area due to the presence of equipment and haul trucks entering and leaving the construction site. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the area roadways would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new crossing would be no different than maintenance activities that are undertaken currently for other crossings. Typical maintenance activities that occur on crossings include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. The aforementioned maintenance activities would be temporary in nature and short in duration. They would likely not require complete closure of the crossing, but temporary closure of a small area where the maintenance activities are occurring. These temporary closures due to maintenance would not be expected to substantially increase hazards or create incompatibility for users. Therefore, the project would have a less than significant long-term impact.

Channels C02/C04

Direct Impacts

The modification of the C02/C04 channels does not include any design features that would substantially increase hazards or create incompatibility for users. The modification of the channels would require temporary lane closures for staging of construction equipment. This primary impact would be along channels that do not have sufficient right-of-ways for staging and/or few alternative staging are options outside of the channel right-of-ways. C04 Reach 20 is one such channel where staging is limited, therefore, a traffic lane from adjacent roadways would need to be taken temporarily for staging.

Roadways that would be impacted are Edinger Avenue, Springdale Street, and Bolsa Avenue (Table 80). Construction activities for C04 Reach 20 would be phased so that lanes on the aforementioned roads are not impacted the entire project construction period. Due to the number of lanes of traffic being reduced on certain roadways, the presence of construction equipment, and haul trucks entering and leaving the construction site, construction activities associated with the modification of the C02/C04 channels could temporarily increase hazards. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the area roadways would be reduced to less than significant.

Indirect Impacts

As stated above, the modification of the C02/C04 channels would require temporary lane closures on some adjacent roadways. The construction would be phased so that roadways are not impacted all at the same time and traffic would be allowed to continue in both directions, although there would be a temporary reduction in the number of lanes of traffic. Due to the temporary lane closures, the reduction in the number of lanes of traffic, the presence of construction equipment, and haul trucks entering and leaving the construction site, construction activities could temporarily increase hazards. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the area roadways would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The stated maintenance activities would be temporary in nature and short in duration. They would likely not require any lane closures. Therefore, the long-term operation and maintenance of the flood control channels within the C02/C04 system would not substantially increase hazards or create incompatibility for users. Therefore, the project would have a less than significant long-term impact.

Channels C05/C06

Direct Impacts

The modification of the C05/C06 channels does not include any design features that would substantially increase hazards or create incompatibility for users. In addition, the modification of the channels is not expected to require temporary lane closures for staging of construction equipment, as sufficient staging areas have been identified within and/or adjacent to the channel right-of-ways. Modification of the channels would require haul trucks entering and leaving the construction site which could temporarily increase hazards. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the area roadways would be reduced to less than significant.

Indirect Impacts

As stated above, the modification of the C05/C06 channels would not require temporary lane closures on adjacent roadways for staging of equipment. However, haul trucks required for construction activities would be entering and exiting the construction site which could temporarily increase hazards. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the area roadways would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The stated maintenance activities would be temporary in nature and short in duration. They would likely not require any lane closures. Therefore, the long-term operation and maintenance of the flood control channels within the C05/C06 system would not substantially increase hazards or create incompatibility for users. Therefore, the project would have a less than significant long-term impact.

Level of Impact for the NED Plan

Less than Significant Impact with Mitigation Incorporated. The proposed project does not include any design features that would substantially increase hazards or create incompatibility for users. However,

construction activities would include temporary lane closures for staging of construction equipment, presence of construction equipment, and haul trucks entering and leaving the construction site. These factors could temporarily increase roadway hazards for users. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to area roadways would be reduced to less than significant.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Channels C02/C04

Direct Impacts

The modification of the C02/C04 channels does not include any design features that would substantially increase hazards or create incompatibility for users. The modification of the channels would require temporary lane closures for staging of construction equipment. This primary impact would be along channels that do not have sufficient right-of-ways for staging and/or few alternative staging are options outside of the channel right-of-ways. C04 Reach 20 is one such channel where staging is limited, therefore, a traffic lane from adjacent roadways would need to be taken temporarily for staging. Roadways that would be impacted are Edinger Avenue, Springdale Street, and Bolsa Avenue (Table 80). Construction activities for C04 Reach 20 would be phased so that lanes on the aforementioned roads are not impacted the entire project construction period. In addition to temporarily taking lanes for staging of construction equipment, 14 crossings would be replaced to accommodate the geometry change of the channels from trapezoidal to rectangular shaped. The bridge crossings would be modified in two to three phases depending on size in order to continue to allow traffic in both directions; however, temporary lane closures would be required. Due to the number of lanes of traffic being reduced on certain roadways and crossings, the presence of construction equipment, and haul trucks entering and leaving the construction site, construction activities associated with the modification of the C02/C04 channels could temporarily increase hazards. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible,

and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the area roadways would be reduced to less than significant.

Indirect Impacts

As stated above, the modification of the C02/C04 channels would require temporary lane closures on some adjacent roadways and crossings. The construction would be phased so that roadways and crossings are not impacted all at the same time and traffic would be allowed to continue in both directions, although there would be a temporary reduction in the number of lanes of traffic. Due to the temporary lane closures, the reduction in the number of lanes of traffic, the presence of construction equipment, and haul trucks entering and leaving the construction site, construction activities could temporarily increase hazards. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the area roadways would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The stated maintenance activities would be temporary in nature and short in duration. They would likely not require any lane closures. Therefore, the long-term operation and maintenance of the flood control channels within the C02/C04 system would not substantially increase hazards or create incompatibility for users. Therefore, the project would have a less than significant long-term impact.

Channels C05/C06

Direct Impacts

The modification of the C05/C06 channels does not include any design features that would substantially increase hazards or create incompatibility for users. In addition, the modification of the channels is not expected to require temporary lane closures for staging of construction equipment, as sufficient staging areas have been identified within and/or adjacent to the channel right-of-ways. Modification of the channels would require the replacement of 30 crossings to accommodate the geometry change of the channels from trapezoidal to rectangular shaped. The bridge crossings would be modified in two to three phases depending on size in order to continue to allow traffic in both directions; however, temporary lane closures would be required. Due to the number of lanes of traffic being reduced on certain crossings, the presence of construction equipment, and haul trucks entering and leaving the construction site, construction activities associated with the modification of the C05/C06 channels could temporarily increase roadway hazards. To minimize the temporary adverse impact created during construction

activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the area roadways would be reduced to less than significant.

Indirect Impacts

As stated above, the modification of the C05/C06 channels would require temporary lane closures on crossings that are being replaced as part of the proposed project. Construction of the crossings would be phased to continue to allow traffic in both directions. Due to the number of lanes of traffic being reduced on certain crossings, the presence of construction equipment, and haul trucks entering and leaving the construction site, construction activities associated with the modification of the C05/C06 channels could temporarily increase hazards. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the area roadways would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The stated maintenance activities would be temporary in nature and short in duration. They would likely not require any lane closures. Therefore, the long-term operation and maintenance of the flood control channels within the C05/C06 system would not substantially increase hazards or create incompatibility for users. Therefore, the project would have a less than significant long-term impact.

Diversion Channel

Direct Impacts

The diversion channel does not include any design features that would substantially increase hazards or create incompatibility for users. In addition, the construction of the diversion channel is not expected to require temporary lane closures for staging of construction equipment, as sufficient staging has been identified within the right-of-way. Construction of the diversion channel would require the replacement of two crossings. The crossings would be modified in two to three phases depending on size in order to continue to allow traffic in both directions; however, temporary lane closures would be required. Due to the number of lanes of traffic being reduced on these crossings, the presence of construction equipment, and haul trucks entering and leaving the construction site, construction activities associated with the

construction of the diversion channel could temporarily increase roadway hazards. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the area roadways would be reduced to less than significant.

Indirect Impacts

As stated above, the construction of the diversion channel would require temporary lane closures on crossings that are being replaced as part of the proposed project. Construction of the crossings would be phased to continue to allow traffic in both directions. Due to the number of lanes of traffic being reduced on certain crossings, the presence of construction equipment, and haul trucks entering and leaving the construction site, construction activities associated with the diversion channel could temporarily increase hazards. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to the area roadways would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the construction of the diversion channel would be no different than maintenance activities that are undertaken currently for the existing flood control channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The stated maintenance activities would be temporary in nature and short in duration. They would likely not require any lane closures. Therefore, the long-term operation and maintenance of the diversion channel would not substantially increase hazards or create incompatibility for users. Therefore, the project would have a less than significant long-term impact.

Level of Impact for the LPP

Less than Significant Impact with Mitigation Incorporated. The proposed project does not include any design features that would substantially increase hazards or create incompatibility for users. However, construction activities would include temporary lane closures for staging of construction equipment, presence of construction equipment, and haul trucks entering and leaving the construction site. These factors could temporarily increase roadway hazards for users. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and

coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to area roadways would be reduced to less than significant.

5.15.4.4 IMPACT TT-4: Results in inadequate emergency access.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative, construction of the project would not occur. The current level of risk would remain for flooding of communities within the project area. Widespread overtopping within the project area would still occur between the 10% and 4% ACE events. Depending on the location, severity, and duration of the flooding, emergency access could be temporarily impaired. While this would be a temporary impact, it could be significant depending on the duration of flooding and the length of time it takes to reopen roads that may be impacted by flooding.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

The modification of the Warner Avenue Bridge would require lane closures during construction activities, which are anticipated to last approximately 15 months. The construction would be phased to allow traffic in both directions. The first phase would be extending the bridge on the left hand side which would require closing the two vehicle lanes and one bike lane conveying traffic east. The two lanes conveying traffic to the west would be divided to have a single lane conveying traffic west and a single lane conveying traffic east. The second phase would be extending the bridge on the right hand side which would require closing the two vehicle lanes and one bike lane conveying traffic west. The two lanes conveying traffic to the east would be divided to have a single lane conveying traffic west and a single lane conveying traffic east. Therefore, approximately half of the Warner Avenue Bridge will be closed at different stages during construction, with traffic remaining open at all times to allow traffic in both directions. Since traffic would be reduced to from two lanes in either direction to a single lane in either direction during construction, a bottleneck would be created that would potentially interfere with adequate emergency access, causing a temporary adverse impact. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation

of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to emergency access would be reduced to less than significant.

Indirect Impacts

The modification of the Warner Avenue Bridge would require lane closures during construction activities, which are anticipated to last approximately 15 months. Although the bridge would remain open at all times to allow traffic in both directions, the normal four lane bridge would be reduced to two lanes while construction is occurring. This could potentially indirectly impact nearby roads that also allow access to the inland part of Orange County off of the PCH as residents become used to the closure and potentially take alternate routes. The closest major road to the north of Warner Avenue Bridge is Seal Beach Boulevard which is approximately 2.84 miles away and is a six lane road providing three lanes of traffic in each direction. The closest major road to the south of Warner Avenue Bridge is Goldenwest Street which is approximately 4.0 miles away and is a six lane road providing three lanes of traffic in each direction. The construction of Warner Avenue Bridge and the temporary lane closures could create more traffic on these nearby major inlet roads that would potentially indirectly interfere with adequate emergency access. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to emergency access would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modification of Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. The aforementioned maintenance activities would be temporary in nature and short in duration. They would likely not require a full lane closure, but temporary closure of a small area where the maintenance activities are occurring. These temporary closures due to maintenance would not be expected to substantially impact emergency access. Therefore, the project would have a less than significant long-term impact.

Tide Gates

Direct Impacts

The permanent removal of the tide gates on C05 Reach 1 and replacement with a small span bridge would require temporary closure of the bike/walking path crossing during construction activities, which are anticipated to last approximately five months. The crossing does provide access for emergency response vehicles from the south to the channel maintenance road on the north in case there is an emergency within the flood control channels or within the BCER. The closest crossing that would provide access to the north bank maintenance road from the south is the oil field bridge which is located approximately 0.58 miles east of the tide gate location. Since access to the north bank maintenance road would not be

prevented during implementation of this measure, and the detour crossing is located less than a mile from the impacted crossing, a less than significant impact is expected.

Indirect Impacts

The permanent removal of the tide gates and replacement with a small span bridge is not expected to have any indirect impacts to the implementation of an adopted emergency response plan or emergency evacuation plan. The tide gate crossing is primarily a recreational crossing that is only used occasionally as an access point by emergency response vehicles responding to an emergency within the flood control channels.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new span bridge to replace the tide gates would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. The aforementioned maintenance activities would be temporary in nature and short in duration. Due to the size of the span bridge, any maintenance activities would like require closing of the bridge, but the closure would likely be no longer than 24 hours. Therefore, the project would have a less than significant long-term impact.

Channels C02/C04

Direct Impacts

The majority of the modifications within the C02/C04 flood control channels would not require temporary lane closures during construction activities, which are anticipated to last a combined total of approximately six years and ten months. The primary impact would be along channels that do not have sufficient right-of-ways for staging and/or few alternative staging area options outside of the channel right-of-ways. C04 Reach 20 is one such channel where staging is limited, therefore, a traffic lane from adjacent roadways would need to be taken temporarily for staging. Roadways that would be impacted are Edinger Avenue, Springdale Street, and Bolsa Avenue. Construction activities for C04 Reach 20 would be phased so that lanes on the aforementioned roads are not impacted the entire total construction period. The first phase would be the portion of C04 Reach 20 extending from Bolsa Chica Street to McFadden Avenue. Construction is anticipated to take approximately three years. During this time, a single lane from the westbound traffic side of Edinger Avenue, from Bolsa Chica Street east to Springdale Street, would be temporarily closed to allow for construction staging. One lane of traffic on the westbound side would still remain open during construction to allow through traffic. In addition, a single lane from the southbound traffic side of Springdale Street, from Edinger Avenue north to McFadden Avenue, would be temporarily closed to allow for construction staging. One lane of traffic on the southbound side would still remain open during construction to allow through traffic. The second phase would be the portion of C04 Reach 20 extending from McFadden Avenue to just south of where the channel goes under Bolsa Avenue. Construction is anticipated to take approximately 12 ½ months. During this time, a single lane from the northbound traffic side of Springdale Street, from McFadden Avenue to Engineer Drive, would be temporarily closed to allow for construction staging. One lane of traffic on the northbound side would still remain open during construction to allow through traffic. Lastly, the third phase would be the portion of C04 Reach 20 extending from north of where the channel goes under Bolsa Avenue to west of Edwards Street. Construction is anticipated to take approximately 29 weeks. During this time, a single lane from the westbound traffic side of Bolsa Avenue, from where Bolsa Avenue crosses the channel to Edwards Street, would be temporarily closed to allow for construction staging. Two lanes of traffic on the

westbound side would still remain open during construction to allow through traffic. The remaining channels to be modified (i.e., C02 Reach 23, C04 Reach 22) are not expected to require the temporary closure of a traffic lane for staging. This measure also does not include any crossing construction which would require temporary lane closures.

Since traffic would be reduced from two westbound lanes to one on Edinger, two southbound lanes to one on Springdale Street, two northbound lanes to one on Springdale Street, and three westbound lanes to two on Bolsa Avenue, a bottleneck would be created that would potentially interfere with adequate emergency access, causing a temporary significant adverse impact. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to emergency access would be reduced to less than significant.

Indirect Impacts

The modification of the flood control channels within the C02/C04 system would require temporary lane closures during construction activities for staging of equipment. Construction activities for C04 Reach 20, which will require temporary lane closures, are anticipated to last between 29 weeks and 3 years for the various phases of construction. Although the impacted roadways would remain open at all times to allow traffic in both directions, there would be the temporary loss of a single lane in one direction. This could potentially indirectly impact nearby roads as residents become used to the closures and potentially take alternate routes. Nearby roads similar in size to those that would have temporarily lane closures and could be used as alternative routes include Edwards Street, Goldenwest Street, McFadden Avenue, and Heil Avenue. The modification of the flood control channels and the associated temporary lane closures would create additional traffic on these nearby major roads that could potentially indirectly interfere with adequate emergency access. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to emergency access would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The aforementioned maintenance activities would be

temporary in nature and short in duration. They would likely not require any lane closures. Therefore, this measure is not expected to have any long-term impacts to the provision of adequate emergency access.

Channels C05/C06

Direct Impacts

The modifications within the C05/C06 flood control channels are not expected to require temporary lane closures during construction activities, which are anticipated to last a combined total of approximately 11 years and four months. The primary reason temporary lane closures would be expected with implementation of this alternative would be due to insufficient staging space for construction equipment within the channel right-of-ways and/or few alternative staging options outside of the channel right-of-ways. However, sufficient staging areas have been identified within the C05/C06 system so that using a lane for staging is not required. In addition, this measure does not include any crossing construction which would require temporary lane closures. Therefore, a less than significant impact to emergency access would occur.

Indirect Impacts

The modification of the flood control channels within the C05/C06 system are not expected to require any temporary lane closures during construction activities for staging of equipment. Roadways are expected to remain open at all times to allow traffic to continue in both directions. Therefore, this measure is would have a less than significant impact to the provision of adequate emergency access.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels would be no different than maintenance activities that are undertaken currently for the existing channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The aforementioned maintenance activities would be temporary in nature and short in duration. They would likely not require any lane closures. Therefore, this measure is not expected to have any long-term impacts to the provision of adequate emergency access.

Level of Impact for the NED Plan

Less than Significant Impact with Mitigation Incorporated. The proposed project does not include any design features that would substantially increase hazards or create incompatibility for users. However, construction activities would include temporary lane closures for staging of construction equipment, presence of construction equipment, and haul trucks entering and leaving the construction site. These factors could temporarily increase roadway hazards for users. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP’s for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to emergency access would be reduced to less than significant.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Channels C02/C04

Direct Impacts

The majority of the modifications within the C02/C04 flood control channels would not require temporary lane closures during construction activities, which are anticipated to last a combined total of approximately seven years and six months. The primary impact would be along channels that do not have sufficient right-of-ways for staging and/or few alternative staging area options outside of the channel right-of-ways. C04 Reach 20 is one such channel where staging is limited, therefore, a traffic lane from adjacent roadways would need to be taken temporarily for staging. Roadways that would be impacted are Edinger Avenue, Springdale Street, and Bolsa Avenue. Construction activities for C04 Reach 20 would be phased so that lanes on the aforementioned roads are not impacted the entire total construction period. The first phase would be the portion of C04 Reach 20 extending from Bolsa Chica Street to McFadden Avenue. Construction is anticipated to take approximately 18 months. During this time, a single lane from the westbound traffic side of Edinger Avenue, from Bolsa Chica Street east to Springdale Street, would be temporarily closed to allow for construction staging. One lane of traffic on the westbound side would still remain open during construction to allow through traffic. In addition, a single lane from the southbound traffic side of Springdale Street, from Edinger Avenue north to McFadden Avenue, would be temporarily closed to allow for construction staging. One lane of traffic on the southbound side would still remain open during construction to allow through traffic. The second phase would be the portion of C04 Reach 20 extending from McFadden Avenue to just south of where the channel goes under Bolsa Avenue. Construction is anticipated to take approximately just under 18 months. During this time, a single lane from the northbound traffic side of Springdale Street, from McFadden Avenue to Engineer Drive, would be temporarily closed to allow for construction staging. One lane of traffic on the northbound side would still remain open during construction to allow through traffic. Lastly, the third phase would be the portion of C04 Reach 20 extending from north of where the channel goes under Bolsa Avenue to west of Edwards Street. Construction is anticipated to take approximately 23 weeks. During this time, a single lane from the westbound traffic side of Bolsa Avenue, from where Bolsa Avenue crosses the channel to Edwards Street, would be temporarily closed to allow for construction staging. Two lanes of traffic on the westbound side would still remain open during construction to allow through traffic. The remaining channels to be modified (i.e., C02 Reach 23, C04 Reach 22) are not expected to require the temporary closure of a traffic lane for staging.

In addition to the aforementioned temporary lane closures due to staging of equipment for channel modifications, this measure also includes the modification of approximately 15 crossings. For C04 Reach 20 the following crossings would be modified to allow for the rectangular shaped channels:

- McFadden Avenue Crossing

- Bolsa Avenue Crossing
- Edwards Street Crossing

The bridge crossings would be modified in two to three phases depending on size in order to continue to allow traffic in both directions; however, temporary lane closures would be required. Construction would likely occur so that half of the crossing is modified, allowing single lanes of traffic in either direction to continue over the crossing. The second phase would allow construction of the remaining half of the crossing, allowing single lanes of traffic in either direction to continue over the crossing.

For C04 Reach 22, the following crossings would be modified to allow for the rectangular shaped channels:

- Pedestrian Crossing (northeast of Beach Boulevard and West Hazard Avenue intersection)
- Newland Street Crossing
- Magnolia Street Crossing
- Brookhurst Street Crossing
- Ward Street Crossing
- Westminster Avenue Crossing
- Ranney Avenue Crossing
- Blake Street Crossing
- Woodbury Road Crossing
- Teal Drive Crossing
- Mallard Avenue Crossing

The Newland Street, Magnolia Street, Brookhurst Street, Ward Street, and Westminster Avenue crossings would be modified in two to three phases depending on size in order to continue to allow traffic in both directions; however, temporary lane closures would be required. Construction would likely occur so that half of the crossing is modified, allowing single lanes of traffic in either direction to continue over the crossing. The second phase would allow construction of the remaining half of the crossing, allowing single lanes of traffic in either direction to continue over the crossing. The pedestrian crossing near the intersection of Beach Boulevard and West Hazard Avenue would likely be closed completely during construction. Lastly, the Ranney Avenue, Blake Street, Woodbury Road, Teal Drive, and Mallard Avenue crossings would likely be closed, but the closures would be phase so that the access into the neighborhood provided by these crossings is maintained. For example, Ranney Avenue and the Blake Street crossings would likely be completely closed to allow for modification of these two crossings; however, access to the residences in this area would still be provided by Woodbury Road, Teal Drive, and Mallard Avenue. One modification of these crossings is complete, then Woodbury Road, Teal Drive, and Mallard Avenue crossings would likely be completely closed to allow for modification of these three crossings; however, access to the residences in this area would still be provided by Ranney Avenue and Blake Street.

Overall, since traffic would be reduced from two westbound lanes to one on Edinger, two southbound lanes to one on Springdale Street, two northbound lanes to one on Springdale Street, and three westbound lanes to two on Bolsa Avenue, a bottleneck would be created. In addition, bottlenecks would be created due to modification of crossings that would result in the temporary reduction in lanes for a crossing or

restrict traffic completely. The bottlenecks that would be created would potentially interfere with adequate emergency access, causing a significant adverse impact. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to emergency access would be reduced to less than significant.

Indirect Impacts

The modification of the flood control channels within the C02/C04 system would require temporary lane closures during construction activities for staging of equipment. Construction activities for C04 Reach 20, which will require temporary lane closures, are anticipated to last between 23 weeks and 18 months for the various phases of construction. Although the impacted roadways would remain open at all times to allow traffic in both directions, there would be the temporary loss of a single lane in one direction. This could potentially indirectly impact nearby roads as residents become used to the closures and potentially take alternate routes. Nearby roads similar in size to those that would have temporarily lane closures and could be used as alternative routes include Edwards Street, Goldenwest Street, McFadden Avenue, and Heil Avenue. The modification of the flood control channels and the associated temporary lane closures would create additional traffic on these nearby major roads that could potentially indirectly interfere with adequate emergency access.

In addition, modification of the channels, specifically within C04 Reach 20 and C04 Reach 22, will require the modification of approximately 14 crossings to accommodate the rectangular shaped channels. The majority of the impacted crossings would remain open at all times to allow traffic in both directions, however, there would be a reduction in the number of lanes while construction is occurring. Five crossings and a pedestrian only crossing would be completely closed while they are being modified. The reduction in lanes and temporary closures could potentially indirectly impact nearby roads and associated crossings as residents become used to the closures and potentially take alternate routes. The modification of the crossings and the associated reduction in lanes and temporary closures would potentially interfere with adequate emergency access. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to emergency access would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels and modified crossings would be no different than maintenance activities that are undertaken currently for the existing channels and

crossings. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The aforementioned maintenance activities would be temporary in nature and short in duration. They would likely not require a full lane closure, but temporary closure of a small area where the maintenance activities are occurring. These temporary closures due to maintenance would not be expected to substantially impact emergency access. Therefore, the project would have a less than significant long-term impact.

Channels C05/C06

Direct Impacts

The modifications within the C05/C06 flood control channels are not expected to require temporary lane closures during construction activities, which are anticipated to last a combined total of approximately 13 years and five months. The primary reason temporary lane closures would be expected with implementation of this alternative would be due to insufficient staging space for construction equipment within the channel right-of-ways and/or few alternative staging options outside of the channel right-of-ways. However, sufficient staging areas have been identified within the C05/C06 system so that using a lane for staging is not required.

Although no temporary lane closures due to staging of equipment for channel modifications are anticipated, this measure also includes the modification of approximately 30 crossings. For C05 the following crossings would be modified to allow for the rectangular shaped channels:

- Oil Field Bridge (Reach 1)
- Springdale Street Crossing (Reach 1)
- Edwards Street Crossing (Reach 1)
- Goldenwest Street Crossing (Reach 2)
- Pedestrian Bridge Crossing (Reach 3 – upstream of confluence of C05/C06)
- Beach Boulevard/Heil Avenue Crossing (Reach 3)
- Magnolia Street/Edinger Avenue Crossing (Reach 4)
- Pedestrian Bridge (Reach 4 – southwest of Bushard Street Crossing)
- Bushard Street Crossing (Reach 4)
- McFadden Avenue/Brockhurst Street Crossing (Reach 5)
- Pedestrian Bridge (Reach 5 – northeast of McFadden Ave./Brookhurst St. Crossing)
- Ward Street Crossing (Reach 5)
- South Deming Street Crossing (Reach 5)
- South Euclid Street Crossing (Reach 5)
- Bolsa Avenue Crossing (Reach 5)
- West Fifth Street Crossing (Reach 6)
- West Hazard Avenue/North New Hope Street Crossing (Reach 7)
- West Fay Circle Crossing (Reach 8)

- Morningside Avenue Crossing (Reach 8)
- Westminster Avenue Crossing (Reach 8)
- OCTD Yard Crossing (Reach 9)
- Harbor Boulevard Crossing (Reach 9)
- Pedestrian Bridge (Reach 9 – southwest of Trask Avenue Crossing)
- Trask Avenue Crossing (Reach 9)
- Pearce Street Crossing (Reach 9)
- Upstream of Garden Grove Boulevard Crossing (Reach 10)
- Downstream of Aspenwood Crossing (Reach 10)

For C06, the following crossings would be modified to accommodate the rectangular shaped channels:

- Beach Boulevard Crossing (Reach 13)
- Newland Street Crossing (Reach 13)
- Bushard Street Crossing (Reach 17)

The bridge crossings would be modified in two to three phases depending on size in order to continue to allow traffic in both directions; however, temporary lane closures would be required. Construction would likely occur so that half of the crossing is modified, allowing single lanes of traffic in either direction to continue over the crossing. The second phase would allow construction of the remaining half of the crossing, allowing single lanes of traffic in either direction to continue over the crossing. The pedestrian crossings would likely be closed completely while being constructed.

Overall, although there are no temporary road closures required due to staging, the modification of associated crossings would result in the temporary reduction in lanes for a crossing or restrict traffic completely which would cause a bottleneck in these areas. The bottlenecks that would be created would potentially interfere with adequate emergency access, causing a temporary significant adverse impact. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to emergency access would be reduced to less than significant.

Indirect Impacts

The modification of the channels within the C05/C06 system will require the modification of approximately 30 crossings to accommodate the rectangular shaped channels. The majority of the impacted crossings would remain open at all times to allow traffic in both directions, however, there would be a reduction in the number of lanes while construction is occurring. Four pedestrian crossings would be completely closed while they are being modified. The reduction in lanes and temporary closures

could potentially indirectly impact nearby roads and associated crossings as residents become used to the closures and potentially take alternate routes. The modification of the crossings and the associated reduction in lanes and temporary closures would potentially interfere with adequate emergency access. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to emergency access would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified flood control channels and modified crossings would be no different than maintenance activities that are undertaken currently for the existing channels and crossings. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The aforementioned maintenance activities would be temporary in nature and short in duration. They would likely not require a full lane closure, but temporary closure of a small area where the maintenance activities are occurring. These temporary closures due to maintenance would not be expected to substantially impact emergency access. Therefore, the project would have a less than significant long-term impact.

Diversion Channel

Direct Impacts

The construction of the diversion channel is not anticipated to require temporary lane closures during construction activities, which are anticipated to last approximately two years. The primary reason temporary lane closures would be expected with implementation of this alternative would be due to insufficient staging space for construction equipment within the channel right-of-ways and/or few alternative staging options outside of the channel right-of-ways. However, sufficient staging areas have been identified within the vicinity of where the diversion channel would be constructed so that using a traffic lane for staging is not required.

Indirect Impacts

The construction of the diversion channel is not anticipated to require temporary lane closures during construction activities. However, due to a portion of the diversion channel being constructed adjacent to Edwards Street, between the abandoned railroad right-of-way south to Bolsa Avenue, vehicles using Edwards Street may potentially avoid this area due to the presence of construction equipment and vehicles. Vehicles avoiding this area while construction is occurring on the diversion channel could potentially indirectly impact nearby roads such as McFadden Avenue to the west and Goldenwest Street to the east if they are used as a detour. Therefore, the construction of the diversion channel would potentially interfere with adequate emergency access, causing a temporary significant adverse impact. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic

hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to emergency access would be reduced to less than significant.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the diversion channel would be no different than maintenance activities that are undertaken currently for the existing channels. Typical maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. The aforementioned maintenance activities would be temporary in nature and short in duration. They would likely not require a full lane closure, but temporary closure of a small area where the maintenance activities are occurring. These temporary closures due to maintenance would not be expected to substantially impact emergency access. Therefore, the project would have a less than significant long-term impact.

Level of Impact for the LPP

Less than Significant Impact with Mitigation Incorporated. The proposed project does not include any design features that would substantially increase hazards or create incompatibility for users. However, construction activities would include temporary lane closures for staging of construction equipment, presence of construction equipment, and haul trucks entering and leaving the construction site. These factors could temporarily increase roadway hazards for users. To minimize the temporary adverse impact created during construction activities, mitigation measures MM-TT-1 through MM-TT-4 would be implemented. MM-TT-1 requires the contractor to prepare a Traffic Safety Management Plan and coordinate the implementation of the plan with local jurisdictions. MM-TT-2 through MM-TT-4 include various measures to reduce construction related traffic during peak traffic hours, have construction traffic avoid congested areas when feasible, and ensure any damage to roads caused by construction related traffic is repaired. The preparation and implementation of the Traffic Safety Management Plan along with the BMP's for minimizing traffic congestion caused by the presence of construction vehicles is expected to minimize the temporary impacts created by construction activities. Therefore, with the implementation of MM-TT-1 through MM-TT-4, the potential temporary adverse impact to emergency access would be reduced to less than significant.

5.16 Utilities and Service Systems

5.16.1 Regulatory Framework

No Federal agency jurisdictions or regulations are applicable to utilities impacts associated with the proposed alternatives. The Santa Ana Watershed Project Authority and the Orange County Sanitation District manage and operate the Inland Empire Brine Line/Santa Ana Regional Interceptor (IEBL/SARI) Line. The California Public Utilities Commission and the Federal Energy Regulatory Commission both regulate operation of Southern California Gas pipelines and SoCal Edison's high-tension electrical transmission lines.

5.16.2 Impact Significance Criteria

The impact criteria below were taken from Appendix G of the CEQA Guidelines and are also being adopted for NEPA. For purposes of this analysis, the No Action Plan, NED Plan, and LPP would have a significant impact related to Utilities and Service Systems if it would:

IMPACT USS-1: Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.

IMPACT USS-2: Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years.

IMPACT USS-3: Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.

IMPACT USS-4: Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.

IMPACT USS-5: Comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

5.16.3 Mitigation Measures

No mitigation measures are proposed for implementation with the NED Plan or LPP.

5.16.4 Utilities and Service Systems Impacts

5.16.4.1 IMPACT USS-1: Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative, no federal project would constructed. Therefore, no relocation or construction of new or expanded utility and/or service systems would occur. The Westminster watershed is considered fairly built out, therefore, the land uses of the area are not expected to change significantly in the future. Due to the area being primarily built out it is unlikely that there would be significant changes to utilities. Population increases in the area may cause increased demand and subsequent improvement of public utilities and facilities; however, the increased demand is not expected to surpass the current carrying capacity of these existing utilities and facilities. Overall, the impact to any public utilities and facilities in the future due to increased population growth would be less than significant.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

The modification of the Warner Avenue Bridge does not include uses or activities that would generate wastewater requiring treatment, nor create impervious surfaces where none currently exist. While the modification of the existing bridge requires lengthening the span of the bridge, the current area the increased span would cover is the existing Warner Avenue. Therefore, no additional impervious surface would be created through lengthening of the bridge. Overall, the proposed project would not generate the need to construct new wastewater treatment facilities or expand existing facilities, nor construct new stormwater drainage facilities or the expansion of existing facilities. Therefore, there would be no direct impact.

Indirect Impacts

The modification of the Warner Avenue Bridge would not indirectly result in the relocation or construction of new or expanded utility and/or service systems. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. These maintenance activities are temporary in duration and would not cause the need for relocation or construction of new or expanded utility and/or service systems, therefore, there would be no long-term impact.

Tide Gates

Direct Impacts

The permanent removal of the tide gates and replacement with a new small span bridge does not include activities that would generate wastewater requiring treatment, nor create impervious surfaces where none currently exist. While the construction of the new small span bridge would be impervious surface, it is replacing the impervious surface that was at the site due to the presence of the tide gates. Therefore, no additional impervious surface would be created through the construction of the new span bridge. Overall, the proposed project would not generate the need to construct new wastewater treatment facilities or expand existing facilities, nor construct new stormwater drainage facilities or the expansion of existing facilities. Therefore, there would be no direct impact.

Indirect Impacts

The permanent removal of the tide gates and replacement with a new span bridge would not indirectly result in the relocation or construction of new or expanded utility and/or service systems. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new span bridge would be no different than maintenance activities that are undertaken for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. These maintenance activities are temporary in duration and would not cause the need for relocation or construction of new or expanded utility and/or service systems, therefore, there would be no long-term impact.

C02/C04 Channels

Direct Impacts

The replacement of earthen/riprap trapezoidal channels with concrete lined trapezoidal channels does not include activities that would generate wastewater requiring treatment. The proposed project would increase impervious surface within the C02/C04 system through the lining of channels with concrete. However, the modification of the channels would expand the channel from a 25-year-storm capacity to a 50-year-storm capacity, resulting in a beneficial impact on the flood control system. Overall, the proposed project would not generate the need to construct new wastewater treatment facilities or expand existing facilities, nor would the project require new or expanded offsite drainage facilities. Therefore, there would be no direct impact.

Indirect Impacts

The modification of the flood control channels within the C02/C04 system would not indirectly result in the relocation or construction of new or expanded utility and/or service systems. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) currently occur within the existing channels and would not cause the need for relocation or construction of new or expanded utility and/or service systems, therefore, there would be no long-term impact.

C05/C06 Channels

Direct Impacts

The replacement of earthen/riprap trapezoidal channels with concrete lined trapezoidal channels does not include activities that would generate wastewater requiring treatment. The proposed project would increase impervious surface within the C05/C06 system through the lining of channels with concrete. However, the modification of the channels would expand the channels from a 10-year storm capacity to a 25-year storm capacity, resulting in a beneficial impact on the flood control system. Overall, the proposed project would not generate the need to construct new wastewater treatment facilities or expand existing facilities, nor would the project require new or expanded offsite drainage facilities. Therefore, there would be no direct impact.

Indirect Impacts

The modification of the flood control channels within the C05/C06 system would not indirectly result in the relocation or construction of new or expanded utility and/or service systems. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) currently occur within the existing channels and would not cause the need for relocation or construction of new or expanded utility and/or service systems, therefore, there would be no long-term impact.

Level of Impact for the NED Plan

No Impact. Construction and maintenance activities for the proposed project are not expected to result in the relocation or construction of new or expanded utility and/or service systems.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

The replacement of earthen/riprap/concrete trapezoidal channels with open rectangular concrete lined channels does not include activities that would generate wastewater requiring treatment. The proposed project would increase impervious surface within the C02/C04 system through the lining of channels with concrete as well as through the change in geometry. However, the modification of the channels would expand the channel from a 25-year storm capacity to a 100-year storm capacity, resulting in a beneficial impact on the flood control system. Overall, the proposed project would not generate the need to construct new wastewater treatment facilities or expand existing facilities, nor would the project require new or expanded offsite drainage facilities. Therefore, there would be no direct impact.

Indirect Impacts

The modification of the flood control channels within the C02/C04 system would not indirectly result in the relocation or construction of new or expanded utility and/or service systems. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) currently occur within the existing channels and would not cause the need for relocation or construction of new or expanded utility and/or service systems, therefore, there would be no long-term impact.

C05/C06 Channels

Direct Impacts

The replacement of earthen/riprap/concrete trapezoidal channels with open rectangular concrete lined channels does not include activities that would generate wastewater requiring treatment. The proposed project would increase impervious surface within the C05/C06 system through the lining of channels with concrete as well as through the change in geometry. However, the modification of the channels would expand the channel from a 10-year storm capacity to a 100-year storm capacity, resulting in a beneficial impact on the flood control system. Overall, the proposed project would not generate the need to construct new wastewater treatment facilities or expand existing facilities, nor would the project require new or expanded offsite drainage facilities. Therefore, there would be no direct impact.

Indirect Impacts

The modification of the flood control channels within the C05/C06 system would not indirectly result in the relocation or construction of new or expanded utility and/or service systems. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) currently occur within the existing channels and would not cause the need for relocation or construction of new or expanded utility and/or service systems, therefore, there would be no long-term impact.

Diversion Channel

Direct Impacts

The construction of the diversion channel within the C04 system does not include activities that would generate wastewater requiring treatment. The proposed project would increase impervious surface within the C04 system through the construction of the diversion channel and lining the channel with concrete. However, the diversion channel would expand the C02/C04 channel system from a 25-year storm

capacity to a 100-year storm capacity, resulting in a beneficial impact on the flood control system. Overall, the proposed project would not generate the need to construct new wastewater treatment facilities or expand existing facilities, nor would the project require new or expanded offsite drainage facilities. Therefore, there would be no direct impact.

Indirect Impacts

The construction of the diversion channel within the C04 flood control system would not indirectly result in the relocation or construction of new or expanded utility and/or service systems. Therefore, there would be no indirect impact.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the diversion channel would be no different than maintenance activities that are currently undertaken for the existing flood control channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) currently occur within the existing flood control channels and would not cause the need for relocation or construction of new or expanded utility and/or service systems, therefore, there would be no long-term impact.

Level of Impact for the LPP

No Impact. Construction and maintenance activities for the proposed project are not expected to result in the relocation or construction of new or expanded utility and/or service systems.

5.16.4.2 IMPACT USS-2: Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no project would be implemented. Therefore, no relocation or construction of new or expanded utility and/or service systems would occur. The area is considered fairly built out, therefore, the land uses of the area are not expected to change significantly in the future. Due to the area being primarily built out it is unlikely that there would be significant changes to utilities. Population increases in the area may cause increased demand and subsequent improvement of public utilities and facilities; however, the increased demand is not expected to surpass the current carrying capacity of these existing utilities and facilities. Overall, the impact to any public utilities and facilities in the future due to increased population growth would be less than significant.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The modification of the Warner Avenue Bridge does not include uses or activities that would require new or expanded water supplies. Maintenance activities associated with the modified Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical

maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Construction and maintenance activities are temporary in duration and would not include uses or activities that would require new or expanded water supplies, therefore, there would be no direct, indirect, or long-term water supply impact.

Tide Gates

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The permanent removal of the tide gates and replacement with a new small span bridge does not involve uses or activities that would require new or expanded water supplies. Maintenance activities associated with the new span bridge would be no different than maintenance activities that are undertaken for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Construction and maintenance activities are temporary in duration and would not involve uses or activities that would require new or expanded water supplies, therefore, there would be no direct, indirect, or long-term water supply impact.

C02/C04 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The modification of the flood control channels within the C02/C04 system does not involve uses or activities that would require new or expanded water supplies. Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) currently occur within the existing channels and would not involve uses or activities that would require new or expanded water supplies. Overall, construction and maintenance activities are temporary in duration and would not involve uses or activities that would require new or expanded water supplies, therefore, there would be no long-term water supply impact.

C05/C06 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The modification of the flood control channels within the C05/C06 system does not involve uses or activities that would require new or expanded water supplies. Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) currently occur within the existing channels and would not involve uses or activities that would require new or expanded water supplies. Overall, construction and maintenance activities are temporary in duration and would not involve uses or activities that would require new or expanded water supplies, therefore, there would be no long-term water supply impact.

Level of Impact for the NED Plan

No Impact. Construction and maintenance activities for the proposed project are not expected to include any uses or activities that would require new or expanded water supplies.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The modification of the flood control channels within the C02/C04 system does not involve uses or activities that would require new or expanded water supplies. Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) currently occur within the existing channels and would not involve uses or activities that would require new or expanded water supplies. Overall, construction and maintenance activities are temporary in duration and would not involve uses or activities that would require new or expanded water supplies, therefore, there would be no long-term water supply impact.

C05/C06 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The modification of the flood control channels within the C05/C06 system does not involve uses or activities that would require new or expanded water supplies. Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) currently occur within the existing channels and would not involve uses or activities that would require new or expanded water supplies. Overall, construction and maintenance activities are temporary in duration and would not involve uses or activities that would require new or expanded water supplies, therefore, there would be no long-term water supply impact.

Diversion Channel

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The construction of the diversion channel within the C04 system does not involve uses or activities that would require new or expanded water supplies. Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These small-scale, routine maintenance activities (e.g., levee and channel repairs and sediment removal) currently occur within the existing channels and would not involve uses or activities that would require new or expanded water supplies. Overall, construction and maintenance activities are temporary in duration and would not involve uses or activities that would require new or expanded water supplies, therefore, there would be no long-term water supply impact.

Level of Impact for the LPP

No Impact. Construction and maintenance activities for the proposed project are not expected to include any uses or activities that would require new or expanded water supplies.

5.16.4.3 IMPACT USS-3: Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no project would be implemented. Therefore, no relocation or construction of new or expanded utility and/or service systems would occur. The area is considered fairly built out, therefore, the land uses of the area are not expected to change significantly in the future. Due to the area being primarily built out it is unlikely that there would be significant changes to utilities. Population increases in the area may cause increased demand and subsequent improvement of public utilities and facilities; however, the increased demand is not expected to surpass the current carrying capacity of these existing utilities and facilities. Overall, the impact to any public utilities and facilities in the future due to increased population growth would be less than significant.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The modification of the Warner Avenue Bridge does not included uses or activities that would generate the need for wastewater requiring treatment beyond the capacity of existing facilities. Maintenance activities associated with the modified Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Overall, construction and maintenance activities are temporary in duration and would not include uses or activities that would

generate the need to wastewater requiring treatment beyond the capacity of existing facilities, therefore, there would be no long-term impact.

Tide Gates

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The permanent removal of the tide gates and replacement with a new access bridge does not include uses or activities that would generate the need for wastewater requiring treatment beyond the capacity of existing facilities. Maintenance activities associated with the new access bridge would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. Overall, construction and maintenance activities are temporary in duration and would not include uses or activities that would generate the need to wastewater requiring treatment beyond the capacity of existing facilities, therefore, there would be no long-term impact.

C02/C04 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The modification of the C02/C04 flood control channels does not include uses or activities that would generate the need for wastewater treatment beyond the capacity of existing facilities. Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Overall, construction and maintenance activities are temporary in duration and would not include uses or activities that would generate the need to wastewater requiring treatment beyond the capacity of existing facilities, therefore, there would be no long-term impact.

C05/C06 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The modification of the C05/C06 flood control channels does not include uses or activities that would generate the need for wastewater treatment beyond the capacity of existing facilities. Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Overall, construction and maintenance activities are temporary in duration and would not include uses or activities that would generate the need to wastewater requiring treatment beyond the capacity of existing facilities, therefore, there would be no long-term impact.

Level of Impact for the NED Plan

No Impact. Construction and maintenance activities for the proposed project are not expected to generate the need for wastewater treatment beyond the capacity of existing facilities.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The modification of the C02/C04 flood control channels does not include uses or activities that would generate the need for wastewater treatment beyond the capacity of existing facilities. Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Overall, construction and maintenance activities are temporary in duration and would not include uses or activities that would generate the need to wastewater requiring treatment beyond the capacity of existing facilities, therefore, there would be no long-term impact.

C05/C06 Channels

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The modification of the C05/C06 flood control channels does not include uses or activities that would generate the need for wastewater treatment beyond the capacity of existing facilities. Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Overall, construction and maintenance activities are temporary in duration and would not include uses or activities that would generate the need to wastewater requiring treatment beyond the capacity of existing facilities, therefore, there would be no long-term impact.

Diversion Channel

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

The construction of the diversion channel within the C04 system does not include uses or activities that would generate the need for wastewater treatment beyond the capacity of existing facilities. Maintenance activities for the diversion channel would be no different than maintenance activities that are currently undertaken for the existing channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. Overall, construction and maintenance activities are temporary in duration and would not include uses or activities that would generate the need to wastewater requiring treatment beyond the capacity of existing facilities, therefore, there would be no long-term impact.

Level of Impact for the LPP

No Impact. Construction and maintenance activities for the proposed project are not expected to generate the need for wastewater treatment beyond the capacity of existing facilities.

5.16.4.4 IMPACT USS-4: Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no project would be implemented. Therefore, no relocation or construction of new or expanded utility and/or service systems would occur. The area is considered fairly built out, therefore, the land uses of the area are not expected to change significantly in the future. Due to the area being primarily built out it is unlikely that there would be significant changes to utilities. Population increases in the area may cause increased demand and subsequent improvement of public utilities and facilities; however, the increased demand is not expected to surpass the current carrying capacity of these existing utilities and facilities. Overall, the impact to any public utilities and facilities in the future due to increased population growth would be less than significant.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

The modification of the Warner Avenue Bridge would involve the export of approximately 48,800 cy of demolition debris (concrete, soil, etc.). Exported soil would either be used as fill material, stockpiled at the permanent facility for use at other construction sites, or disposed of at the Frank R. Bowerman, Olinda Alpha, or Prima Deschecha Landfills if not of suitable quality for use as fill on other projects. The Frank R. Bowerman Landfill is located at 11002 Bee Canton Access Road in the City of Irvine, approximately 26 miles east of the site. The Olinda Alpha Landfill is located at 1942 North Valencia Avenue in the City of Brea, approximately 29 miles northeast of the site. The Prima Deschecha Landfill is located at 32250 Avenida La Pata in the City of San Juan Capistrano, about 35 miles southeast of the site. Remaining capacities and estimated closure dates of the aforementioned landfills are listed below in Table 90.

The exact disposal method of demolition waste is currently unknown and would be determined by the waste hauler contracted for the project; however, the project is anticipated to haul demolition debris such as concrete to a construction and demolition debris recycling facility. The four nearest facilities to the project site are the Rainbow Environmental Services at 17121 Nichols Lane in the City of Huntington Beach, about four miles east of the site; Madison Materials at 1035 East 4th Street in the City of Santa Ana, about 18 miles northeast of the site; Stanton Recycling and Transfer Facility at 11232 Knott Avenue in the City of Stanton, about 9 miles northeast of the site; and Tierra Verde EcoCentre at 8065 Marine Way in the City of Irvine, about 23 miles southeast of the site. The permitted throughput of the facilities is 4,000 tons per day (tpd) for Rainbow, 950 tpd for Madison, 1,800 tpd for Stanton, and 3,000 tpd for Tierra Verde (CalRecycle 2019). Project demolition work would generate a total of approximately 48,800 cy of demolition debris, or an average of 233 tons per workday over the 15 month construction period.

Demolition and construction would generate approximately 14 fully loaded haul trucks traveling from the site on days with maximum demolition. There is adequate construction and demolition debris recycling capacity in the region for project-generated demolition debris, and the project would not require construction of new or expanded recycling facilities or landfills.

Table 90: Area Landfill Information

Facility	City/Community	Permitted Disposal Rate Tons/day	Average Disposal Rate Tons/day	Remaining Capacity Cubic yards	Estimated Closure Date
Frank R. Bowerman	Brea	11,500	8,500	198,100,000	2053
Olinda Alpha	Irvine	8,000	7,000	47,700,000	2030
Prima Deshecha	San Jaun Capistrano	4,000	1,400	136,200,000[a]	2102
[a] Source: OC Waste & Recycling's Prima Deshecha Landfill 2018					

If exported soil is hauled to a landfill, the amount would not exceed the permitted capacity of the landfill. Impacts to landfills would be less than significant.

Indirect Impacts

The modification of the Warner Avenue Bridge is not expected to indirectly cause generation of solid waste in excess of standards or in excess of local landfill capacity.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. These maintenance activities could generate small amounts of solid waste requiring disposal, however, the amount of solid waste generated from maintenance activities is not expected to be in excess of standards or local landfill capacity.

Tide Gates

Direct Impacts

The permanent removal of the tide gates and replacement with a new small span bridge would involve the export of approximately 4,500 cubic yards of demolition debris (concrete, soil, etc.). Exported soil would either be used as fill material, stockpiled at the permanent facility for use at other construction sites, or disposed of at the Frank R. Bowerman, Olinda Alpha, or Prima Deschecha Landfills if not of suitable quality for use as fill on other projects. The Frank R. Bowerman Landfill is located at 11002 Bee Canton Access Road in the City of Irvine, approximately 26 miles east of the site. The Olinda Alpha Landfill is located at 1942 North Valencia Avenue in the City of Brea, approximately 29 miles northeast of the site. The Prima Deschecha Landfill is located at 32250 Avenida La Pata in the City of San Juan Capistrano, about 35 miles southeast of the site. Remaining capacities and estimated closure dates of the aforementioned landfills are listed below in Table 90.

The exact disposal method of demolition waste is currently unknown and would be determined by the waste hauler contracted for the project; however, the project is anticipated to haul demolition debris such as concrete to a construction and demolition debris recycling facility. The four nearest facilities to the project site are the Rainbow Environmental Services at 17121 Nichols Lane in the City of Huntington Beach, about four miles east of the site; Madison Materials at 1035 East 4th Street in the City of Santa Ana, about 18 miles northeast of the site; Stanton Recycling and Transfer Facility at 11232 Knott Avenue in the City of Stanton, about 9 miles northeast of the site; and Tierra Verde EcoCentre at 8065 Marine Way in the City of Irvine, about 23 miles southeast of the site. The permitted throughput of the facilities is 4,000 tons per day (tpd) for Rainbow, 950 tpd for Madison, 1,800 tpd for Stanton, and 3,000 tpd for Tierra Verde (CalRecycle 2019). Project demolition work would generate a total of approximately 11 cy of demolition debris, or an average of 0.02 tons per workday over the 15 month construction period. Demolition and construction would generate approximately 1 fully loaded haul trucks traveling from the site on days with maximum demolition. There is adequate construction and demolition debris recycling capacity in the region for project-generated demolition debris, and the project would not require construction of new or expanded recycling facilities or landfills.

If exported soil is hauled to a landfill, the amount would not exceed the permitted capacity of the landfill. Impacts to landfills would be less than significant.

Indirect Impacts

The permanent removal of the tide gates and replacement with a small span bridge is not expected to indirectly cause generation of solid waste in excess of standards or in excess of local landfill capacity.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new span bridge would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. These maintenance activities could generate small amounts of solid waste requiring disposal, however, the amount of solid waste generated from maintenance activities is not expected to be in excess of standards or local landfill capacity.

C02/C04 Channels

Direct Impacts

The modification of the C02/C04 flood control channels would involve the export of approximately 82,000 cy of demolition debris (concrete, soil, etc.). Exported soil would either be used as fill material, stockpiled at the permanent facility for use at other construction sites, or disposed of at the Frank R. Bowerman, Olinda Alpha, or Prima Deschecha Landfills if not of suitable quality for use as fill on other projects. The Frank R. Bowerman Landfill is located at 11002 Bee Canton Access Road in the City of Irvine, and ranges between approximately 19 and 26 miles east of the C02/C04 system. The Olinda Alpha Landfill is located at 1942 North Valencia Avenue in the City of Brea, and ranges between approximately 19 and 28 miles northeast of the C02/C04 system. The Prima Deschecha Landfill is located at 32250 Avenida La Pata in the City of San Juan Capistrano, and ranges between approximately 34 and 36 miles southeast of the C02/C04 system. Remaining capacities and estimated closure dates of the aforementioned landfills are listed below in Table 90.

The exact disposal method of demolition waste is currently unknown and would be determined by the waste hauler contracted for the project; however, the project is anticipated to haul demolition debris such as concrete to a construction and demolition debris recycling facility. The four nearest facilities to the project site are the Rainbow Environmental Services at 17121 Nichols Lane in the City of Huntington Beach, ranges between approximately 5 and 7 miles east of the site; Madison Materials at 1035 East 4th Street in the City of Santa Ana, ranges between approximately 8 and 18 miles northeast of the site; Stanton Recycling and Transfer Facility at 11232 Knott Avenue in the City of Stanton, ranges between approximately 7 and 8 miles northeast of the site; and Tierra Verde EcoCentre at 8065 Marine Way in the City of Irvine, ranges between approximately 16 and 26 miles southeast of the site. The permitted throughput of the facilities is 4,000 tons per day (tpd) for Rainbow, 950 tpd for Madison, 1,800 tpd for Stanton, and 3,000 tpd for Tierra Verde (CalRecycle 2019). Project demolition work would generate a total of approximately 82,000 cy of demolition debris, or an average of 68 tons per workday over the 81 month construction period. Demolition and construction would generate approximately 4 fully loaded haul trucks traveling from the site on days with maximum demolition. There is adequate construction and demolition debris recycling capacity in the region for project-generated demolition debris, and the project would not require construction of new or expanded recycling facilities or landfills.

If exported soil is hauled to a landfill, the amount would not exceed the permitted capacity of the landfill. Impacts to landfills would be less than significant.

Indirect Impacts

The modification of the C02/C04 flood control channels is not expected to indirectly cause generation of solid waste in excess of standards or in excess of local landfill capacity.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing flood control channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These maintenance activities could generate small amounts of solid waste requiring disposal, however, the amount of solid waste generated from maintenance activities is not expected to be in excess of standards or local landfill capacity.

C05/C06 Channels

Direct Impacts

The modification of the C05/C06 flood control channels would involve the export of approximately 128,200 cy of demolition debris (concrete, soil, etc.). Exported soil would either be used as fill material, stockpiled at the permanent facility for use at other construction sites, or disposed of at the Frank R. Bowerman, Olinda Alpha, or Prima Deschecha Landfills if not of suitable quality for use as fill on other projects. The Frank R. Bowerman Landfill is located at 11002 Bee Canton Access Road in the City of Irvine, and ranges between approximately 15 and 25 miles east of the C05/C06 system. The Olinda Alpha Landfill is located at 1942 North Valencia Avenue in the City of Brea, and ranges between approximately 14 and 29 miles northeast of the C05/C06 system. The Prima Deschecha Landfill is located at 32250 Avenida La Pata in the City of San Juan Capistrano, and ranges between approximately 31 and 34 miles southeast of the C05/C06 system. Remaining capacities and estimated closure dates of the aforementioned landfills are listed below in Table 90.

The exact disposal method of demolition waste is currently unknown and would be determined by the waste hauler contracted for the project; however, the project is anticipated to haul demolition debris such as concrete to a construction and demolition debris recycling facility. The exact disposal method of demolition waste is currently unknown and would be determined by the waste hauler contracted for the project; however, the project is anticipated to haul demolition debris such as concrete to a construction and demolition debris recycling facility. The four nearest facilities to the project site are the Rainbow Environmental Services at 17121 Nichols Lane in the City of Huntington Beach, ranges between approximately 3 and 12 miles east of the site; Madison Materials at 1035 East 4th Street in the City of Santa Ana, ranges between approximately 5 and 13 miles northeast of the site; Stanton Recycling and Transfer Facility at 11232 Knott Avenue in the City of Stanton, ranges between approximately 8 and 10 miles northeast of the site; and Tierra Verde EcoCentre at 8065 Marine Way in the City of Irvine, ranges between approximately 14 and 22 miles southeast of the site. The permitted throughput of the facilities is 4,000 tons per day (tpd) for Rainbow, 950 tpd for Madison, 1,800 tpd for Stanton, and 3,000 tpd for Tierra Verde (CalRecycle 2019). Project demolition work would generate a total of approximately 128,200 cy of demolition debris, or an average of 87 tons per workday over the 136 month construction period. Demolition and construction would generate approximately 6 fully loaded haul trucks traveling from the site on days with maximum demolition. There is adequate construction and demolition debris recycling capacity in the region for project-generated demolition debris, and the project would not require construction of new or expanded recycling facilities or landfills.

If exported soil is hauled to a landfill, the amount would not exceed the permitted capacity of the landfill. Impacts to landfills would be less than significant.

Indirect Impacts

The modification of the C05/C06 flood control channels is not expected to indirectly cause generation of solid waste in excess of standards or in excess of local landfill capacity.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing flood control channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These maintenance activities could generate small amounts of solid waste requiring disposal, however, the amount of solid waste generated from maintenance activities is not expected to be in excess of standards or local landfill capacity.

Level of Impact for the NED Plan

Less than Significant. Construction and maintenance activities for the proposed project are not expected to generate solid waste in excess of standards or local landfill capacity.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

The modification of the C02/C04 flood control channels would involve the export of approximately 600,300 cy of demolition debris (concrete, soil, etc.). Exported soil would either be used as fill material, stockpiled at the permanent facility for use at other construction sites, or disposed of at the Frank R. Bowerman, Olinda Alpha, or Prima Deschecha Landfills if not of suitable quality for use as fill on other projects. The Frank R. Bowerman Landfill is located at 11002 Bee Canton Access Road in the City of Irvine, and ranges between approximately 19 and 26 miles east of the C02/C04 system. The Olinda Alpha Landfill is located at 1942 North Valencia Avenue in the City of Brea, and ranges between approximately 19 and 28 miles northeast of the C02/C04 system. The Prima Deschecha Landfill is located at 32250 Avenida La Pata in the City of San Juan Capistrano, and ranges between approximately 34 and 36 miles southeast of the C02/C04 system. Remaining capacities and estimated closure dates of the aforementioned landfills are listed below in Table 90.

The exact disposal method of demolition waste is currently unknown and would be determined by the waste hauler contracted for the project; however, the project is anticipated to haul demolition debris such as concrete to a construction and demolition debris recycling facility. The exact disposal method of demolition waste is currently unknown and would be determined by the waste hauler contracted for the project; however, the project is anticipated to haul demolition debris such as concrete to a construction and demolition debris recycling facility. The four nearest facilities to the project site are the Rainbow Environmental Services at 17121 Nichols Lane in the City of Huntington Beach, ranges between approximately 5 and 7 miles east of the site; Madison Materials at 1035 East 4th Street in the City of Santa Ana, ranges between approximately 8 and 18 miles northeast of the site; Stanton Recycling and Transfer Facility at 11232 Knott Avenue in the City of Stanton, ranges between approximately 7 and 8 miles northeast of the site; and Tierra Verde EcoCentre at 8065 Marine Way in the City of Irvine, ranges between approximately 16 and 26 miles southeast of the site. The permitted throughput of the facilities is 4,000 tons per day (tpd) for Rainbow, 950 tpd for Madison, 1,800 tpd for Stanton, and 3,000 tpd for Tierra Verde (CalRecycle 2019). Project demolition work would generate a total of approximately 600,300 cy of demolition debris, or an average of 349 tons per workday over the 114 month construction period. Demolition and construction would generate approximately 20 fully loaded haul trucks traveling from the site on days with maximum demolition. There is adequate construction and demolition debris recycling capacity in the region for project-generated demolition debris, and the project would not require construction of new or expanded recycling facilities or landfills.

If exported soil is hauled to a landfill, the amount would not exceed the permitted capacity of the landfill. Impacts to landfills would be less than significant.

Indirect Impacts

The modification of the C02/C04 flood control channels is not expected to indirectly cause generation of solid waste in excess of standards or in excess of local landfill capacity.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing flood control channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These maintenance activities could generate small amounts of solid waste requiring disposal, however, the amount of solid waste generated from maintenance activities is not expected to be in excess of standards or local landfill capacity.

C05/C06 Channels

Direct Impacts

The modification of the C05/C06 flood control channels would involve the export of approximately 1,054,400 cy of demolition debris (concrete, soil, etc.). Exported soil would either be used as fill material, stockpiled at the permanent facility for use at other construction sites, or disposed of at the Frank R. Bowerman, Olinda Alpha, or Prima Deschecha Landfills if not of suitable quality for use as fill on other projects. The Frank R. Bowerman Landfill is located at 11002 Bee Canton Access Road in the City of Irvine, and ranges between approximately 15 and 25 miles east of the C05/C06 system. The Olinda Alpha Landfill is located at 1942 North Valencia Avenue in the City of Brea, and ranges between approximately 14 and 29 miles northeast of the C05/C06 system. The Prima Deschecha Landfill is located at 32250 Avenida La Pata in the City of San Juan Capistrano, and ranges between approximately 31 and 34 miles southeast of the C05/C06 system. Remaining capacities and estimated closure dates of the aforementioned landfills are listed below in Table 90.

The exact disposal method of demolition waste is currently unknown and would be determined by the waste hauler contracted for the project; however, the project is anticipated to haul demolition debris such as concrete to a construction and demolition debris recycling facility. The four nearest facilities to the project site are the Rainbow Environmental Services at 17121 Nichols Lane in the City of Huntington Beach, ranges between approximately 3 and 12 miles east of the site; Madison Materials at 1035 East 4th Street in the City of Santa Ana, ranges between approximately 5 and 13 miles northeast of the site; Stanton Recycling and Transfer Facility at 11232 Knott Avenue in the City of Stanton, ranges between approximately 8 and 10 miles northeast of the site; and Tierra Verde EcoCentre at 8065 Marine Way in the City of Irvine, ranges between approximately 14 and 22 miles southeast of the site. The permitted throughput of the facilities is 4,000 tons per day (tpd) for Rainbow, 950 tpd for Madison, 1,800 tpd for Stanton, and 3,000 tpd for Tierra Verde (CalRecycle 2019). Project demolition work would generate a total of approximately 1,054,400 cy of demolition debris, or an average of 552 tons per workday over the 122 month construction period. Demolition and construction would generate approximately 40 fully loaded haul trucks traveling from the site on days with maximum demolition. There is adequate construction and demolition debris recycling capacity in the region for project-generated demolition debris, and the project would not require construction of new or expanded recycling facilities or landfills.

If exported soil is hauled to a landfill, the amount would not exceed the permitted capacity of the landfill. Impacts to landfills would be less than significant.

Indirect Impacts

The modification of the C05/C06 flood control channels is not expected to indirectly cause generation of solid waste in excess of standards or in excess of local landfill capacity.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing flood control channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These maintenance activities could generate small amounts of solid waste requiring disposal, however, the amount of solid waste generated from maintenance activities is not expected to be in excess of standards or local landfill capacity.

Diversion Channel

Direct Impacts

The construction of the diversion channel would involve the export of approximately 106,500 cy of demolition debris (concrete, soil, etc.). Exported soil would either be used as fill material, stockpiled at the permanent facility for use at other construction sites, or disposed of at the Frank R. Bowerman, Olinda Alpha, or Prima Deschecha Landfills if not of suitable quality for use as fill on other projects. The Frank R. Bowerman Landfill is located at 11002 Bee Canton Access Road in the City of Irvine, and is approximately 24 miles southeast of where the diversion channel would be constructed. The Olinda Alpha Landfill is located at 1942 North Valencia Avenue in the City of Brea, and is approximately 24 miles northeast of where the diversion channel would be constructed. The Prima Deschecha Landfill is located at 32250 Avenida La Pata in the City of San Juan Capistrano, and is approximately 34 miles southeast of where the diversion channel would be constructed. Remaining capacities and estimated closure dates of the aforementioned landfills are listed below in Table 90.

The exact disposal method of demolition waste is currently unknown and would be determined by the waste hauler contracted for the project; however, the project is anticipated to haul demolition debris such as concrete to a construction and demolition debris recycling facility. The four nearest facilities to the project site are the Rainbow Environmental Services at 17121 Nichols Lane in the City of Huntington Beach, about 4 miles south of the site; Madison Materials at 1035 East 4th Street in the City of Santa Ana, about 10 miles east of the site; Stanton Recycling and Transfer Facility at 11232 Knott Avenue in the City of Stanton, about 5 miles north of the site; and Tierra Verde EcoCentre at 8065 Marine Way in the City of Irvine, about 21 miles southeast of the site. The permitted throughput of the facilities is 4,000 tons per day (tpd) for Rainbow, 950 tpd for Madison, 1,800 tpd for Stanton, and 3,000 tpd for Tierra Verde (CalRecycle 2019). Project demolition work would generate a total of approximately 106,500 cy of demolition debris, or an average of 332 tons per workday over the 23 month construction period. Demolition and construction would generate approximately 19 fully loaded haul trucks traveling from the site on days with maximum demolition. There is adequate construction and demolition debris recycling capacity in the region for project-generated demolition debris, and the project would not require construction of new or expanded recycling facilities or landfills.

If exported soil is hauled to a landfill, the amount would not exceed the permitted capacity of the landfill. Impacts to landfills would be less than significant.

Indirect Impacts

The construction of the diversion channel is not expected to indirectly cause generation of solid waste in excess of standards or in excess of local landfill capacity.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the diversion channel would be no different than maintenance activities that are currently undertaken for the existing flood control channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These maintenance activities could generate small amounts of solid waste requiring disposal, however, the amount of solid waste generated from maintenance activities is not expected to be in excess of standards or local landfill capacity.

Level of Impact for the LPP

Less than Significant. Construction and maintenance activities for the proposed project are not expected to generate solid waste in excess of standards or local landfill capacity.

5.16.4.5 IMPACT USS-5: Comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

ALTERNATIVE: NO ACTION PLAN

Under the No Action Alternative no project would be implemented. Therefore, there would be no project that would potentially not comply with federal, state, and local management and reduction statutes and regulations related to solid waste. The area is considered fairly built out, therefore, the land uses of the area are not expected to change significantly in the future. Due to the area being primarily built out it is unlikely that there would be significant changes to utilities. Population increases in the area may cause increased demand and subsequent improvement of public utilities and facilities; however, the increased demand is not expected to surpass the current carrying capacity of these existing utilities and facilities. Overall, the impact to any public utilities and facilities in the future due to increased population growth would be less than significant.

ALTERNATIVE: NED PLAN

Warner Avenue Bridge

Direct Impacts

AB 939 (Chapter 1095, Statutes of 1989), the “California Integrated Waste Management Act (IWMA) of 1989” required each city, county, and regional agency to develop a source reduction and recycling element of an integrated waste management plan containing specified components, including a source reduction component, a recycling component, and a composting component. With certain exceptions, the source reduction and recycling element of that plan was required to divert 50 percent of all solid waste from landfill disposal or transformation by January 1, 2000, through source reduction, recycling, and composting activities.

The modification of the Westminster Avenue Bridge would comply with the aforementioned statute by recycling construction debris and reusing excavated material as fill to the extent practicable. Feasibility level design of the project assumes hauling steel sheet pile and concrete to a recycling facility, and this would be further developed during the next phase of the project to determine what percentage would be hauled to recycling versus landfill. In addition, the Contractor would be required to develop a recycling

plan prior to construction activities to ensure compliance with the above statute. Therefore, the implementation of this proposed project would have no adverse impact on the County's ability to comply with the existing regulations.

Indirect Impacts

The modification of the Warner Avenue Bridge is not expected to have any indirect impacts that would cause the proposed project to not comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the modified Warner Avenue Bridge would be no different than maintenance activities that are undertaken currently for the bridge. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. These maintenance activities could generate small amounts of solid waste requiring disposal. To the extent practicable, solid waste generated during maintenance activities would be recycled and/or reused as fill material on other projects. Therefore, maintenance activities and long-term operation of the bridge would have no adverse impact on the County's ability to comply with existing regulations.

Tide Gates

Direct Impacts

Refer to *NED Plan, Warner Avenue Bridge, Direct Impacts* for a discussion on the applicable statutes. The permanent removal of the tide gates and replacement with a small span bridge would comply with applicable statutes by recycling construction debris and reusing excavated material as fill to the extent practicable. Feasibility level design of the project assumes hauling steel sheet pile and concrete to a recycling facility, and this would be further developed during the next phase of the project to determine what percentage would be hauled to recycling versus landfill. In addition, the Contractor would be required to develop a recycling plan prior to construction activities to ensure compliance with the above statute. Therefore, the implementation of this proposed project would have no adverse impact on the County's ability to comply with the existing regulations.

Indirect Impacts

The permanent removal of the tide gates and replacement with a span bridge is not expected to have any indirect impacts that would cause the proposed project to not comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

Long-Term Operation and Maintenance Impacts

Maintenance activities associated with the new span bridge would be no different than maintenance activities that are undertaken currently for other bridges. Typical maintenance activities that occur on bridges include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, bent or damaged railings, painting, erosion protection, and inspections. These maintenance activities could generate small amounts of solid waste requiring disposal. To the extent practicable, solid waste generated during maintenance activities would be recycled and/or reused as fill material on other projects. Therefore, maintenance activities and long-term operation of the span bridge would have no adverse impact on the County's ability to comply with existing regulations.

C02/C04 Channels

Direct Impacts

Refer to *NED Plan, Warner Avenue Bridge, Direct Impacts* for a discussion on the applicable statutes. The modification of the flood control channels within the C02/C04 system would comply with applicable statutes by recycling construction debris and reusing excavated material as fill to the extent practicable. Feasibility level design of the project assumes hauling steel sheet pile and concrete to a recycling facility, and this would be further developed during the next phase of the project to determine what percentage would be hauled to recycling versus landfill. In addition, the Contractor would be required to develop a recycling plan prior to construction activities to ensure compliance with the above statute. Therefore, the implementation of this proposed project would have no adverse impact on the County's ability to comply with the existing regulations.

Indirect Impacts

The modification of the flood control channels within the C02/C04 system is not expected to have any indirect impacts that would cause the proposed project to not comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing flood control channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These maintenance activities could generate small amounts of solid waste requiring disposal. To the extent practicable, solid waste generated during maintenance activities would be recycled and/or reused as fill material on other projects. Therefore, maintenance activities and long-term operation of the modified flood control channels would have no adverse impact on the County's ability to comply with existing regulations.

C05/C06 Channels

Direct Impacts

Refer to *NED Plan, Warner Avenue Bridge, Direct Impacts* for a discussion on the applicable statutes. The modification of the flood control channels within the C05/C06 system would comply with applicable statutes by recycling construction debris and reusing excavated material as fill to the extent practicable. Feasibility level design of the project assumes hauling steel sheet pile and concrete to a recycling facility, and this would be further developed during the next phase of the project to determine what percentage would be hauled to recycling versus landfill. In addition, the Contractor would be required to develop a recycling plan prior to construction activities to ensure compliance with the above statute. Therefore, the implementation of this proposed project would have no adverse impact on the County's ability to comply with the existing regulations.

Indirect Impacts

The modification of the flood control channels within the C05/C06 system is not expected to have any indirect impacts that would cause the proposed project to not comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing flood control channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These maintenance activities could generate small amounts of solid waste requiring disposal. To the extent practicable, solid waste generated during maintenance activities would be recycled and/or reused as fill material on other projects. Therefore, maintenance activities and long-term operation of the modified flood control channels would have no adverse impact on the County's ability to comply with existing regulations.

Level of Impact for the NED Plan

No Impact. Construction and maintenance activities for the proposed project are not expected to have any impacts that would cause the proposed project to not comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

ALTERNATIVE: LPP

Warner Avenue Bridge

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

Tide Gates

This measures is the same as described for the NED Plan, therefore, the level of impact for the LPP would be the same as the NED Plan.

C02/C04 Channels

Direct Impacts

Refer to *NED Plan, Warner Avenue Bridge, Direct Impacts* for a discussion on the applicable statutes. The modification of the flood control channels within the C02/C04 system would comply with applicable statutes by recycling construction debris and reusing excavated material as fill to the extent practicable. Feasibility level design of the project assumes hauling steel sheet pile and concrete to a recycling facility, and this would be further developed during the next phase of the project to determine what percentage would be hauled to recycling versus landfill. In addition, the Contractor would be required to develop a recycling plan prior to construction activities to ensure compliance with the above statute. Therefore, the implementation of this proposed project would have no adverse impact on the County's ability to comply with the existing regulations.

Indirect Impacts

The modification of the flood control channels within the C02/C04 system is not expected to have any indirect impacts that would cause the proposed project to not comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing flood control channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These maintenance activities could generate small amounts of solid waste requiring disposal. To the extent practicable, solid waste generated during maintenance activities would be recycled and/or reused as fill material on other projects. Therefore, maintenance activities and long-term operation of the modified flood control channels would have no adverse impact on the County's ability to comply with existing regulations.

C05/C06 Channels

Direct Impacts

Refer to *NED Plan, Warner Avenue Bridge, Direct Impacts* for a discussion on the applicable statutes. The modification of the flood control channels within the C05/C06 system would comply with applicable statutes by recycling construction debris and reusing excavated material as fill to the extent practicable. Feasibility level design of the project assumes hauling steel sheet pile and concrete to a recycling facility, and this would be further developed during the next phase of the project to determine what percentage would be hauled to recycling versus landfill. In addition, the Contractor would be required to develop a recycling plan prior to construction activities to ensure compliance with the above statute. Therefore, the implementation of this proposed project would have no adverse impact on the County's ability to comply with the existing regulations.

Indirect Impacts

The modification of the flood control channels within the C05/C06 system is not expected to have any indirect impacts that would cause the proposed project to not comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the modified flood control channels would be no different than maintenance activities that are currently undertaken for the existing flood control channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These maintenance activities could generate small amounts of solid waste requiring disposal. To the extent practicable, solid waste generated during maintenance activities would be recycled and/or reused as fill material on other projects. Therefore, maintenance activities and long-term operation of the modified flood control channels would have no adverse impact on the County's ability to comply with existing regulations.

Diversion Channel

Direct Impacts

Refer to *NED Plan, Warner Avenue Bridge, Direct Impacts* for a discussion on the applicable statutes. The construction of the diversion channel within the C04 system would comply with applicable statutes by recycling construction debris and reusing excavated material as fill to the extent practicable. Therefore, the implementation of this proposed project would have no adverse impact on the County's ability to comply with the existing regulations.

Indirect Impacts

The construction of the diversion channel within the C04 system is not expected to have any indirect impacts that would cause the proposed project to not comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the diversion channel would be no different than maintenance activities that are currently undertaken for the existing flood control channels. Maintenance activities would include vegetation control, rodent control, levee and channel repair, and sediment removal from within the channels if needed. These maintenance activities could generate small amounts of solid waste requiring disposal. To the extent practicable, solid waste generated during maintenance activities would be recycled and/or reused as fill material on other projects. Therefore, maintenance activities and long-term operation of the diversion channel would have no adverse impact on the County's ability to comply with existing regulations.

Level of Impact for the LPP

No Impact. Construction and maintenance activities for the proposed project are not expected to have any impacts that would cause the proposed project to not comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

5.17 Summary of Environmental Consequences

The following tables summarize the levels of impact for the NED Plan (Table 91) and LPP (Table 92) with regard to the resource categories discussed in Sections 5.3 through 5.16.

Table 91: Summary of Impact Levels for the NED Plan.

Resource	Existing Condition Overview	Environmental Consequences Overview
Earth Resources	The study area is located within the Peninsular Range Physiographic Province, a geomorphic province that extends 900 miles south from the Los Angeles basin to the tip of Baja California and is bound on the east by the Colorado Desert. Local soils moving from inland towards the shoreline include alluvium and marine terrace deposits. The Newport-Inglewood Fault runs through the study area. The most recent large event for this fault was the 1933 6.3 magnitude Long Beach Earthquake. A majority of the study area is in a Zone of Required Investigation for Liquefaction. There are no landslides that have been mapped within the study area.	**Less than Significant Impact with Mitigation Incorporated**: Construction activities and the long-term operation of the project would not increase the risk or exposure of people to significant adverse impacts over the existing condition due to seismic-related events. Construction activities would include excavation that could instigate soil erosion and/or loss of topsoil thereby potentially causing a significant impact. In addition, excavation activities could encounter previously unidentified fossil remains for which the accidental destruction of these resources would be a significant impact. This significant impact would be reduced to less than significant with the incorporation of mitigation measures.
Water Resources	The study area originally contained natural watercourses that have since been altered for flood control or water supply purposes. The study area lies within the historic overflow path of the Santa Ana River (SAR), and is susceptible to flooding because of its location on the alluvial plain of the SAR. Significant regional storm events or floods have occurred in the area over the last 175 years with the most recent occurring in 2017, for which a Major Disaster Declaration was approved for California. Orange County has a National Pollutant Discharge Elimination System permit number CAS618030 issued and approved by the Santa Ana Regional Water Quality Control Board Order number R8-2009-0030, which includes the study area. Channel C05 and Huntington Harbour have been placed on the Santa Ana Region 303(d) List of Water Quality Limited Segments. Both the BCER and the Bolsa Marsh are being added to the 2016 303(d) list due to toxicity. Wetlands have been identified within the vicinity of the Proposed Project.	**Less than Significant Impact with Mitigation Incorporated**: During construction, ground-disturbing activities would occur that could lead to a temporary significant impact to water quality and induce erosion. This significant impact would be reduced to less than significant with the incorporation of mitigation measures.
Air Quality	The study area lies within the South Coast Air Basin (SCAB). The SCAB area has high levels of air pollution, particularly from June through September. High rates of pollutant emissions combined with light wind and shallow vertical atmospheric mixing lead to reduced pollutant dispersion and exacerbate elevated air pollution levels. In regards to National Ambient Air Quality Standards, the study area is currently not attaining ozone and particulate matter $PM_{2.5}$ national standards, ozone and particulate matter state standards, and is maintaining carbon monoxide, nitrogen dioxide, and PM_{10} national standards.	**Potentially Significant Impact**: Preliminary analysis could not rule out the potential for localized impacts to air quality during construction of the project. Dispersion modeling would need to be conducted to confirm if the project would exceed air quality standards or cause localized impacts. Mitigation measures are proposed for incorporation to minimize potential air quality impacts. However, without a dispersion model (which requires additional data and design details beyond the feasibility phase level), it cannot be said at this time with certainty that the mitigation measures would reduce the level of impact to less than significant.
Energy	Southern California Edison provides electrical services to the study area through State-regulated public utility contracts, while the Southern California Gas Company provides natural gas services. In regards to energy consumption, both electricity consumption and natural gas consumption have exhibited a decreasing trend between 2013 and 2017. Conversely, automotive fuel consumption has exhibited an increasing trend between 2013 and 2018.	**No Impact**: Construction and operation of the project would not result in wasteful, inefficient or unnecessary consumption of energy resources. The project would also not conflict with or obstruct any local or state plans for renewable energy or energy efficiency. Since there would be no impact, no mitigation measures are proposed.
Noise	The study area is located in an urban setting surrounded by residential and commercial uses. Ambient noise levels consist of traffic noise and noise associated with residential and commercial operations. Roadway traffic consisting of cars, buses, and commercial trucks generate the highest ground vibrations.	**Potentially Significant Impact**: Noise levels during construction activities would exceed exterior noise levels at residential land use thresholds. Although mitigation measures would be implemented to minimize noise impacts, it is unlikely that these measures would reduce noise levels below the threshold. Therefore, there would be a potentially significant adverse impact to ambient noise levels within the vicinity of construction activities. This would be a

Resource	Existing Condition Overview	Environmental Consequences Overview
		temporary impact lasting only the duration of construction. Noise levels would return to their existing condition levels after construction of the project is complete.
Biological Resources	The Westminster watershed has been channelized and a majority of the channels have been hardened with either riprap or concrete to increase flood conveyance. The vegetation resources are typical of constructed flood damage reduction channels in the urban environment. The vegetation in the channels is dominated by annual, weedy, and ruderal species. Eelgrass, which is designated as essential fish habitat, is found within the study area. Eelgrass is primarily found in the Anaheim Bay/Huntington Harbour area, with smaller amounts occurring in the lower portion of channel C02. Thirteen federally-listed threatened, endangered, or candidate species are listed on the U.S. Fish and Wildlife Service's official species list as potentially occurring within the study area. In addition, there are approximately 38 state-listed special status species that potentially occur within the study area. These special status species are primarily located within the adjacent BCER and Seal Beach National Wildlife Refuge.	**Less than Significant with Mitigation Incorporated**: Construction activities would have both short-term and long-term impacts to biological resources. Activities would have a long-term indirect impact to eelgrass within the vicinity of C02 Reach 23, a long-term direct impact to wetland habitat within the vicinity of Warner Avenue Bridge, and a short-term direct impact to foraging habitat for special status species. Mitigation measures as well as compensatory mitigation are included in the recommended plan (see Appendix M – Conceptual Mitigation Strategy for proposed compensatory mitigation). With the implementation of mitigation measures and compensatory mitigation, the impacts stated above would be reduced to less than significant.
Cultural Resources	There are no previously recorded National Register of Historic Places listed or eligible properties within or adjacent to the study area for channel reaches C02/C04 and C06. This is also true for the majority of C05, except the downstream reach (Reach 1) which is adjacent to the BCER. Within this area there are two historic period sites, one multicomponent site, and two prehistoric sites.	**Less than Significant with Mitigation Incorporated**: Excavation activities associated with the project have the potential to encounter previously undiscovered archaeological resources. The accidental destruction of these resources would be a significant impact. This significant impact would be reduced to less than significant with the incorporation of mitigation measures.
Tribal Cultural Resources	No sacred sites are recorded within the study area, however, Native American consultation conducted to date strongly indicates that the Proposed Project area should be considered sensitive for Native American resources.	**Less than Significant with Mitigation Incorporated**: Excavation activities associated with the project have the potential to encounter previously undiscovered tribal cultural resources. The accidental destruction of these resources would be a significant impact. This significant impact would be reduced to less than significant with the incorporation of mitigation measures.
Socioeconomic/Environmental Justice	Most cities within the Westminster watershed have significant white, Hispanic, and Asian populations in various percentages. Stanton, Anaheim, and Santa Ana have dominant Hispanic or Latino populations, whereas Westminster and Garden Grove have dominant Asian populations. Fountain Valley, Cypress, Huntington Beach, and Los Alamitos are the only cities with a median household income above the state average. Westminster, Stanton, Garden Grove, Anaheim, and Santa Ana have a greater than state average of those below the national poverty level.	**Less than Significant Impact:** Overall, the project as a whole would be providing a benefit to the communities within the Westminster watershed by reducing the potential for flooding and flood induced impacts to residences. Under the NED Plan, flood damage risk would be reduced up to approximately the 1% ACE event in some locations, but other locations upstream of the I-405 would still occur between the 10% and 4% ACE. By reducing the risk of flooding, the project would result in positive impacts to socioeconomics by reducing the likelihood of flooding, loss of life, or pain and suffering.
Hazardous, Toxic, and Radioactive Waste	A limited Hazardous, Toxic, and Radioactive Waste (HTRW) Phase I Environmental Site Assessment was conducted for the Proposed Project area. In regards to channels within the C02/C04 and C05/C06 system, a review of the EDR database suggests that there are LUST's adjacent to the proposed project area that have not been fully remediated. In addition, there are several service stations with active USTs and a facility with a potential surface impoundment directly adjacent to the Proposed Project area. In addition, C05 Reach 1 is adjacent to the Bolsa Chica Lowlands Restoration Project where remediation activities have occurred.	**Less than Significant Impact with Mitigation Incorporated**: Transport, use, and disposal of hazardous materials would adhere to existing regulations of several agencies. The flood control channels are not listed on the database of hazardous materials sites. Construction activities would involve the use of small quantities of hazardous or toxic equipment that could be inadvertently leaked or spilled which could result in an adverse significant impact to the public or environment. In addition, during construction there could be temporary direct and indirect impacts to emergency response/emergency evacuation plans from lane closures for staging of equipment and construction activities. Mitigation measures would be incorporated

Resource	Existing Condition Overview	Environmental Consequences Overview
		during project construction. With the incorporation of mitigation measures the potential significant adverse impacts stated above would be reduced to less than significant.
Land Use/Recreation	Current land use consists of a mix of residential, schools, businesses and a few parks located adjacent to the channels within the study area. Commercial uses such as retail and office buildings are scattered throughout almost the entire channel system. Industrial uses include warehouses and distribution centers. Open space along the channel system consists mainly of parks and a golf course. The only undeveloped area adjacent to the channel system is located at the west end of C05 Reach 1, which is currently in oil production. There are several parks that are adjacent or within the vicinity of the Proposed Project. On the C02/C04 system there are five nearby parks, while the C05/C06 system has seven nearby parks including the BCER.	**Less than Significant Impact**: Construction would occur primarily within designated flood control channels and flood control channel right-of-ways. Land use designations are not expected to change from what they are currently due to construction of the project. The project would not impact nearby recreational facilities or recreational opportunities. Since the impact would be less than significant, no mitigation measures are proposed.
Aesthetics	The Proposed Project is located in western Orange County, California, approximately 25 miles southeast of the City of Los Angeles. Within the study area, the majority of scenic vistas and scenic resources are located within the City of Huntington Beach and along the coast. The Pacific Ocean is the area's most prominent scenic vista and scenic resource and is located west of the study area. Also west of the study area is the Bolsa Chica State Beach. Views of the channel system are limited to adjacent residential and commercial land uses, and areas where streets and highways cross over the reaches. Views are further limited by landscaping and fencing along the channel system.	**Less than Significant Impact**: The project would not have any impacts to scenic vistas in the area. In addition, the project would not create new sources of substantial light or glare that could potentially impact views in the area. The presence of construction equipment and construction activities would temporarily impact views. This would be a short-term impact that would last only while construction is occurring.
Transportation	Several major freeways traverse the study area including the San Diego Freeway (e.g., I-405), the Santa Ana Freeway (I-5) and the Garden Grove Freeway (State Route 22). Local bus services are provided in most of the cities in Orange County. Several cities within the study area have designated truck routes for construction activities and long-term business operations.	**Less than Significant Impact with Mitigation Incorporated**: Construction activities would result in temporary direct and indirect impacts to CMP roadways, intersection operation, public transit, and/or pedestrian and bicycle facilities. Construction activities are not expected to generate a substantial increase in vehicle trips that could cause a significant transportation impact. In addition, the project does not include any design features that would substantially increase hazards or create incompatibility for users of the local transportation network. Construction activities include temporary lane closures for staging of construction equipment, presence of construction equipment, and haul trucks entering and leaving the construction site. These factors could temporarily increase roadway hazards for users of the local transportation network. Mitigation measures are proposed to minimize impacts. With the incorporation of mitigation measures, the impact would be reduced to less than significant.
Utilities	The channel systems within the study area bisect numerous utilities. These utility lines provide natural gas, sewer, water, oil, and fiber optic services.	**Less than Significant Impact**: Construction of the project would not result in the relocation or construction of new or expanded utility and/or service systems. In addition, the project does not include nor would it require new or expanded water supplies. Project construction would involve the excavation and disposal of demolition debris. The amount of demolition debris to be exposed of is not expected to exceed solid waste standards or local landfill capacity. Since the impact would be less than significant, no mitigation measures are proposed.

Table 92: Summary of Impact Levels for the LPP Plan.

Resource	Existing Condition Overview	Environmental Consequences Overview
Earth Resources	The study area is located within the Peninsular Range Physiographic Province, a geomorphic province that extends 900 miles south from the Los Angeles basin to the tip of Baja California and is bound on the east by the Colorado Desert. Local soils moving from inland towards the shoreline include alluvium and marine terrace deposits. The Newport-Inglewood Fault runs through the study area. The most recent large event for this fault was the 1933 6.3 magnitude Long Beach Earthquake. A majority of the study area is in a Zone of Required Investigation for Liquefaction. There are no landslides that have been mapped within the study area.	**Less than Significant Impact with Mitigation Incorporated**: Construction activities and the long-term operation of the project would not increase the risk or exposure of people to significant adverse impacts over the existing condition due to seismic-related events. Construction activities would include excavation that could instigate soil erosion and/or loss of topsoil thereby potentially causing a significant impact. In addition, excavation activities could encounter previously unidentified fossil remains for which the accidental destruction of these resources would be a significant impact. This significant impact would be reduced to less than significant with the incorporation of mitigation measures.
Water Resources	The study area originally contained natural watercourses that have since been altered for flood control or water supply purposes. The study area lies within the historic overflow path of the Santa Ana River (SAR), and is susceptible to flooding because of its location on the alluvial plain of the SAR. Significant regional storm events or floods have occurred in the area over the last 175 years with the most recent occurring in 2017, for which a Major Disaster Declaration was approved for California. Orange County has a National Pollutant Discharge Elimination System permit number CAS618030 issued and approved by the Santa Ana Regional Water Quality Control Board Order number R8-2009-0030, which includes the study area. Channel C05 and Huntington Harbour have been placed on the Santa Ana Region 303(d) List of Water Quality Limited Segments. Both the BCER and the Bolsa Marsh are being added to the 2016 303(d) list due to toxicity. Wetlands have been identified within the vicinity of the Proposed Project.	**Less than Significant Impact with Mitigation Incorporated**: During construction, ground-disturbing activities would occur that could lead to a temporary significant impact to water quality and induce erosion. This significant impact would be reduced to less than significant with the incorporation of mitigation measures.
Air Quality	The study area lies within the South Coast Air Basin (SCAB). The SCAB area has high levels of air pollution, particularly from June through September. High rates of pollutant emissions combined with light wind and shallow vertical atmospheric mixing lead to reduced pollutant dispersion and exacerbate elevated air pollution levels. In regards to National Ambient Air Quality Standards, the study area is currently not attaining ozone and particulate matter $PM_{2.5}$ national standards, ozone and particulate matter state standards, and is maintaining carbon monoxide, nitrogen dioxide, and PM_{10} national standards.	**Potentially Significant Impact**: Preliminary analysis could not rule out the potential for localized impacts to air quality during construction of the project. Dispersion modeling would need to be conducted to confirm if the project would exceed air quality standards or cause localized impacts. Mitigation measures are proposed for incorporation to minimize potential air quality impacts. However, without a dispersion model (which requires additional data and design details beyond the feasibility phase level), it cannot be said at this time with certainty that the mitigation measures would reduce the level of impact to less than significant.
Energy	Southern California Edison provides electrical services to the study area through State-regulated public utility contracts, while the Southern California Gas Company provides natural gas services. In regards to energy consumption, both electricity consumption and natural gas consumption have exhibited a decreasing trend between 2013 and 2017. Conversely, automotive fuel consumption has exhibited an increasing trend between 2013 and 2018.	**No Impact**: Construction and operation of the project would not result in wasteful, inefficient or unnecessary consumption of energy resources. The project would also not conflict with or obstruct any local or state plans for renewable energy or energy efficiency.
Noise	The study area is located in an urban setting surrounded by residential and commercial uses. Ambient noise levels consist of traffic noise and noise associated with residential and commercial operations. Roadway traffic consisting of cars, buses, and commercial trucks generate the highest ground vibrations.	**Potentially Significant Impact**: Noise levels during construction activities would exceed exterior noise levels at residential land use thresholds. Although mitigation measures would be implemented to minimize noise impacts, it is unlikely that these measures would reduce noise levels below the threshold. Therefore, there would be a potentially significant adverse impact to ambient noise levels within the vicinity of construction activities. This would be a temporary

Resource	Existing Condition Overview	Environmental Consequences Overview
		impact lasting only the duration of construction. Noise levels would return to their existing condition levels after construction of the project is complete.
Biological Resources	The Westminster watershed has been channelized and a majority of the channels have been hardened with either riprap or concrete to increase flood conveyance. The vegetation resources are typical of constructed flood damage reduction channels in the urban environment. The vegetation in the channels is dominated by annual, weedy, and ruderal species. Eelgrass, which is designated as essential fish habitat, is found within the study area. Eelgrass is primarily found in the Anaheim Bay/Huntington Harbour area, with smaller amounts occurring in the lower portion of channel C02. Thirteen federally-listed threatened, endangered, or candidate species are listed on the U.S. Fish and Wildlife Service's official species list as potentially occurring within the study area. In addition, there are approximately 38 state-listed special status species that potentially occur within the study area. These special status species are primarily located within the adjacent BCER and Seal Beach National Wildlife Refuge.	**Less than Significant with Mitigation Incorporated**: Construction activities would have both short-term and long-term impacts to biological resources. Activities would have a long-term indirect impact to eelgrass within the vicinity of C02 Reach 23, a long-term direct impact to wetland habitat within the vicinity of Warner Avenue Bridge, and a short-term direct impact to foraging habitat for special status species. Mitigation measures as well as compensatory mitigation are included in the recommended plan (see Appendix M – Conceptual Mitigation Strategy for proposed compensatory mitigation). With the implementation of mitigation measures and compensatory mitigation, the impacts stated above would be reduced to less than significant.
Cultural Resources	There are no previously recorded National Register of Historic Places listed or eligible properties within or adjacent to the study area for channel reaches C02/C04 and C06. This is also true for the majority of C05, except the downstream reach (Reach 1) which is adjacent to the BCER. Within this area there are two historic period sites, one multicomponent site, and two prehistoric sites.	**Less than Significant with Mitigation Incorporated**: Excavation activities associated with the project have the potential to encounter previously undiscovered archaeological resources. The accidental destruction of these resources would be a significant impact. This significant impact would be reduced to less than significant with the incorporation of mitigation measures.
Tribal Cultural Resources	No sacred sites are recorded within the study area, however, Native American consultation conducted to date strongly indicates that the Proposed Project area should be considered sensitive for Native American resources.	**Less than Significant with Mitigation Incorporated**: Excavation activities associated with the project have the potential to encounter previously undiscovered tribal cultural resources. The accidental destruction of these resources would be a significant impact. This significant impact would be reduced to less than significant with the incorporation of mitigation measures.
Socioeconomic/Environmental Justice	Most cities within the Westminster watershed have significant white, Hispanic, and Asian populations in various percentages. Stanton, Anaheim, and Santa Ana have dominant Hispanic or Latino populations, whereas Westminster and Garden Grove have dominant Asian populations. Fountain Valley, Cypress, Huntington Beach, and Los Alamitos are the only cities with a median household income above the state average. Westminster, Stanton, Garden Grove, Anaheim, and Santa Ana have a greater than state average of those below the national poverty level.	**Less than Significant Impact**: Overall, the project as a whole would be providing a benefit to the communities within the Westminster watershed by reducing the potential for flooding and flood induced impacts to residences. Under the LPP, flood damage risk would be reduced to events greater than the 1% ACE. By reducing the risk of flooding, the project would result in positive impacts to socioeconomics by reducing the likelihood of flooding, loss of life, or pain and suffering.
Hazardous, Toxic, and Radioactive Waste	A limited Hazardous, Toxic, and Radioactive Waste (HTRW) Phase I Environmental Site Assessment was conducted for the Proposed Project area. In regards to channels within the C02/C04 and C05/C06 system, a review of the EDR database suggests that there are LUST's adjacent to the proposed project area that have not been fully remediated. In addition, there are several service stations with active USTs and a facility with a potential surface impoundment directly adjacent to the Proposed Project area. In addition, C05 Reach 1 is adjacent to the Bolsa Chica Lowlands Restoration Project where remediation activities have occurred.	**Less than Significant Impact with Mitigation Incorporated**: Transport, use, and disposal of hazardous materials would adhere to existing regulations of several agencies. The flood control channels are not listed on the database of hazardous materials sites. Construction activities would involve the use of small quantities of hazardous or toxic equipment that could be inadvertently leaked or spilled which could result in an adverse significant impact to the public or environment. In addition, during construction there could be temporary direct and indirect impacts to emergency response/emergency evacuation plans from lane closures for staging of equipment and construction activities. Mitigation measures would be incorporated during project construction. With the incorporation of mitigation measures the potential significant adverse impacts stated above would be reduced to less than significant.

Resource	Existing Condition Overview	Environmental Consequences Overview
Land Use/Recreation	Current land use consists of a mix of residential, schools, businesses and a few parks located adjacent to the channels within the study area. Commercial uses such as retail and office buildings are scattered throughout almost the entire channel system. Industrial uses include warehouses and distribution centers. Open space along the channel system consists mainly of parks and a golf course. The only undeveloped area adjacent to the channel system is located at the west end of C05 Reach 1, which is currently in oil production. There are several parks that are adjacent or within the vicinity of the Proposed Project. On the C02/C04 system there are five nearby parks, while the C05/C06 system has seven nearby parks including the BCER.	**Less than Significant Impact**: Construction would occur primarily within designated flood control channels and flood control channel right-of-ways. Land use designations are not expected to change from what they are currently due to construction of the project. The project would not impact nearby recreational facilities or recreational opportunities. Since the impact would be less than significant, no mitigation measures are proposed.
Aesthetics	The Proposed Project is located in western Orange County, California, approximately 25 miles southeast of the City of Los Angeles. Within the study area, the majority of scenic vistas and scenic resources are located within the City of Huntington Beach and along the coast. The Pacific Ocean is the area's most prominent scenic vista and scenic resource and is located west of the study area. Also west of the study area is the Bolsa Chica State Beach. Views of the channel system are limited to adjacent residential and commercial land uses, and areas where streets and highways cross over the reaches. Views are further limited by landscaping and fencing along the channel system.	**Less than Significant Impact**: The project would not have any impacts to scenic vistas in the area. In addition, the project would not create new sources of substantial light or glare that could potentially impact views in the area. The presence of construction equipment and construction activities would temporarily impact views. This would be a short-term impact that would last only while construction is occurring.
Transportation	Several major freeways traverse the study area including the San Diego Freeway (e.g., I-405), the Santa Ana Freeway (I-5) and the Garden Grove Freeway (State Route 22). Local bus services are provided in most of the cities in Orange County. Several cities within the study area have designated truck routes for construction activities and long-term business operations.	**Less than Significant Impact with Mitigation Incorporated**: Construction activities would result in temporary direct and indirect impacts to CMP roadways, intersection operation, public transit, and/or pedestrian and bicycle facilities. Construction activities are not expected to generate a substantial increase in vehicle trips that could cause a significant transportation impact. In addition, the project does not include any design features that would substantially increase hazards or create incompatibility for users of the local transportation network. Construction activities include temporary lane closures for staging of construction equipment, presence of construction equipment, and haul trucks entering and leaving the construction site. These factors could temporarily increase roadway hazards for users of the local transportation network. Mitigation measures are proposed to minimize impacts. With the incorporation of mitigation measures, the impact would be reduced to less than significant.
Utilities	The channel systems within the study area bisect numerous utilities. These utility lines provide natural gas, sewer, water, oil, and fiber optic services.	**Less than Significant Impact**: Construction of the project would not result in the relocation or construction of new or expanded utility and/or service systems. In addition, the project does not include nor would it require new or expanded water supplies. Project construction would involve the excavation and disposal of demolition debris. The amount of demolition debris to be exposed of is not expected to exceed solid waste standards or local landfill capacity. Since the impact would be less than significant, no mitigation measures are proposed.

5.18 Mandatory Findings of Significance

The following mandatory findings of significance are based on the CEQA checklist as provided in Appendix G to the CEQA Guidelines. These criteria are also being adopted for NEPA.

- Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

The Westminster watershed where either the NED Plan or LPP would be implemented is a highly urbanized area, of which the majority does not contain any sensitive natural resources that would be impacted by the project (refer to Section 5.8.4.1 through Section 5.8.4.3 for discussion). The exception is the downstream ends of the proposed project areas, specifically C02 Reach 23 (adjacent to Huntington Harbour and Seal Beach Naval Weapons Station), C05 Reach 1 (adjacent to BCER and OBB), and Warner Avenue Bridge (adjacent to BCER, OBB, and Huntington Harbour). Construction activities within these downstream reaches would have a direct impact on 1) special status species within the BCER, 2) eelgrass, and 3) biological richness within the drainage channels.

Special status species that are found within the BCER that would be temporarily impacted due to construction activities at Warner Avenue Bridge and within C05 Reach 1 are the western snowy plover (federal threatened), California least tern (federal endangered), light-footed Ridgway's rail (federal endangered), coastal California gnatcatcher (federal threatened), Belding's savannah sparrow (state endangered), and green turtle (federal endangered). Mitigation measures MM-BIO-1 through MM-BIO-10 would be implemented during construction of the project (refer to Section 5.8.3 for detail on the biological resources mitigation measures) to reduce temporary significant adverse impacts on the aforementioned species to less than significant.

Eelgrass is found downstream of the Edinger Bridge on C02 Reach 23 and where the drainage channel outlets into Huntington Harbour. While construction activities are not expected to directly impact eelgrass within this area, the subsequent operation of the modified drainage channels would have indirect long-term adverse impacts to eelgrass due to increased velocities. Modification of the drainage channels could increase storm-flow velocities at the downstream end of C02. The increased velocities could be greater than eelgrass is able to withstand, thereby resulting in an indirect impact. The estimated acreage of eelgrass that could be indirectly impacted by the project is 1.7 acres. The Conceptual Mitigation Strategy (*Appendix M*) provides a methodology for conducting in-kind and out-of-kind mitigation to offset the possible mortality of eelgrass at the downstream end of C02 in Huntington Harbour. With the implementation of mitigation, this indirect impact would be reduced to less than significant.

Lastly, the modification of the drainage channels would reduce the biological richness within these channels due to the elimination of soft-bottom habitat and angled banks, although the impact is expected to be less than significant. The majority of the channels within the Westminster Watershed are already lined with either concrete or riprap. Riprap and earthen reaches of the drainage channels currently provide substrates for benthic invertebrates and aquatic vegetation. Although the invertebrate community within the drainage channels has not been sampled, it is assumed that it is primarily comprised of pollution tolerant species due to urban runoff being the primary source of water within the system. To understand the potential impacts due to conversion, a literature search was conducted. Marsh and Stinemetz (1983) sampled the invertebrate community within the earthen Coachella Canal in southern California to identify the existing invertebrate community and identify potential effects of converting the canal from earthen to

concrete lined. The study concluded that burrowing benthic invertebrates would be temporarily impacted due to the loss of natural substrates; however, they would likely be able to recolonize the concrete canal once substrate from run-off began to accumulate. Conversion to concrete would also result in a reduction of cover and bank heterogeneity resulting in a loss of habitat diversity. Conversely, the study found that concrete provided habitat for *Cladophora* and other periphyton which would likely support grazing and filter-feeding benthic invertebrates. In addition, conversion to concrete would enhance water clarity by the elimination of bank erosion. The improved water clarity was expected to have a positive effect on primary and secondary production within the canal.

Burton et al. (2005) conducted a study within the SAR in southern California that looked at benthic invertebrates within three different channel types: natural, channelized with soft-bottom, and concrete-lined. The study suggested that channelized sites with a soft-bottom were able to support similar invertebrate communities as natural channels. In addition, channelized sites supported more aquatic vegetation than concrete channels. In regards to benthic invertebrates, the study found that a less diverse macroinvertebrate community was present in concrete channels when compared to channelized or natural channels. In terms of periphyton, relative diatom richness and abundance were lowest in concrete-lined channels, whereas green algae biovolume was highest in concrete lined channels.

Based on these two studies, the conversion of channelized earthen and riprap channels to concrete lined channels will have an impact to the benthic invertebrate community and aquatic vegetation but not substantially. Conversion of the channels to concrete would reduce habitat heterogeneity within the channels, thereby, altering the benthic invertebrate community to a more resilient and less diverse community. It is important to note, however, that the benthic invertebrate community within the existing channels is already stressed due to urban runoff being the primary water source and the channels being channelized. In addition, the channels are maintained by OCPW, therefore, aquatic vegetation within the channels is often lacking due to treatment by the County. Overall, a less than significant impact is expected since the channels are already impacted by urban runoff and channelization, and lining the channels with concrete would only be expected to shift the composition of the invertebrate community present.

In addition to biological resources, the potential impact of the project to cultural and historical resources was assessed (refer to Section 5.9 and Section 5.10). A records and literature search was conducted for the presence of cultural and historical resources within the APE for the NED Plan and LPP. Results of the searches shows no previously recorded NRHP listed or eligible properties within or adjacent to the APE reaches of C02, C04, and C06. This was also true for the majority of C05. In or adjacent to the APE of C05 Reach 1, there are two historic period sites (P-30-100052 and CA-30-179858), one multicomponent site (CA-ORA-78/H), and two prehistoric sites (CA-ORA-83 and CA-ORA-84/289). Construction activities for C05 Reach 1 would occur only within the channel rights-of-way and would not occur on the Bolsa Chica Mesa. Although no impacts to these identified cultural resources are expected with the implementation of the LPP, completion of the Section 106 consultation process with the Tribes, interested parties, and the SHPO is required to make determinations of eligibility that have not been previously made, make determinations of effect, and how to resolve any adverse effects to historic properties that are present if avoidance is not feasible.

The modification of the channels under the LPP would include converting trapezoidal shaped channels to rectangular shaped channels. Because of the rectangular shape, the proposed construction may excavate into native soils. Therefore, there is some possibility, however remote, that archaeological resources may be encountered during construction and this impact would be potentially significant. Implementation of mitigation measures MM-CR-1 through MM-CR-4 would reduce this impact to less than significant.

- Does the project have impacts that are individually limited, but cumulatively considerable ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

Implementation of the NED Plan or LPP is not expected to have significant adverse cumulative impacts to any resources discussed in Section 5.3 through Section 5.16. Section 5.19 includes an analysis of potential cumulative impacts for both the NED Plan and LPP.

- Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?

Neither the NED Plan nor LPP include environmental effects which would have a substantial adverse effect either directly or indirectly on human beings. Currently, flooding begins at approximately the 10% ACE flood event throughout the study area and is caused by overtopping of the channels as well as failure of the levees in the downstream reaches of the C05 channel system. Overtopping and failure of the levees in the downstream reach of C04 occurs at approximately the 2% ACE flood event. Widespread overtopping of the channels as well as levee failure would still occur between the 10% and 4% ACE events within the two channel systems if no project is implemented, thereby leaving homes that are within the 100 year flood plain at risk to impacts from flooding.

Implementation of the NED Plan or LPP would provide flood risk reduction by significantly reducing flood risk throughout the project area. Flood damage risk would be reduced up to approximately the 1% ACE flood event in some locations, but other locations upstream of the I-405 would still occur between the 10% and 4% ACE flood event for the NED Plan. Under the LPP, flood damage risk would be reduced to events greater than the 1% ACE event. Therefore, implementation of either the NED Plan or LPP would have long-term beneficial impacts on human beings within the study are by reducing flood risk.

5.19 Cumulative Impacts

NEPA and CEQA require the consideration of cumulative effects of the proposed action combined with those of other projects. NEPA defines a cumulative effect as an environmental affect that results from the incremental effect of an action when combined with other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions (40 C.F.R. 1508.7). The CEQA guidelines require an assessment of the cumulative impacts of a project when the project's incremental effect is "cumulatively considerable". The CEQA requires cumulative impacts of a project be assessed with respect to past, current, and probable future projects within the region. *CEQA Guidelines* (Section 15355) define cumulative effects as "two or more individual effects that, when considered together, are considerable or which compound or increase other environmental impacts." According to CEQA Guidelines Section 15130 (b), the purpose of the cumulative impacts discussion shall reflect "the severity of the impacts and their likelihood of occurrence" and shall "be guided by the standards of practicality and reasonableness and should focus on the cumulative impact to which the identified other projects contribute…" As further defined in Section 15130 (b), an element necessary to an adequate discussion of significant cumulative impacts is a list of past, present, and probable future projects producing related or cumulative impacts, including those projects outside the control of the Lead Agency (list approach); or a summary of projections contained in an adopted general plan or in a prior environmental document that was adopted or certified that described or evaluated regional or area-wide conditions contributing to the cumulative impact (plan approach). This cumulative analysis uses the list approach. Section 5.19.4 includes a description of the past, present, and reasonably foreseeable future projects.

5.19.1 Methodology and Geographic Scope of the Analysis

If a technical issue area includes a project-specific impact that is considered less than significant or greater as a result of implementation of the NED Plan or LPP, a cumulative context is presented. No cumulative context is presented for technical issue areas that do not include a project-specific impact (i.e., no impact). The cumulative impact analysis takes into consideration whether the projects identified in Section 5.19.4, in combination with the NED Plan or LPP, would have the potential to affect the same resources. If there is not a combined effect, then a finding of no cumulative impact is made. If there would be a combined effect, then a determination is made if that combined effect would: (1) result in a significant cumulative impact; and (2) if a proposed alternative's contribution to the effect would be considerable (consistent with CEQA Guidelines Section 15355). Finally, a determination is made as to whether mitigation measures recommended for the project-specific impact would reduce the contribution to the cumulative impact to a less than significant level; therefore, resulting in a less than significant cumulative impact. Mitigation of significant cumulative effects could be accomplished by rescheduling actions of proposed projects and adopting different technologies to meet compliances. Significance of cumulative effects is determined by meeting federal and State mandates and specified criteria identified in this document for affected resources.

5.19.2 Geographic Scope

The context of the cumulative analysis varies by technical issue area. The cumulative context for each technical issue area is further defined by the specific geographic area affected. Air and water resources extend beyond the confines of the project footprints since effects on these resources would not necessarily be confined to the project areas. When the effects of the NED Plan and LPP are considered in combination with those of other past, present, and reasonably foreseeable future projects to identify cumulative effects, the other projects that are considered may also vary depending on the type of environmental effects being assessed. The following (Table 93) are general geographic areas associated with the different resources being addressed in this analysis:

Table 93: Geographic area that would be affected by the Westminster, East Garden Grove Flood Risk Management Study.

Resource Area	Geographic Area
Earth Resources	Vicinity of the individual sites of construction activity.
Water Resources	The project area, with regional implications, including: BCER, OBB, SBNWR, Huntington Harbour, Anaheim Bay, and the vicinity of the study area.
Air Quality	Regional; global for GHG emissions
Noise and Vibration	Immediate vicinity of the individual sites of construction activity and haul routes.
Biological Resources	The project area, with regional implications, including: BCER, OBB, SBNWR, Huntington Harbour, Anaheim Bay, and the vicinity of the study area.
Cultural Resources	The project area, with regional implications, including: BCER, OBB, SBNWR, Huntington Harbour, Anaheim Bay, and the vicinity of the study area.
Tribal Cultural Resources	The project area, with regional implications, including: BCER, OBB, SBNWR, Huntington Harbour, Anaheim Bay, and the vicinity of the study area.
Hazards and Hazardous Materials	The project area, including Cities of Anaheim, Cypress, Fountain Valley, Garden Grove, Huntington Beach, Los Alamitos, Seal Beach, Stanton, Westminster, and Orange County.

Resource Area	Geographic Area
Land Use and Planning	The project area, including Cities of Anaheim, Cypress, Fountain Valley, Garden Grove, Huntington Beach, Los Alamitos, Seal Beach, Stanton, Westminster, and Orange County.
Aesthetics	Individual sites and landscape level.
Transportation	Roadway network within the study area, including Cities of Anaheim, Cypress, Fountain Valley, Garden Grove, Huntington Beach, Los Alamitos, Seal Beach, Stanton, Westminster, and the Orange County, with regional implications.
Utilities and Service Systems	Local (utilities and facilities near construction sites)

5.19.3 Project Impacts

The potential impacts from implementing the proposed project are discussed in Section 5.3 through Section 5.16. Significant and unavoidable impacts from implementing the proposed project are shown in Table 95.

5.19.4 Past, Present, and Reasonably Foreseeable Future Projects

This section briefly describes the past, present, and future projects in the study area. The exact construction timing and sequencing of these projects are not yet determined or may depend on uncertain funding sources. A forecast of projects likely to be constructed concurrently with the NED Plan or LPP is required to evaluate cumulative effects on environmental resources in the area. In addition, mitigation or mitigation measures must be developed to avoid or reduce any adverse effects to less than significant based on federal and local agency criteria. Those effects that cannot be avoided or reduced to less than significant, are more likely to contribute to cumulative effects in the area.

5.19.4.1 Past Projects

Channelization within the study area occurred throughout the mid-20th century with containment in concrete channels and earthen berm channels. As a result, the Bolsa Chica (Facility No. C02), Westminster (Facility No. C04), East Garden Grove-Wintersburg (Facility No. C05), and Oceanview (Facility No. C06) channels vary in age, size, geometry, and lining material. Moreover, these channels have been modified from their original construction from activities that have been completed prior to the issuance of the Notice of Preparation (NOP) on November 1, 2018. Modifications consisted of the following types: 1) emergency and maintenance repairs necessary to maintain the function of the facility; 2) installation and repair of utility crossings over a channel; 3) addition of storm drain outfalls into a channel from surrounding development, roadways, or both; 4) improvements consisting of channel surface modifications, and, 5) changes in geometry design. When combined, all of the types of activities have resulted in thousands of physical changes to the channels between original construction through to the Notice or Preparation.

5.19.4.2 Present and Future Projects with a FRM Emphasis

The following descriptions of related or similar flood risk management projects include those that are under active consideration, were proposed, or have some form of environmental documentation completed. In addition, these projects have the potential to affect the same resources and fall within the same geographic scope and are thus to be cumulatively considered. In particular, the affected resources are earth resources, water resources, biological resources, land use and planning, transportation, and utilities and service systems. See Section 5.19.2 for the geographic scope of consideration for effects on these resources.

East Garden Grove-Wintersburg Channel Sheet pile Flood Control Improvement Project from Warner Avenue to 1,250 feet downstream of Goldenwest Street

The project involves improvements to the C05 facility from Warner Avenue to 1,250 feet downstream of Goldenwest Street to correct channel erosion, provide additional protection from flooding, and increase flood conveyance capacity. The length of the proposed construction is approximately 4,970 linear feet. Project construction would consist of inserting two parallel sheet pile walls on both sides of the northern maintenance road and both sides of the southern maintenance road. One row of sheet piles would be inserted at the landside hinge point between the maintenance road and the existing top-of-channel slope, and the second row would be driven 15 feet farther from the channel and parallel to the first row. The second row of sheet piles would be almost half way down the levee backslope. All four rows of sheet piles (two rows on each side of the channel) would be located outside of waters of the U.S. (WoUS) and waters of the State of California.

Initial Study/Mitigated Negative Declaration No. IP 18-052 was adopted by, and the project was approved by the Orange County Board of Supervisors on October 22, 2019. Construction is scheduled to start in late 2019 and be completed in early 2021.

East Garden Grove-Wintersburg Channel Confluence with Ocean View Channel to Woodruff Street Project

The proposed project consists of the construction of a 60-feet wide vertical wall reinforced concrete channel. The existing facility under the Heil Avenue and Beach Boulevard intersection (10 feet X 10 feet) triple box culvert would be replaced with five (11 feet X 10 feet) barrels. The first task of construction will consist of removing all of the existing riprap on both the invert and channel slopes. Then, the construction contractor will most likely excavate the existing maintenance roads at a slope and drive temporary shoring at the lower locations of the excavation. As an alternative to open cutting the maintenance roads to reduce the depth of the shoring, the contractor may select to drive temporary shoring at the location of the existing top of riprap slope approximately 3 to 5 feet behind the proposed concrete walls. The temporary shoring would most likely be steel H-beams with either timber lagging or steel sheets.

EIR No. 560 – East Garden Grove-Wintersburg/Oceanview Channel System Improvement Project was certified by the Orange County Board of Supervisors acting as the Orange Control Flood Control District on March 24, 1998. The Ocean View Channel to Woodruff Street Project is a component of and consistent with this Improvement Project. This project will be administratively approved by OC Public Works. Construction is estimated to commence in 2022 and be completed in 2023.

FEMA, Flood Mitigation Assistance Program and the Hazard Mitigation Grant Program

These programs seek to reduce or eliminate the loss of life and property damage resulting from natural and human-caused hazards. In order to qualify for these programs, a community must be enrolled in the NFIP and have a Flood Hazard Mitigation Plan approved by the FEMA Regional Director. This plan must include a description of the existing flood hazard and identification of the flood risk including estimates of the number and type of structures at risk, repetitive loss properties and the extent of flood depth and damage potential. A project must be cost-effective, not costing more than the anticipated value of the reduction in both direct damages and subsequent negative impacts to the area if these programs must compete for funding. The Cities of Anaheim, Fountain Valley, Huntington Beach, and Westminster are enrolled in the NFIP and have approved FEMA Hazard Mitigation Plans in place.

5.19.4.3 Navigation Projects

Anaheim Bay

Anaheim Bay is just south of Seal Beach, California, and is part of a physiographic region known as the Sunset Gap. This gap is bordered by Landing Hill to the northwest and Bolsa Chica Mesa to the south. Tidal marshes made up the majority of Sunset Gap's area at one time, but during the flood of 1862 the SAR shifted its course to capture much of the drainage area of Anaheim Bay. Previous to this flood, the marsh was much larger and was polyhaline in nature. Because of the area's rapid transition from semirural to a metropolitan area in the last 50 years, much of the tidal marsh has undergone change. Anaheim Bay has shrunk approximately 30% in size in 95 years. Practically all that is left of Sunset Gap's salt marsh is found in Anaheim Bay, within the U.S. Naval Weapons Station, an area approximately 670 acres in size.

The Anaheim Bay area was known historically as a port. Anaheim Landing at the bay's ocean exit has been an important regional port for over a hundred years, being established in 1868. When Orange County was established in March 1889, Anaheim Bay was included and the Bay became a resort of considerable fame. The bay and surrounding coastal area enjoyed a boom partially resulting from the region's increasing use by sportsmen. Twenty-three gun clubs occupied the Sunset and Bolsa gaps between 1899 and 1900. These clubs took advantage of one of the greatest natural habitats for wildlife and game birds in the world.

In 1944, the U.S. Government took over Anaheim Landing as well as most of Anaheim Bay for a naval station (see discussion above for NWSSB). Although piers, railways, jetties, and ammunition magazines were added to the area, the tidal flats were not developed but kept as a buffer between the ammunition and the public for safety reasons.

Currently, the NWSSB is proposing to conduct maintenance dredging to restore federally authorized depths in the outer harbor at Anaheim Bay and the approach and entrance channels to the NWSSB. Dredging would occur over approximately 171 acres with about 343,600 cubic yards of sediments being removed. Approximately 197,700 cubic yards of material would be placed in a 55-acre nearshore placement site off Sunset Beach. Approximately 145,900 cubic yards of material would be placed at LA-2 Ocean Dredged Material Disposal Site. An application for permit was submitted to the USACE LA District Regulatory Branch April 27, 2018. The Navy awarded a contract for dredging on July 15, 2019. The construction schedule has not yet been finalized but dredging could begin toward the end of 2019 or in early 2020. Likely foreseeable future projects for Anaheim Bay include dredging, maintenance of the breakwaters, and potentially reconfiguration of the breakwaters.

Naval Weapons Station Seal Beach

In 1944, the Department of the Navy acquired about 5,000 acres of land in and around Anaheim Bay from the Alamitos Land Company. Although the Navy purchased the land, the California State Lands Commission held all of the submerged lands within the station.

While the primary focus of the activities at NWSSB are directed toward achieving its mission, there are also various actions taken at NWSSB to conserve the Station's natural resources. Existing laws and regulations, such as the Sikes Act Improvement Act of 1997 (Sikes Act), provide assistance in achieving a balance on military lands between protecting natural resources and ensuring the continued support of the military mission. The Navy also provides funding to support various management actions taken on the SBNWR to protect listed species.

Currently, as part of the U.S. Rebalance to the Asia-Pacific region, the Navy is moving more of its ships from the Atlantic Ocean to the Pacific Ocean, which will increase the number of ships that NWSSB will be required to support. The Navy has proposed a project that would replace the ammunition pier which was constructed in 1953. The current wharf's condition, capacity and configuration do not meet the Navy's current and future needs. Construction of the new ammunition pier would meet current earthquake standards, would support the loading of more than one medium-sized ship at a time, and enable larger ships to safely enter Anaheim Bay and load at the new pier. The project also proposes the construction of associated waterfront facilities and a new small boat access channel for civilian boat traffic to and from Huntington Harbour (see Huntington Harbour for additional details on the proposed small boat access channel). The project would also include dredging for the pier, turning basin, and small boat access channel (refer to Anaheim Bay above). Likely foreseeable projects include dredging and maintenance activities.

Huntington Harbour

Huntington Harbour is a residential development of 680 acres consisting of five manmade islands with waterways used for boating in the north end of Huntington Beach. The five manmade islands in Huntington Harbour include Trinidad, Humboldt, Davenport, Gilbert and Admiralty. Huntington Harbour was formed in the 1960s. The harbors and peninsulas are located on the former site of the historic Sunset Bay Estuary wetlands that were dredged and filled to develop the land for the new community.

Currently, as part of a proposed project for the NWSSB, a new small boat access channel for civilian boat traffic to and from Huntington Harbour would be constructed south of Anaheim Bay's east jetty. The access channel for civilian boat traffic would reduce disruptions to boaters during Navy ship transits, high-security conditions, and exercises. A contract was awarded July 15, 2019 for the first phase of the project which includes dredging (refer to Anaheim Bay above) and construction of the pier. A contract for the second phase of the project which includes the civilian boat access channel has not yet been awarded. However, the entire project (i.e., phase one and phase two) is expected to be completed within five to six years. Likely foreseeable future projects for Huntington Harbour include dredging and maintenance of Harbour facilities.

5.19.4.4 Projects Affecting Fish and Wildlife

Seal Beach National Wildlife Refuge

In 1963, Congressman Richard Hanna told the USFWS he was interested in establishing a refuge between Huntington Beach and Seal Beach. This cooperative plan for 600 acres of tidal marsh was approved in 1964 through a three-way agreement among the Navy, the USFWS, and the CDFW. Through the efforts of Congressman Hosmer, President Nixon signed Public Law 92-408 in August 1972, authorizing the establishment of a NWR on the NWSSB. The SBNWR was officially established on July 11, 1974.

Four tidal basins were created for the restoration of wetlands: Forrestal Pond, Case Road Pond, 7th Street Pond, and Perimeter Pond, which currently support the subtidal habitat in the Refuge with tidal water from Anaheim Bay supporting the ponds. Oil extraction beneath the bay led to the marsh subsiding. From 1957 to 1984, the elevation dropped by almost 10 inches.

In January 2016, the USFWS began efforts to prepare for sea level rise on the SBNWR by implementing the first-ever thin-layer salt marsh sediment augmentation project on the west coast of the U.S. Salt marsh habitat within the project site has been degraded by excessive tidal inundation, the combined result of subsidence, gradual sea level rise, and the historical alteration of natural sediment inputs.

Raising the elevation of the site by applying 10 inches of clean sediment over the 10-acre low salt marsh project site is intended to enhance the quality of the cordgrass-dominated salt marsh habitat and improve nesting opportunities for the federally endangered light-footed Ridgway's rail. Improving the quality of the cordgrass vegetation is also expected to maintain carbon sequestration within the marsh overtime.

This project has been made possible through a multiple agency partnership that includes funding from the USFWS, California State Coastal Conservancy, CDFW, Orange County Parks, and the USACE, Engineer Research and Development Center, Environmental Laboratory. Other agency partners include the U.S. Navy and California State Lands Commission. Reasonably foreseeable future projects and management activities for SBNWR may be found in the SBNWR Final Comprehensive Plan (USFWS 2012).

Bolsa Chica Ecological Reserve

Once part of a 165,000 acre Spanish land grant, the BCER presently consists of approximately 1,550 acres of undeveloped coastal wetland and adjacent upland areas. Native Americans once lived on the upland mesas, gathering shellfish and other edibles from the wetlands. In 1900, the tidal nature of the wetland was essentially destroyed when the natural ocean inlet to the wetland was closed to improve duck hunting. Since then, the area has been used for agriculture, cattle grazing, military coastal artillery emplacements and oil production.

Figure 47: Historical coastal wetlands, Los Angeles and Orange counties. Source: Amigos de Bolsa Chica.

In 1973, as part of a controversial land swap, the State of California acquired approximately 3,300 acres of wetlands adjacent to PCH for the public and to be managed by the CDFW. A portion of this was restored by the state in 1979 to become the BCER. The remaining acreage was retained in private hands. Planning for the construction of a massive marina, commercial, and residential development was quickly underway. The plan was drastically reduced in 1989 through the settlement of a lawsuit filed by the Amigos de Bolsa Chica.

In 1997 the state acquired 880 acres of Bolsa Chica wetlands and another 41 acres was acquired in 2005, bringing public ownership of the Bolsa Chica area to over 1200 acres. Wetland restoration of nearly 600 acres of BCER began in fall 2004. In the summer of 2006, seawater flowed into the restored wetland for the first time in over 100 years. To achieve the biological benefits of tidal restoration, a direct connection to the Pacific Ocean was reestablished through the creation of a new tidal inlet that cut through Bolsa Chica State Beach and across PCH near the Huntington Mesa. PCH and adjacent oil field facilities remain in operation. The Bolsa Chica wetland restoration was the largest coastal wetland restoration ever undertaken in southern California (Amigos de Bolsa Chica).

Currently, the new tidal inlet that was created requires dredging to ensure connectivity with the ocean. Without regularly removing sand from the inlet, the full tidal basin would become closed off from the ocean, causing degradation of water quality, impacts to the biota in the basin, damage to intertidal plant communities, and loss of an important food source for nesting birds. The sediment management dredging program for the BCER is proposed to continue removing sands from the full tidal basin entrance channel and flood shoal deposits on a recurrent cycle of every one to three years. Each dredging cycle removes approximately 65,400 to 460,000 cubic yards of material, depending on conditions. The receiver beaches for the dredged sediment are the Bolsa Chica State Beach and the Huntington Beach City Beach. The dredged sand is to be deposited along the beach face, or within near shore subtidal areas, to provide feed sand for littoral transport southeastward along the shoreline.

Reasonably foreseeable future projects for the BCER include continued dredging of the new ocean inlet and general maintenance such as removing non-native vegetation, planting native vegetation, trash removal and other general maintenance tasks.

5.19.4.5 Development Projects

The development projects listed in Table 94 are within Orange County and within the study area. These projects have the potential to affect similar resource areas as the NED Plan or LPP and have, therefore, been included in the cumulative impacts analysis.

Table 94: Development projects within the vicinity of the study area.

Project Name	General Location	Project Characteristics
Planning Phase		
Golden Road Brewing	Northwest end of Huntington Harbour.	Re-establish an 8,849 square feet restaurant and brewery with 960 square feet of outdoor patio.
Harmony Cove Marina Development	3901 Warner Avenue (north side of Warner Avenue, west of Weatherly Lane); adjacent to OBB outlet to Huntington Harbour	2.28 acre site: 23-boat slip marina, eating and drinking establishment.
Rainbow Environmental Services Transfer Station	17121 Nichols Street, Huntington Beach	Proposal to expand existing transfer station and material recovery facility (MRF) to include approximately 193,150 square feet of new building area including two transfer stations, a secondary recycling building, office, and enclosure of existing MRF canopy.
Sunset Beach Hotel	17145 Pacific Coast Highway, Huntington Beach	Proposal to consolidate seven parcels into one parcel, demolish an existing car wash, and develop a new three-story, 12-unit hotel with a 1,800 square feet commercial tenant space.
Windward Residential Development	17202 Bolsa Chica (east side of Bolsa Chica Street, south of Los Patos Avenue)	2.5 acre site: 36-unit for-sale development.
Construction Phase		
Edinger Avenue Bridge Project	Near Huntington Harbour at the west end of Edinger Avenue; spans over the Bolsa Chica Channel (C02).	Replace existing deteriorated timber bridge with a precast concrete bridge and widen bridge.
I-405 Improvement Project	SR-73 to I-605	One new regular lane in each direction; two express lanes in each direction; new, replaced and widened bridges; interchange reconfigurations; merge lane improvements; new and replaced soundwalls; and new bike lanes and sidewalks.
Parkside Estates	West side of Graham Street, south of Warner Avenue, along the East Garden Grove Wintersburg Flood Channel	111 single family residences; 23 acres of preserved, restored and enhanced open space; 1.6 acre neighborhood park; public trails; creation of water quality treatment system.
Peters Landing	Northwest end of Huntington Harbour.	Renovation of the Peter's Landing Marina property. Updates include the exterior storefront facades, landscaping, and hardscape.

5.20 Cumulative Impacts Analysis

The following describes the project's potential contribution to cumulative effects on each resource topic presented in Table 93.

Earth Resources

Other developments in the study area would be subject to the same types of geology and topography, seismic conditions, soil characteristics, and mineral resources as the proposed project. These types of impacts represent site-specific effects and do not result in a greater combined impact than the individual impacts. Proposed channel modifications under both the NED Plan and LPP would be designed, constructed, and maintained in compliance with the regulatory standards of USACE, OCPW, and the latest seismic designs. As a result, channel modifications would be designed to avoid or minimize any potential for seismic-related failure. Earth disturbing activities could increase the rates of erosion over current conditions, resulting in increased sediment loading in receiving waters or increases in air-borne dust. The proposed project would comply with NPDES General Construction Permit requirements by the SAQWCB to prevent storm water runoff from construction entering receiving waters. Finally, the alternatives would have no short- or long-term effects on oil wells occurring within the Huntington Beach Oil Field area. Overall, no cumulative effect would occur.

Water Resources

In regards to hydrology and hydraulics, flood risk management improvements within the channel reaches would contain flood flows to reduce potential flooding within the surrounding communities. All FRM projects are regulated and considered within the context of the regional system so that transfer of flood risk is avoided and no adverse, cumulative effects result. Neither the NED Plan nor the LPP would contribute to a cumulatively significant impact. Cumulative impacts would be less than significant because the past projects are incorporated into the existing environmental baseline. The one present project (East Garden Grove-Wintersburg Channel Westminster watershed Sheet pile Flood Control Improvement Project from Warner Avenue to 1,250 feet downstream of Goldenwest Street) includes mitigation measures that reduce potentially significant impacts below the level of significance. The one future project (East Garden Grove-Wintersburg Channel Confluence with Ocean View Channel to Woodruff Street Project) includes mitigation measures as part of EIR No. 560 that reduces potentially significant impacts below the level of significance.

In regards to water quality, construction activities have the potential to temporarily degrade water quality through the direct release of soil and construction materials into water bodies or the indirect release of contaminants into water bodies through runoff. Both the NED Plan and LPP would be required to comply with NPDES General Construction Permit requirements for developing and implementing BMPs. Construction activities associated with the NED Plan or LPP could occur during the same time frame as routine dredging of the full tidal basin ocean entrance channel (BCER), Huntington Harbour, and/or Anaheim Bay. If construction occurs during the same timeframe, receiving water quality could be diminished due to increased turbidity and/or inadvertent release of construction materials, resulting in significant cumulative impacts. Construction of the NED Plan or LPP would have a temporary adverse impact that would be considered significant, but would be reduced to less than significant with the implementation of mitigation measures.

Air Quality

Both the NED Plan and LPP contribute to emissions of criteria pollutants in the region, and may have a significant cumulative effect on air quality. Each of these projects could implement their own mitigation

plan and reduce the emissions to below significant levels, but there is potential for significant cumulative effects to remain if all are considered together. Emissions modeling (*Appendix I – General Conformity Analysis*) assumes individual projects do not occur concurrently according to the project schedules. Because 2021 NOx emission estimates exceeded the NOx *de minimis* level and SCAQMD air quality significance threshold, construction of either the NED Plan or LPP may result in a significant contribution to atmospheric emissions of NOx. Implementation of mitigation measures to reduce criteria pollutants includes use of Tier 4 off-road equipment, 2010 and newer haul truck engines, and a fugitive dust control plan. By incorporating all feasible mitigation measures to reduce NOx emissions, obtaining a positive conformity determination for NOx in 2021, and considering long-term air quality benefits of reduced traffic delays that result from the NED Plan or LPP, air quality impacts may be considered less than significant with mitigation incorporated as described in Section 5.5. By considerably reducing the NED Plan's or LPP's NOx and other criteria pollutant emissions, the cumulative impact may become less than significant.

It is unlikely that any single project by itself could have a significant impact on the environment with respect to GHGs. Considered on a project-only basis, construction of either the NED Plan or LPP would cause a temporary and less than significant increase in GHG emissions. However, the cumulative effect of human activities has been linked to quantifiable changes in the composition of the atmosphere, which, in turn, have been shown to be the main cause of global climate change (IPCC 2007). Therefore, the analysis of the environmental effects of GHG emissions is inherently a cumulative impact issue. While the emissions of one single project will not cause global climate change, GHG emissions from multiple projects throughout the world could result in a cumulative effect with respect to global climate change. On an individual basis, each of these project emissions are (or would mitigate) below general reporting thresholds. If construction projects are implemented concurrently, combined cumulative emissions become more significant. Although there are currently no reporting requirements for GHG emissions for construction, SCAQMD established CO_{2eq} thresholds for industrial facilities which are not exceeded by estimated project CO_{2eq} emissions. Therefore, the overall cumulative GHG emissions from the NED Plan or LPP are considered to be less than significant.

Noise and Vibration

The cumulative setting for impacts related to noise is based on other local projects that would result in temporarily increased levels of ambient noise and vibration in the study area. In residential areas and sensitive receptor areas adjacent to the drainage channels, this would be a significant effect on those receptors. However, the effects would be limited to the people or wildlife in the immediate proximity to the construction sites. If there are any projects constructing within audible distance from one another, USACE would coordinate with the other projects to ensure that the NED Plan or LPP would not be constructed at the same time as other, adjacent construction when possible. The NED Plan and LPP would not contribute to a significant cumulative impact because the project noise and vibration impacts would be site-specific and would not combine with other projects' noise and vibration impacts.

Biological Resources

The cumulative setting for impacts related to biological resources is the project area including the BCER and the SBNWR. There is the potential for significant cumulative impacts to special status species, primarily nesting birds, if the proposed project and the other projects were to occur at the same time. The other projects include construction activities associated with developments, but also maintenance dredging of Anaheim Bay/NWSSB, Huntington Harbour, and the ocean inlet to the full tidal basin at the BCER. Construction noise, equipment, and personnel associated with these projects could disturb nesting birds resulting in unsuccessful hatchings. The construction of the proposed project, especially increasing

the span of Warner Avenue Bridge, removal of the tide gates and replacement with an access bridge, and channel modifications along C02 Reach 23 and C05 Reach 1, could contribute to the significant cumulative impact to nesting and foraging birds. However, with the implementation of mitigation measures, the impacts of the NED Plan or LPP would be reduced to less than significant. Therefore, the projects would not contribute to a significant cumulative impact to biological resources.

Both the NED Plan and LPP include unavoidable adverse impacts that will require mitigation. Both the NED Plan and LPP would include direct impacts to approximately 0.15 acres of wetland and indirect impacts to 1.70 acres of eelgrass. To offset these impacts, a conceptual mitigation plan has been prepared to replace the acreage of the impacted resources elsewhere in/around the study area. Opportunities for mitigation have been identified at the BCER and offshore of the Palos Verdes peninsula. The Mitigation Plan may be found in *Appendix M*.

Consultation with the USFWS under Section 7 of the Endangered Species Act (1973) was completed February 10, 2020 (refer to *Appendix J – Coordination*). Consultation with the NMFS under Section 7 of the Endangered Species Act was completed with the receipt of a Biological Opinion dated March 27, 2020 (refer to *Appendix J – Coordination*). A consistency determination (CD-0008-19) for project consistency with the Coastal Zone Management Act was filed with the California Coastal Commission December 27, 2019 (refer to *Appendix N – Coastal Consistency Determination*). The 75-day statutory time limit for commission action ran through March 11, 2020. The USACE formally extended the statutory time limit for commission action to April 21, 2020. The April 21, 2020 date was passed without any commission action, therefore, the consistency determination (CD-0008-19) is presumed to be concurred with.

Cultural Resources

There is the potential for the NED Plan or LPP to encounter cultural resources although it is a developed and, therefore, a highly impacted area. The greatest probability of encountering cultural resources appears to be with the removal of the approximately 0.6-acre upland constriction associated with increasing the span of the Warner Avenue Bridge. The Windward Residential Development is primarily the only other project that could have a significant impact to cultural resources within the study area. Implementation of mitigation measures listed in Section 5.10.3 are expected to reduce potential significant adverse impacts to previously undiscovered cultural resources to less than significant. Consultation with the State Historic Preservation Office under Section 106 of the National Historic Preservation Act was completed February 18, 2020 (refer to *Appendix J – Coordination*).

Tribal Cultural Resources

Similar to cultural resources, the greatest potential for encountering previously undiscovered tribal cultural resources is during the excavation of the approximately 0.6-acre upland constriction located south of Warner Avenue Bridge on the left descending bank of OBB. In addition, tribal cultural resources could be inadvertently discovered during excavation required for the conversion of trapezoidal channels to rectangular channels under the LPP. Implementation of mitigation measures listed in Section 5.10.3 are expected to reduce potential significant adverse impacts to previously undiscovered tribal cultural resources to less than significant. Consultation with the State Historic Preservation Office under Section 106 of the National Historic Preservation Act was completed February 18, 2020 (refer to *Appendix J – Coordination*).

Hazards and Hazardous Materials

The cumulative setting for hazards and hazardous materials is the study area. Implementation of future projects occurring within the same timeframe would result in significant cumulative impacts to public services primarily related to the increase in construction vehicle traffic and/or inaccessibility due to construction activities, which could obstruct public services and increase response times of fire, medical, or police vehicles and personnel. In addition, due to heavy truck and construction equipment movements associated with these future projects there is a greater potential for road hazards to occur, thereby increasing the chance of accidents. The proposed alternatives would contribute to this significant cumulative impact with increased construction vehicle traffic, closures/inaccessibility, and construction equipment movements associated with construction activities.

Implementation of the mitigation measures listed in Section 5.12.3 would reduce both the NED Plan and LPP's contribution to less than significant because a traffic management plan and a public safety management plan would be prepared and implemented by the contractor. Therefore, by incorporating mitigation measures, the NED Plan and LPP would not contribute to significant cumulative impact on hazards and hazardous materials.

Land Use and Planning

The cumulative setting for land use and planning in the study area includes the Cities of Westminster, Huntington Beach, Garden Grove, Fountain Valley, and Santa Ana. Implementation of the NED Plan or LPP would not significantly alter designated land uses or type of land use. Foreseeable projects that are occurring within the study area are also not expected to significantly alter designated land uses or type of land use. Overall, no cumulative effect to land use and planning would occur.

Aesthetics

The cumulative setting for aesthetics would be site specific to those areas in or adjacent to the study area. Implementation of projects within the study area would result in temporary impacts to visual resources related to loss of visual quality during construction; however, these projects are not expected to have a long-term impact to visual quality. Overall, the implementation of the NED Plan or LPP and projects detailed above would not contribute to a significant cumulative impact to aesthetics.

Transportation

The cumulative setting for impacts to transportation is the transportation network in the study area. Projects planned in the study area constructed at the same time as the NED Plan or LPP could contribute to short-term increases in construction-related vehicle trips and disruptions to traffic patterns. While there would be a cumulative effect on freeways and other regional roadways, the roadways are designed to handle increased traffic loads. The NED Plan and LPP would not contribute to significant cumulative impacts on transportation in the vicinity because there is enough distance between the NED Plan or LPP and the other projects that the effects would not combine. In addition, the timing of the NED Plan or LPP and the other projects is uncertain. Therefore, there would be no cumulative impact.

Utilities and Service Systems

The cumulative setting for utilities includes the Cities of Westminster, Huntington Beach, Garden Grove, Fountain Valley, and Santa Ana and areas within the project study area served by utilities in Orange County. Implementation of projects in the list above would result in increased demand on local utilities within the study area. Utilities planning and implementation of capital improvement projects, in concert with the development of these projects, would reduce impacts on service. However, development of these

projects would have potential significant cumulative impacts related to the expansion and service from utilities. Implementation of the NED Plan or LPP would not require the use or expansion of local utilities. Therefore, the NED Plan or LPP would not result in a cumulative impact to utilities and service systems in the study area.

5.21 Unavoidable Significant Environmental Effects

Certain adverse impacts cannot be avoided with the application of mitigation measures. State CEQA Guidelines Section 21100(b)(2)(A) provides that an EIR shall include a detailed statement setting forth "any significant effect on the environment that cannot be avoided if the project is implemented." Section 5.3 through Section 5.16 provide a detailed analysis of all potentially significant direct, indirect, and long-term environmental impacts of the NED Plan or LPP, feasible mitigation measures that could reduce or avoid the project's significant impacts, and whether these mitigation measures would reduce these impacts to less than significant levels. The NED Plan and LPP's significant cumulative impacts are in Section 5.19 If a specific impact cannot be reduced to a less than significant level, it is considered a significant and unavoidable impact. The significant and unavoidable impacts (direct, indirect and/or cumulative) of the NED Plan and LPP are shown in Table 95.

Table 95: Significant and unavoidable environmental impacts of the NED Plan and LPP.

Resource	Effect
Air Quality	Both the NED Plan and LPP may result in potentially significant unavoidable localized impacts. Analysis showed that during construction PM10 emissions from C05 Reach 1 exceeded LST in 2023. This would be a temporary direct adverse impact. Due to the size of the projects, project-specific air quality modeling would best confirm if the LPP would exceed air quality standards or cause localized impacts. This would be conducted during PED. (Refer to Section 5.5.5.4 for the detailed analysis)
Noise and Vibration	Although mitigation measures (MM-NV-1 through MM-NV-5) would be implemented during construction to minimize noise levels, it is unlikely that these mitigation measures would reduce construction noise levels below the exterior noise levels at residential land uses threshold. This would be a temporary direct adverse impact lasting the duration of construction activities. (Refer to Section 5.7.4.1 for the detailed analysis)

5.22 Growth Inducing Impacts

NEPA defines indirect effects as those that include growth-inducing effects or other effects related to induced changes in population density or growth rate (40 C.F.R. § 1508.8). CEQA Guidelines, Section 15126.2(d) requires a discussion of growth-inducing impacts of a proposed action. An action is defined as growth-inducing when it:

1. Fosters economic growth, population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment.
2. Removes obstacles to population growth.
3. Results in further taxes to existing community service facilities.
4. Encourages or facilitates other activities that could significantly affect the environment, either individually or cumulatively.

Growth inducement is generally dependent upon the presence or lack of existing utilities and public services in the area. The provision of new utilities and services can induce growth in an undeveloped area.

Growth inducement can also occur if a proposed action makes it feasible to increase the density of development in surrounding areas. Neither the NED Plan nor the LPP propose to construct housing or extend infrastructure, such as new roads or utilities that would support the future construction of housing. In addition, the area is considered built-out with only approximately 10 acres considered open/vacant land. Therefore, implementation of either the NED Plan or LPP is not expected to induce growth.

5.23 Irreversible and Irretrievable Commitment of Resources

NEPA requires that an EIS include a discussion of the irreversible and irretrievable commitments of resources that may be involved should the project be implemented. Similarly, the State CEQA Guidelines require a discussion of the significant, irreversible environmental changes that would be caused by the project should it be implemented. The irreversible and irretrievable commitments of resources are the permanent loss of resources for future or alternative purposes. Irreversible and irretrievable resources are those than cannot be recovered or recycled or those that are consumed or reduced to unrecoverable forms. Project implementation would result in the irreversible and irretrievable commitments of energy and material resources during project construction and maintenance, including the following:

1. Construction materials, including such resources as soil and rocks;
2. Land area committed to expanded project facilities;
3. Energy expended in the form of electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles that would be needed to project construction, O&M; and
4. Water used for dust abatement.

The use of these nonrenewable resources are expected to account for only a small portion of the region's resources and would not affect the availability of these resources for other needs within the region. Construction activities would not result in the inefficient use of energy or natural resources. As described throughout this Draft IFR, without implementation of the NED Plan or LPP, the risk of overtopping the drainage channels within the Westminster watershed would remain high. While a precise quantification of environmental impacts associated with overtopping of the channels is not possible, there is a potential for a variety of significant environmental impacts. Overtopping of the channels and the resulting emergency and reconstruction efforts could expend more energy, overall, than construction of either the NED Plan or LPP. A large volume of downed vegetation and other debris would result from a significant flood event, all of which would likely have to be disposed of in a landfill. After debris removal is complete, re-building would occur and new materials would be required to construct homes, businesses, roads, and other impacted urban infrastructure. Thus, implementation of the NED Plan or LPP preempts potentially substantial future consumption and is likely to result in long-term energy and materials conservation.

5.24 Local Short-term Uses of the Environment and Long-Term Productivity

NEPA requires that an EIS include a discussion of the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity. Within the context of this Draft IFR, "short-term" refers to the construction period, while "long-term" refers to the operational life of the project and beyond. Short-term (construction-related) impacts caused by the project would be similar for the NED Plan and the LPP. These impacts would occur during and immediately after construction and would generally result in adverse effects. However, the long-term impacts that would occur over the life of the project would result in overall beneficial effects. Temporarily adversely affected resources include earth resources, water resources, air quality, noise and vibration, biological resources, cultural resources, tribal cultural resources, hazards and hazardous materials, land use and planning,

aesthetics, transportation and, utilities and service systems. However, most of these impacts would be temporary, lasting only the duration of construction activities.

Mitigation measures would be implemented to lessen the severity of construction impacts as much as reasonably feasible. Some impacts to biological resources and transportation, for example, would be compensated for with temporary measures until the completion of construction activities.

Project implementation would also result in long-term effects, including direct impacts to 0.15 acre of wetlands (adjacent to Warner Avenue Bridge) and indirect impacts to 1.7 acres of eelgrass (adjacent to C02 Reach 23 in Huntington Harbour). This would result in an indirect impact to wildlife species that may utilize the habitat being removed.

Implementation of the NED Plan or LPP would contribute to long-term productivity of the environment by addressing the continued periodic flooding of local area residences and businesses. If the No Action Plan is implemented, this would mean continued periodic flooding, putting people's lives and property at risk.

6.0 Public Involvement, Review and Coordination*

This chapter summarizes public and agency involvement undertaken by USACE and OCPW that were conducted to date, are ongoing, and/or will be conducted for this project and that satisfy NEPA and CEQA requirements for public scoping and agency consultation and coordination. Additionally, consultation with Native American Tribes is described.

6.1 Public Involvement under NEPA and CEQA

This section describes key elements of the public involvement process for this feasibility study. This report was prepared as an integrated document which combines the Feasibility Report and EIS/EIR into a single document.

6.1.1 Notice of Intent, Notice of Preparation, Scoping Meeting, and Scoping Letters

A NOI for preparation of a joint Draft EIS/EIR was published in the Federal Register on January 13, 2006 (Vol. 71, No. 9, p.2193) (see *Appendix J – Coordination*).

The USACE on November 30, 2017, submitted an updated scoping letter (see *Appendix J – Coordination*) to the California State Clearinghouse and Planning Unit (SCH) in the Governor's Office of Planning and Research for distribution to state and local agencies. In response, on December 12, 2017, the SCH distributed a Request for Advance Notification to California State public agencies (see *Appendix J – Coordination*) soliciting comments on the project.

A NOP of a Draft IFR, Draft EIS/EIR was submitted to the SCH for distribution to State Trustee Agencies, state agencies, and Responsible agencies October 19, 2018. The NOP was also distributed directly to local Responsible agencies. The release of the NOP also coincided with the release of the Draft EIS.

USACE is the lead agency for the FR and EIS and for NEPA compliance. The OCPW is the local sponsor and lead agency for the EIR and for CEQA compliance.

A public scoping meeting was held at the Garden Grove Civic Center on Wednesday, January 25, 2006. A summary of comments received during the public meeting covered the following broad requests and recommendations:

- Evaluate the water quality within the channels.
- Evaluate use of holding ponds, diversions, and wetlands to improve water quality.
- Evaluate levee modifications and detention basins to reduce flood impacts to restored areas within the BCER.
- Evaluate flooding along the Bellgrave Channel.
- Take a balanced approach to flood control by incorporating ecosystem restoration, recreational activities, and modifications to water quality.
- Retain soft-bottom habitat in channels and assess the possibility of acquiring open space adjacent to channels.

Measures for FRM were evaluated as part of this study. Plan formulation and measure screening are described in Chapter 3.0. Water quality of the C05/C06 channel was evaluated and the report is in *Appendix L – Environmental Considerations*. The purpose of this study is FRM, therefore, measures focused solely on ecosystem restoration were eliminated early in the study; however, opportunities to

incorporate environmentally beneficial measures into FRM alternatives were more fully considered. The Bellgrave Channel is outside the scope of this study.

Due to the study being put on hold for an extended period of time, scoping letters were distributed in November 30, 2017 in order to reengage federal, state, local, and other stakeholders about the proposed project. Additionally, Native American tribes were also sent scoping letters (see Section 6.3). Refer to *Appendix J – Coordination* for the scoping letter distribution list. Responses to scoping letters were received from the Santa Ana RWQCB Board, CDFW, Native American Heritage Commission, California State Lands Commission, San Manuel Band of Mission Indians, Jamul Indian Village of the Kumeyaay Nation, Augustine Band of Cahuilla Indians, Pala Band of Mission Indians, and Twenty-Nine Palms Band of Mission Indians. Refer to *Appendix J – Coordination* for response received during scoping.

6.1.2 Public Review

A Notice of Availability for the draft report was published in the Federal Register on October 20, 2018, and circulated for a 45-day public review period to federal, state and local agencies, organizations and individuals who have an interest in the project. In addition, over 8,000 postcards notifying the availability of the Notice of Preparation and environmental document were sent to residents located within 500 feet of the project footprint. During the review period, two public meetings were held to provide additional opportunities to discuss and comment on the draft report. The public meetings were held on November 7 & 8, 2018 in Westminster, CA and Huntington Beach, CA, respectively. All comments received during the public review period were considered and incorporated into the final report and *Appendix J - Coordination*, as appropriate.

An additional 45-day public review period under CEQA was held from December 24, 2019 to February 07, 2020. Prior to the review period commencing, over 8,000 postcards notifying the availability of the EIR were sent to residents located within 500 feet of the project footprint.

Lastly, a Notice of Availability of the final report for a 30-day State, agency, and public review period will be published in the Federal Register by the USEPA in April 2020. All comments received during this period will be considered prior to USACE making a final decision on the Recommended Plan and in preparing the Record of Decision (ROD).

6.2 Coordination with Other Federal, State, Regional, and Local Agencies

Chapter 7.0 describes how the project complies with applicable federal, State, and local laws, regulations, and other requirements and discusses required consultations and coordination. The following briefly summarizes the consultation and coordination efforts.

Beyond formal public scoping, USACE and OCPW communicated with federal, State, and local agencies in the course of project planning, alternative development, and preparation of this report. The environmental stakeholders included California Coastal Commission, State Lands Commission, CDFW, State Water Board, Bolsa Chica Steering Committee, USFWS, NOAA, NMFS, and USEPA. These communications included in-person meetings, telephone conversations, and written correspondence in 2018 and 2019. Regular monthly coordination calls were conducted with USFWS and NMFS since July 2019. The communications addressed consistency with other planning studies and projects in the region, pursuit of agency approvals, information to be considered in the document, and opportunities for partnership.

USACE coordinated and informally consulted with USFWS during the study to help analyze potential effects to biological resources, including threatened and endangered species. In their Final CAR (Sobiech

2020), USFWS provided the recommendations shown in Section 6.2.1. USACE's response to each recommendation is also provided.

USACE also coordinated and formally consulted with the NMFS during the study to help analyze potential effects to green sea turtle, eelgrass, and essential fish habitat. NMFS prepared a Biological Opinion with regard to the project and green sea turtle. Refer to *Appendix K – Coordination* for the Biological Opinion. As part of the Biological Opinion, NMFS also provided recommendations under the Fish and Wildlife Coordination Act. These recommendations are provided in Section 6.2.2. USACE's response to each recommendation is also provided.

6.2.1 U.S. Fish and Wildlife Service Recommendations

A PAL, dated July 24, 2018, was prepared by the USFWS (Avery 2018). The PAL describes existing environmental resources within the project area and potential effects of the project on these resources. Recommendations developed by the USFWS in the PAL were considered in plan formulation and mitigation development.

A Draft Coordination Act Report (CAR), dated July 31, 2019, was prepared by the USFWS (Sobiech 2019). The Draft CAR describes existing environmental resources within the project area and potential effects of the NED Plan and LPP on these resources. Recommendations developed by the USFWS in the Draft CAR were considered in plan formulation and mitigation development. The USFWS finalized the Draft CAR into a Final CAR that was provided to the USACE on March 20, 2020. Recommendations in the Final CAR were considered by the USACE and incorporated into the Final Report where applicable. The following is a summary of the recommendations provided by the USFWS for the recommended project in the Final CAR. For the entire Draft and Final CAR refer to *Appendix K – USFWS Coordination Act Report*.

<u>USFWS Recommendation 1</u>: The USFWS suggests removing the westernmost 3,000 feet of the northern levee at the end (lower reach) of Channel C05. This subject portion of Channel C05 is within the BCER, and this levee does not provide flood risk management protection to significant structures or resources. The USFWS suggests that about 40 percent of this levee section (i.e., 1,200 feet linear length of levee) should generally be completely removed down to the adjacent Channel C05 bottom depth. About 50 percent of the subject levee section linear length (i.e., 1,500 feet of levee) should be removed so as to provide variable shallow water areas (i.e., aquatic habitats) ranging roughly from +4 to -2 feet deep MLLW; the remaining 10 percent of the subject levee length (i.e., 300 feet of levee) should be retained (with the existing surface gravel removed) above MHHW as a series of small "islands" surrounded by shallow sloped water areas. Removal of this 3,000-foot levee section would improve hydrological and ecological conditions and connectivity for both the adjacent muted tidal pocket and Channel C05 within the BCER (which would then become one water body), and likely reduce most flood flow velocities within this lower section of Channel C05 in any given storm event through an effectively widened lower reach of Channel C05. Rerouting of recreational foot-traffic currently utilizing the road/path along the north levee would likely be required.

<u>Response 1</u>: The Corps will further evaluate this recommendation during the preconstruction engineering and design phase (PED). As part of the Conceptual Mitigation Strategy (*Appendix M*) the Corps has proposed breaching the levee between Channel C05 and the muted tidal pocket (in the BCER), but via a hydraulic stoplog structure. The hydraulic stoplog structure allows for more control over the amount of water flowing into the muted tidal pocket from Channel C05 and allows for continued use of the levee by recreational users. The USFWS proposal is recommending complete removal of the levee with no control over the amount of flow from Channel C05 into the muted tidal pocket. In addition, a recreational trail

would no longer be available to the public. During PED, the Corps would work with the Bolsa Chica Ecological Reserve landowner to determine if the USFWS recommendation is more preferable and environmentally beneficial over the hydraulic stoplog structure that is currently proposed as part of compensatory mitigation. If so, then the USFWS recommendation may be pursued as compensatory mitigation; however, additional analysis and public review would need to occur to confirm that it is more beneficial as well as to comply with CEQA and NEPA.

USFWS Recommendation 2: Recommend that the proposed sheet pile to be driven into the lower (westernmost) portions of the Channel C05 north and south levees be removed from the Project design. This portion of Channel C05 is within the BCER and these levees provide minimal flood risk management protection to significant structures or resources. This recommendation applies to the westernmost 4,800 feet of the southern levee, and the westernmost 4,650 feet of the northern levee. Eliminating the insertion of new sheet pile within levees within BCER from the proposed Project maintains future options for essential hydrological restoration at BCER, including potential removal of the western portion of the south levee from Channel C05 (the portion within BCER) to reconnect the BCER full tidal basin to Outer Bolsa Bay, as it existed before these waters were artificially disconnected with a levee circa 1899 (as noted above). Driving sheet pile in these levees would be a major investment and would be costly and difficult to remove in the future as part of potential future BCER hydrological restoration projects. Eliminating the proposed sheet pile from this portion of the Project would also substantially reduce Project costs (estimated at $50 million by USACE staff).

Response 2: The Corps will further evaluate this recommendation during the preconstruction engineering and design phase (PED) when a value engineering (VE) study would be conducted per Corps policy to evaluate high dollar project components, of which fortifying the lower reach of Channel C05 with dual sheet pile is a high dollar project component. Value engineering is an organized effort directed at analyzing proposed building features, systems, equipment, and material for the purpose of achieving essential functions at the lowest life cycle cost consistent with required performance, quality, reliability, and safety. Within the Final Report, the USACE has included the evaluation of this recommendation during the PED phase, and specifically during the value engineering study, in Section 8.10.6, Further Studies.

USFWS Recommendation 3: Suggest that a design alternative be analyzed/developed that would provide (through levee removal or modification) for moving storm-flood flows, or both low and storm-flood flows, from Channel C05 within the BCER to the ocean through the full tidal basin. It is expected that known contaminant sites within the BCER (where/when these sites would remain even with Project implementation) would likely need additional armoring for protection from flood risks as a result. Potential mobilization of contaminants (reportedly buried within some existing levees within the BCER) should be fully minimized as part of construction and operations. It is expected that moving storm flows partially through the full tidal basin would eliminate or reduce the need for widening of the Warner Avenue Bridge, as currently proposed. While routing low/storm flows through the full tidal basin would likely introduce some modern contaminants from the Westminster watershed into the basin (with concomitant ecological consequences), funding for ongoing dredging of the ocean mouth of the full tidal basin is currently short. A consequence of routing low/storm flows through the basin could be additional flushing of sand from the mouth of the full tidal basin, and funding from the Project may be available to ensure that the basin mouth is maintained with the appropriate capacity (via dredging on regular basis) to provide for passage of Project design storm flows. Future evaluations should include consideration of the cost versus benefit of a combination of the elimination of the Warner Avenue Bridge widening component combined with periodic dredging of the mouth of the full tidal basin to maintain flow capacity.

Response 3: During formulation of measures a new ocean outlet was considered. However, this measure was screened from further analysis. A new tidal inlet was created within the BCER in 2006 to allow connectivity between the ocean and the restored full tidal basin. The tidal inlet requires annual dredging to remove sand from the inlet. Without the annual maintenance of the tidal inlet, the full tidal basin would become closed off from the ocean, causing degradation of water quality, impacts to biota in the basin, damage to intertidal plan communities, and loss of an important food source for nesting birds. During consideration of a new ocean outlet as part of the proposed FRM project there was concern that annual maintenance to maintain the connection of the new outlet to the ocean would be required, similar to what is currently required for the tidal inlet that was created in 2006. Additionally, the CDFW expressed concern in their scoping letter about a new ocean outlet and its potential impacts Rabbit Island and Bolsa Chica Basin in their scoping response letter (Sevrens 2018).

Response 3: The USACE does not accept this recommendation since initially when the project was commenced, overflowing into the full tidal basin of the BCER was included as a constraint. The constraint was due to the quality of the water in the channels and the potential impact that water would have to biological resources within the full tidal basin if it were allowed to overflow. Furthermore, when scoping letters were sent out in 2017 to notify stakeholders that the project was being reinitiated, the CDFW noted in their scoping response (letter dated January 12, 2018) that they were specifically concerned about activities that would breach the East Garden Grove-Wintersburg (EGGW) (i.e., Channel C05 Reach 1) levee since breaching the levee would result in an influx of freshwater flow and introduce contaminants directly into the system. The California State Lands Commission also provided a scoping response (letter dated January 12, 2018) that noted concern about any project alternatives that could increase the potential for overtopping of the existing flood control levees with spillover occurring in the west end of the full tidal basin area of the Bolsa Chica Restoration Project. The concern was due to a portion of the core of the Bolsa Chica Restoration Project levees surrounding the full tidal basin and a large overlook containing contaminated soil covered by one meter of clean compacted fill. Should the clean fill be washed away by spillover flooding, the underlying contaminated soil may become exposed to the flood waters and result in deposition of sediment into the west end of the full tidal basin with negative effects for habitat. The USFWS also originally expressed concern about potential contaminants in project levees and potential mobilization of these contaminants into the Bolsa Chica Restoration Project in a mini-Planning Aid Letter (PAL) that was provided to the Corps via email dated April 8, 2019 (*Appendix K – USFWS CAR*).

Although CDFW, California SLC, and USFWS initially were concerned about overflowing into the full tidal basin, in late 2019 this sentiment changed. Therefore, the USACE performed a high level analysis of the proposed full tidal basin overflow alternative. The results of this analysis were provided to CDFW, California SLC, and USFWS via a white paper (refer to *Appendix L – Environmental Considerations*). The white paper concluded that overflowing into the full tidal basin has a greater potential for environmental impacts, is not significantly more cost effective, and has hazardous, toxic, and radioactive waste (HTRW) policy issues. In addition, the analysis concluded that conveying flood flows from Channel C05 to the full tidal basin would not require regular dredging of the full tidal basin's ocean outlet for flood risk management purposes.

Although it has been suggested by the USFWS that overflowing into the full tidal basin would be less environmentally damaging than the Corps' Recommended Plan, no analysis has been provided to validate this suggestion. Without additional analysis on potential impacts, the USACE remains concerned that the full tidal basin overflow alternative may be just as, if not more, environmentally damaging than the Corps' Recommended Plan. Specifically, with regard to potential biological resource impacts, the USACE is concerned about (1) eelgrass, (2) Rabbit Island, and (3) State Marine Conservation Areas

(SMCAs). With regard to eelgrass, it is the understanding of the USACE that the full tidal basin within the BCER contains approximately 140 acres of eelgrass. The USACE's Recommended Plan is anticipated to only have a potential indirect impact to approximately 1.7 acres of eelgrass located at the downstream end of Channel C02 Reach 23. If the suggested alternative were pursued, the project would still have a potential indirect impact to approximately 1.7 acres of eelgrass at the downstream end of Channel C02 Reach 23 as well as a potential direct/indirect impact to an unknown acreage of eelgrass in the full tidal basin. Although the above discussion focuses on eelgrass, there could be direct/indirect impacts to other wetland habitats (e.g., mudflat, saltmarsh, etc.) within the full tidal basin through implementation of the suggested alternative. All of this could require more mitigation, and increased cost, than is required for implementation of the Recommended Plan.

With regard to Rabbit Island, this sensitive area is located within the full tidal basin of the BCER. The California Department of Fish and Wildlife (CDFW) noted in their scoping response letter (letter dated January 12, 2018, *Appendix J – Coordination*), that sensitive plants and plant communities exist on Rabbit Island, including but not limited to coast woolly-heads, red sand verbena, salt marsh bird's-beak, and southern dune scrub. The island also provides nesting habitat for the federally-listed light-footed Ridgway's rail and the state-listed Belding's savannah sparrow. The suggested alternative by the USFWS would include the overflow of water from Channel C05 into the full tidal basin, where Rabbit Island is located, via a spillover weir or lowering levee constructed along Channel C05's south levee. Depending on where the levee would be constructed and the length of the levee, construction activities could have a direct impact to Rabbit Island through the excavation of material for construction of the spillover weir or lowering levee. Long-term operation of the spillover weir or lowering levee could have an indirect impact to Rabbit Island by potentially causing erosion of the habitat where sensitive species are located and/or nest. The CDFW also expressed concern in their scoping letter (letter dated January 12, 2018) about breaching the Channel C05 levee. While the concern was expressed with regard to breaching the levee at the muted tidal pocket, it seems that these same concerns would be relevant to breaching the levee at the full tidal basin. The letter states that breaching the Channel C05 levee would result "in an influx of freshwater flow and introduce contaminants directly into the system". Furthermore, the letter expresses that breaching of the levee would result in a loss of current function and could impact native vegetation.

With regard to SMCAs, the CDFW expressed in all of their comment response letters concern about potential impacts to CDFW managed SMCAs. The full tidal basin is part of the Bolsa Chica SMCA (No Take). In their most recent letter dated February 5, 2020, the CDFW states that "Any significant loss or degradation of marine habitat within […] the Bolsa Chica Basin SMCA […] would be a significant impact". Therefore, it is possible that the implementation of the suggested alternative by USFWS with the overflow into the full tidal basin (that is part of the Bolsa Chica Basin SMCA [No Take]) may have direct/indirect impacts to marine habitat within the Bolsa Chica Basin SMCA (No Take) that would require additional mitigation beyond what is currently required for the Recommended Plan.

<u>USFWS Recommendation 4</u>: Recommend that the USACE remove the existing levee between Inner Bolsa Bay and Outer Bolsa Bay. This 220-foot-long levee is located at the western terminus of the south levee of Channel C05. The subject levee likely does not provide flood risk management to any structures or resources; its current function appears to solely be to support a dirt access road/path within the estuary of the BCER, between Pacific Coast Highway and the south levee of Channel C05. If a crossing is essential at this location (note that other maintenance and emergency vehicle access points to the south levee are available within one mile to the east), then the access road that currently tops this levee should be replaced with a pedestrian or vehicle bridge (as necessary per Orange County Public Works access) with a hydrological opening/deck length that provides for restoration of full tidal flow and faunal connectivity between Inner and Outer Bolsa Bay under the new bridge.

Response 4: The USACE does not accept this recommendation since it is outside the Corps' specified mission for this study. The Westminster, East Garden Grove Flood Risk Management Study is a general investigation feasibility study addressing flood risk management and is not an ecosystem restoration study. A description of the USACE's Flood Risk Management business line is the reduction of risk to human safety and property damage in the event of floods and coastal storms. The removal of the culverts between Inner Bolsa Bay and Outer Bolsa Bay was not identified during plan formulation as a measure that would reduce risk to human safety and property damage in the event of flooding within the Westminster watershed.

USFWS Recommendation 5: The proposed Project includes compensatory mitigation activities, including the addition of fill and sand nesting substrate to least tern nesting islands within BCER to improve their long-term viability considering predicted sea level rise. We have recently learned that similar enhancement measures at these same nesting locations may already be planned and funded by other parties. If this is so, then we recommend that this project measure be substituted/converted to predator management (e.g., ongoing control of California least tern nest predators) at these same nesting areas in BCER. Predator management at these nest areas is important and appropriate, and reportedly not currently funded/accomplished.

Response 5: The USACE does not accept this recommendation since it was provided at such a late stage in the feasibility study schedule. Improving resiliency to future sea level rise of the two tern islands located in the BCER was initially suggested as a potential mitigation measure that USACE should consider by the CDFW and California SLC during an environmental stakeholder meeting held August 23, 2018. The Corps did consider this proposed mitigation measure and decided to include it in conceptual mitigation plans that were presented during public meetings (November 2018) and that were presented in the Draft Report that was released for a 45-day public review in October 2018 to meet NEPA policy and guidelines. The Draft Report was released for a second 45-day public review in December 2019 to meet CEQA policy and guidelines. During this second 45-day CEQA public review period is when the Corps was first notified via a letter from the CDFW (letter dated February 5, 2020) that enhancing the tern islands was no longer a viable mitigation measure as a grant was being pursued to analyze repairs and fortify the two tern islands to improve sea level resiliency.

Since the status of the grant and what it includes is unclear to the Corps at this time, the Corps has decided to keep the tern island measure as part of the projects compensatory mitigation plan. Pending authorization of the project, appropriation of funds, and completion of the PED phase; if the tern islands have been completed when construction of the proposed mitigation measures would commence, an alternative mitigation proposal similar to the originally proposed mitigation measure will be implemented to offset potential temporary indirect impacts to California least tern foraging habitat. The mitigation strategy in the Final Report (Appendix M) has been updated to reflect this.

USFWS Recommendation 6: Mobilized trash and contaminants in urban and storm run-off remains a challenge in the Project area, per its effects on biota and regional water quality. Trash and contaminants from the Project watershed should be minimized before entry in the Project channel systems through a variety of best management practices and programs, including community outreach and education (e.g., alternatives and appropriate use of fertilizers and chemicals in watershed landscaping), trash racks and signage at storm drains, small-scale and onsite sedimentation/infiltration basins, etc. Trash that makes its way into Project channels should be collected and removed from within Project lower channel reaches with the use of a series of high-function practicable measures, such as trash "wheels," booms, and other effective methods. The USACE and Orange County Public Works should work with upstream cities and state and federal regulatory agencies to address impacts from urban and storm water runoff in the

watershed. The USACE and Orange County Public Works should seek out infrastructure improvements, grant funding, regional partnerships, and technology to improve water quality in the Project region. Fugitive trash transported within Channel C05 should be captured and removed upstream of BCER, to the extent practicable.

Response 6: The USACE does not accept this recommendation since it is outside Corps' authority. While best management practices and programs at the community level may be effective in reducing trash entering the channels from the watershed, it is outside the Corps' authority to implement these practices. It is also outside of the Corps' authority to implement measures strictly for water quality improvement.

Although the recommendation is not being adopted, it is important to note that the design of the recommended project does include trash collection systems within the channels to minimize trash entering downstream sensitive areas such as the BCER. During the preconstruction engineering and design (PED) phase, additional detail on the trash collection systems within the channels will be developed. In addition, Orange County Public Works (OCPW) has several programs already in place that are aimed at reducing trash within the channels through community outreach. These programs include adopt a channel, coastal and inner coastal cleanup day, and various earth day cleanup events. Refer to *https://www.ocwatersheds.com/programs/waterways/stormwater/clean_up_day* for more information on these already existing programs.

USFWS Recommendation 7: Much of the project would convert Project area channels from trapezoidal channels to rectangular channels with vertical walls. As noted above, these vertical walls (concrete and sheet pile bulkheads) would provide very limited opportunities for aquatic or riparian habitat establishment (outside of relatively deep water habitats). Nearshore fish habitats can be rehabilitated to varying degrees within the constraints of flood risk management human use; interest in experimental designs for shoreline features that promote ecological functions is increasing. Detrimental effects of armouring generally fall into categories of connectivity and accessibility, prey availability, predation risk and reproduction. These habitat attributes may be improved by artificial shoreline features that add complexity to the substrate/bulkhead, replicate or restore low-gradient beaches, and/or add vegetation (or functional substitutes). Some agencies have been developing, testing, and implementing artificial technologies to create habitats on bulkheads for fish while maintaining the flood risk management functions for such channels. These potential designs include "habitat skirts" that create shallow-water shelves or benches along wall margins, rock pools in seawalls, and adding texture and relief to seawalls. We suggest the Corps evaluate the altered system dynamics of the Project channels as proposed, and use the principles of biomimicry to develop replicable and durable solutions for creating functional substitute habitats for (at least) larval and juvenile native fish along the Project sheet pile and concrete bulkheads. Desired ecological functions for fish (e.g., shelter, cover, and nourishment) should be minimal essential parts of enhancement designs, along with flood flow conveyance and maintenance issues.

Response 7: The USACE accepts this recommendation to evaluate the addition of habitat features and/or modified sheet pile designs for sheet pile installed adjacent to the BCER. The USACE has added the following language to both Section 8.10.6 of the main report and Appendix M – Conceptual Mitigation Strategy: "*During the preconstruction engineering and design (PED) phase, additional analysis would be conducted that would evaluate various features with the potential to improve fish habitat within the channels, specifically Channel C05 Reach 1 which runs through the BCER. Additional Hydraulic and Hydrological analysis would have to ensure habitat features for fish can be placed in the channel without impacting flow and conveyance capacity. The fish habitat features could include but are not limited to features such as toe stone piles, textured sheet pile, residual rock shelf or other in-channel structures. If implemented, monitoring of the fish habitat features would occur to ensure the habitat is achieving*

identified success criteria. If the fish habitat is not meeting the identified success criteria, adaptive management measures, such as adding in additional substrate, would be undertaken."

USFWS Recommendation 8: The USACE should implement a construction schedule for the Project that avoids the least tern, snowy plover, Belding's savannah sparrow, black skimmer, and Ridgway's rail breeding seasons, if feasible, for any Project activities that are planned within or adjacent to potential breeding, foraging, and loafing areas for any of these species within or near the BCER. The USACE should provide a qualified biologist per these species, acceptable to the Service and California Department of Fish and Wildlife, and approved by the USACE, to help monitor and manage Project activities that would occur during the breeding seasons in or near potential breeding areas of these species or in or near the BCER or Seal Beach National Wildlife Refuge, as appropriate. This monitoring/management program should be carried out during Project activities in potential sensitive species' breeding areas, including regular coordination with the Service and CDFW. Up-to-date surveys should be performed where needed as appropriate. If the areas associated with Project activities have substantial potential of supporting/affecting sensitive species, the USACE should provide an education program for construction crews, including identification of the potential sensitive species, restricted areas and activities, and actions to be taken if sensitive species are found within and near Project activity areas. Similarly, Project construction activities should be timed/located/monitored to avoid green sea turtle activity periods and areas, as practicable.

Response 8: The USACE accepts this recommendation and has included avoidance of avian breeding seasons in areas where these sensitive resources are located as a mitigation measure for biological resources. Construction activities along portions of Channel C02 Reach 23 that is adjacent to SBNWR, Channel C05 Reach 1 that is adjacent to BCER, and Warner Avenue Bridge will only occur between October 1 and February 28, outside of bird nesting season. This mitigation measure is included in the Final Report as MM-BIO-2 in Section 5.8.3. With regard to the green sea turtle, the NMFS has provided a biological opinion with conditions that the USACE will meet in order to avoid and minimize potential impacts to this species.

USFWS Recommendation 9: If least tern, snowy plover, Ridgway's rail, Belding's savannah sparrow, black skimmer, and/or other sensitive wildlife species breeding activity or active nests are found within or directly adjacent to the Project's direct footprint during construction (despite the scheduling of Project activities in the BCER outside their breeding seasons), then all work in the immediate area should be halted, and the USACE biologist should be notified immediately. An appropriate buffer zone around any active nest for exclusion of Project-related activity effects should be specified by the biologist, in coordination with the Service and CDFW.

Response 9: The USACE accepts this recommendation and has included this as a mitigation measure for biological resources. Prior to construction activities, a biologist that meets the Service standard qualifications will conduct a biological resource sweep of the work area. In the event that sensitive (protected) wildlife species are present, the biologist will determine if the activity would cause adverse impacts that have not been previously considered and evaluated. If it is determined that the activity could have the potential to adversely affect wildlife species in a manner not authorized by Federal or State permits, the activity will cease until the species is no longer in harm's way or is relocated outside of the construction activity impact area. This mitigation measure is included in the Final Report as MM-BIO-3 in Section 5.8.3.

6.2.2 National Marine Fisheries Service

On March 27, 2020, the USACE received the NMFS's Endangered Species Act Section 7(a)(2) Biological Opinion (see *Appendix J – Coordination* for the Biological Opinion), Magnuson-Stevens Fishery Conservation and Managmenet Act EFH Response, and Fish and Wildlife Coordination Act Recommendations, for the Westminster-East Garden Grove Flood Risk Management Study (No. WCRO-2018-01360). A response letter from the USACE was electronically sent to NMFS on April 7, 2020 (*Appendix J – Coordination*). The letter provided USACE's response to the EFH conservation recommendations contained in the Biological Opinion, and was provided within 30 days of receipt of the EFH recommendations as in accordance with 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act. The letter also included USACE's responses to recommendations provided by NMFS under the Fish and Wildlife Coordination Act. The responses to the recommendations that were provided by NMFS are included below as well as in *Appendix J – Coordination*.

To address potential impact to threatened and endangered species, the USACE will implement the reasonable and prudent measures, and their associated terms and conditions, set forth in the Biological Opinion issued by the NMFS on March 27, 2020 (*Appendix J – Coordination*).

<u>NMFS EFH Conservation Recommendation 1</u>: In order to offset adverse impacts to eelgrass habitat, the USACe should implement their proposed conceptual mitigation plan, which includes eelgrass establishment within Outer Bolsa Bay and out-of-kind kelp and rocky reef restoration and enhancement offshore the Palos Verdes peninsula, after revising the functional assessment, and finalizing the mitigation site selection and rocky reef mitigation approach, in collaboration with NMFS, USFWS, CDFW, and other interested regulatory agencies.

<u>USACE Response to Recommendation 1</u>: The USACE accepts EFH Conservation Recommendation 1. The USACE's conceptual mitigation strategy is available in Appendix M to the Final Report. As noted in the Final Report Seciton 8.10.6, Further Studies, the engineering work completed for the report was conceptual or feasibility level, therefore, significant uncertainties remain in the plans as currently outlined in the report. Due to this uncertainty several additional studies would be conduced during the next phase of the project, the PED phase to minimize these uncertaintiese. If any of the additional studies conducted show that the potential impacts projected by the USACE would be more significant, then the USACE would work with NMFS, USFWS, CDFW, and other interested agencies to ensure a mitigation strategy that sufficiently offsets project impacts. Actual mitigation requirements would be determined based on pre- and post-construction surveys to delineate the actual impacts resulting from the project.

<u>NMFS EFH Conservation Recommendation 2</u>: Prior to construction, the USACE should conduct an updated eelgrass survey in the downstream portion of C02 and its confluence with Huntington Harbour, and in Huntington Harbour near the Warner Avenue Bridge, in accordance with the California Eelgrass Mitigation Policy (CEMP). The updated eelgrass survey should be used to determine whether eelgrass distribution and abundance has increased beyond the area assumed to be adversely affected by the project. If survey results indicate an increase in eelgrass habitat that may be affected by the project, then the USACE should adjust their compensatory mitigation approach accordingly.

<u>USACE Response to Recommendation 2</u>: The USACE accepts EFH Conservation Recommendation 2. As noted in *Appendix M – Conceptual Mitigation Strategy*, the USACE took a conservative approach in estimating the potential indirect impact to eelgrass due to implementation of the Recommended Plan. The USACE used a 2013 survey where a larger amount of eelgrass was mapped to estimate potential indirect impacts. In addition, specifically for the Westminster East Garden Grove Flood Risk Management Study, the USACE included a 5 meter buffer around potentially impacted eelgrass areas to account for

fluctuating eelgrass distribution and functional influence around the eelgrass cover. The USACE does not typically include a 5 meter buffer when estimating potential impacts to eelgrass, but did exclusively for this project to calculate a conservative estimate for possible eelgrass impacts. Regardless of the conservative approach that was taken to estimate potential indirect impacts, as noted in the Final Report *Section 8.10.6, Further Studies*, a preconstruction eelgrass survey would be conducted 60 days prior to project construction commencing, in accordance with the CEMP, to confirm the amount of eelgrass habitat that may be adversely affected due to implementation of the Recommended Plan.

NMFS EFH Consservation Recommendation 3: Prior to construction, the USACE should survey Outer Bolsa Bay to delineate shallow subtidal, mudflat, and tidal salt marsh habitat areas. This survey should serve as a baseline for assessing direct impacts associated with excavation activities and indirect impacts due to altered hydrology in Outer Bolsa Bay. In addition, the USACE should develop a monitoring plan capable of detecting habitat loss and/or conversion associated with the project. If post-construction monitoring indicates impacts have exceeded current assumptions, then the USACE should adjust their compensatory mitigation approach accordingly.

USACE Response to Recommendation 3: The USACE accepts EFH Conservation Recommendation 3. As noted in the Final Report *Section 8.10.6, Further Studies*, preconstruction surveys of existing natural communities in Outer Bolsa Bay, Inner Bolsa Bay, and the BCER muted tidal pocket would occur during the PED phase. Also during the PED phase, tidal modeling and field data collection in Outer Bolsa Bay, Inner Bolsa Bay, and the BCER muted tidal pocket would occur. These surveys would establish a baseline for which future monitoring of the area post-project would be compared to. If there are any adverse impacts to the existing habitat areas, shown through post-project monitoring, that were not anticipated by the USACE, then the USACE would work with NMFS, FWS, CDFW, and other interested agencies to ensure a mitigation strategy that sufficiently offsets project impacts.

NMFS EFH Conservation Recommendation 4: During the PED period, the USACE should conduct a hydrodynamic and sediment transport study to evaluate the potential effects of increased flow velocities on intertidal and shallow subtidal habitats in outer Bolsa Bay. The USACE should provide NMFS a report summarizing the analysis, results, and conclusions, prior to finalizing the habitat monitoring plan discussed above. If the study indicates that additional habitat loss and/or conversion may occur beyond what is currently anticipated, then the USACE should adjust their compensatory mitigation approach accordingly.

USACE Response to Recommendation 4: The USACE accepts EFH Conservation Recommendation 4. As noted in the Final Report *Section 8.10.6, Further Studies*, additional hydraulic analysis and a sediment transport study would occur during the PED phase of the project. If the results of the additional hydraulic analysis and sediment transport study indicate additional habitat loss and/or conversion may occur beyond what was anticipated by the USACE, then the USACE would work with NMFS, FWS, CDFW, and other interested agencies to ensure a mitigation strategy that sufficiently offsets project impacts.

NMFS EFH Conservation Recommendation 5: During the PED period, the USACE should develop a revised functional assessment for evaluating the impacts associated with channel habitat degradation, wetland loss/conversion, and the proposed enhancements at the Muted Tidal Pocket. The functional assessment should be developed in collaboration with NMFS, FWS, and other interested agencies. The revised assessment approach would help ensure functional losses are adequately addressed in the final compensatory mitigation design.

USACE Response to Conservation Recommendation 5: The USACE partially accepts EFH Conservation Recommendation 5. The USACE does not see the need to develop a revised functional assessment for

evaluating the impacts associated with channel habitat degradation, wetland loss/conversion, and the proposed enhancements at the BCER muted tidal pocket. Instead, the USACE proposes to use the California Rapid Assessment Method (CRAM) during the PED phase to establish a baseline value for the above habitat types in the project area. CRAM would also be used post-project to assess any loss in function to the above habitat types as well as anticipated increases in function at the BCER muted tidal pocket. The U.S. Environmental Protection Agency in a comment response letter dated (February 6, 2020, Appendix J - Coordination) specifically recommended the use of CRAM to assess the condition of existing wetlands within the project action area pre- and post-project. The use of CRAM in determining mitigation success was noted in *Appendix M – Conceptual Mitigation Strategy*.

NMFS EFH Conservation Recommendation 6: During the PED period, the USACE should continue evaluating an alternative that provides increased connectivity and benefit to the Bolsa Chica Lowlands Restoration Project (BCLRP) while also accommodating the increase in floodwaters without significant infrastructure improvements at the Warner Avenue Bridge and associated adverse impacts to wetland habitat. NMFS believes such an alternative may avoid wetland impacts in Outer Bolsa Bay, increase environmental benefits to estuarine HAPC, and decrease overall project costs. This alternative should be evaluated in collaboration with NMFS and the Bolsa Chica Steering Committee to ensure the USACE is utilizing the most current information associated with BCLRP and its management.

USACE Response to Conservation Recommendation 6: The USACE partially accepts EFH Conservation Recommendation 6. The USACE has agreed to further evaluate via a value engineering (VE) study that is conducted during the PED phase (per USACE policy) the need for fortifying the levees in the lower reach of Channel C05 that is adjacent to the BCER. For more information refer to USACE responses below to NMFS Fish and Wildlife Coordination Act Recommendations #1 and #2.

The USACE would not specifically further evaluate an alternative that would send waters from Channel C05 into the full tidal basin of the BCER. Overflowing into the full tidal basin of the BCER was included as a constraint of the project from the initiation of the study. The constraint was due to the quality of the water in the channels and the potential impact that the water would have to biological resources within the full tidal basin if it were allowed to overflow. Furthermore, when scoping letters were sent out in 2017 to notify stakeholders that the project was being reinitiated, the CDFW noted in their scoping response (letter dated January 12, 2018) that they were specifically concerned about activities that would breach the East Garden Grove-Wintersburg (EGGW) (i.e., Channel C05) levee since breaching the levee would result in an influx of freshwater flow and introduce contaminants directly into the system. The California State Lands Commission also provided a scoping response (letter dated January 12, 2018) that noted concern about any project alternatives that could increase the potential for overtopping of the existing flood control levees with spillover occurring in the west end of the full tidal basin area of the Bolsa Chica Restoration Project. The concern was due to a portion of the core of the Bolsa Chica Restoration Project levees surrounding the full tidal basin and a large overlook containing contaminated soil covered by one meter of clean compacted fill. Should the clean fill be washed away by spillover flooding, the underlying contaminated soil may become exposed to the flood waters and result in deposition of sediment into the west end of the full tidal basin with negative effects for habitat. The USFWS also originally expressed concern about potential contaminants in project levees and potential mobilization of these contaminants into the Bolsa Chica Restoration Project in a mini-Planning Aid Letter (PAL) that was provided to the USACE via email dated April 8, 2019 (*Appendix K – USFWS CAR*).

Although there was initial concern by resource agencies about overflowing into the full tidal basin, in late 2019 this sentiment changed. Therefore, the USACE performed a high level analysis of the proposed full tidal basin overflow alternative. The results of this analysis were provided to NMFS as well as other

resource agencies via a white paper (refer to *Appendix L – Environmental Considerations*). The white paper concluded that overflowing into the full tidal basin has a greater potential for environmental impacts, is not significantly more cost effective, and has hazardous, toxic, and radioactive waste (HTRW) policy issues. In addition, the analysis concluded that conveying flood flows from Channel C05 to the full tidal basin would not require regular dredging of the full tidal basin's ocean outlet for flood risk management purposes.

Although it has been suggested by the various resource agencies that overflowing into the full tidal basin would be less environmentally damaging than the USACE's Recommended Plan, no analysis has been provided to validate this suggestion. Without additional analysis on potential impacts, the USACE remains concerned that the full tidal basin overflow alternative may be just as, if not more, environmentally damaging than the USACE's Recommended Plan. Specifically, with regard to potential biological resource impacts, the USACE is concerned about (1) eelgrass, (2) Rabbit Island, and (3) State Marine Conservation Areas (SMCAs).

It is the understanding of USACE that the full tidal basin within the BCER contains approximately 140 acres of eelgrass. The USACE's Recommended Plan is anticipated to only have a potential indirect impact to approximately 1.7 acres of eelgrass located at the downstream end of Channel C02. If the full tidal basin overflow alternative were pursued, the project would still have a potential indirect impact to approximately 1.7 acres of eelgrass at the downstream end of Channel C02, in addition to a potential direct/indirect impact to an undetermined amount of eelgrass in the full tidal basin. The NMFS has already stated that you are concerned about the potential indirect impact to the 1.7 acres of eelgrass and the subsequent impact to green sea turtle foraging in the area. As stated in the Biological Opinion, green sea turtles (i.e., San Diego Bay and Anaheim Bay populations) appear to be attracted to areas with high concentrations of eelgrass, therefore, NMFS concluded that eelgrass is likely a similarly important habitat feature for green sea turtles in the action area. Because it is known that the full tidal basin in the BCER contains a large amount of eelgrass (approximately 140 acres as noted above), it seems logical that overflowing into the full tidal basin could potentially have a larger impact to eelgrass habitat than the Recommended Plan as well as a potentially larger impact to green sea turtle foraging habitat (e.g., quality, quantity, and availability) and disruption to green sea turtle foraging behavior than the Recommended Plan. Although the above focuses on eelgrass, there could be direct/indirect impacts to other aquatic habitats (e.g., mudflat, saltmarsh, etc.) within the full tidal basin through implementation of the recommended full tidal basin overflow alternative. All of this could necessitate more mitigation, and increased cost, than is currently anticipated with implementation of the USACE's Recommended Plan.

With regard to Rabbit Island, this sensitive area is located within the full tidal basin of the BCER. The CDFW noted in their scoping response letter (letter dated January 12, 2018, *Appendix J – Coordination*), that sensitive plants and plant communities exist on Rabbit Island, including but not limited to coast woolly-heads, red sand verbena, salt marsh bird's-beak, and southern dune scrub. The island also provides nesting habitat for the federally-listed light-footed Ridgway's rail and the state-listed Belding's savannah sparrow. The suggested alternative by the FWS would include the overflow of water from Channel C05 into the full tidal basin, where Rabbit Island is located, via a spillover weir or lowering levee constructed along Channel C05's south levee. Depending on where the levee would be constructed and the length of the levee, construction activities could have a direct impact to Rabbit Island through the excavation of material for construction of the spillover weir or lowering levee. Long-term operation of the spillover weir or lowering the levee could have an indirect impact to Rabbit Island by potentially causing erosion of the habitat where sensitive species are located and/or nest. The CDFW also expressed concern in their scoping letter (letter dated January 12, 2018) about breaching the Channel C05 levee. While the concern was expressed with regard to breaching the levee at the muted tidal pocket, it seems that these same

concerns would be relevant to breaching the levee at the full tidal basin. The letter states that breaching the Channel C05 levee would result "in an influx of freshwater flow and introduce contaminants directly into the system." Furthermore, the letter expresses that breaching of the levee would result in a loss of current function and could impact native vegetation.

With regard to SMCAs, the CDFW expressed in all of their comment response letters concern about potential impacts to CDFW managed SMCAs. The full tidal basin is part of the Bolsa Chica Basin SMCA (No Take). In their most recent letter dated February 5, 2020, the CDFW states that "[a]ny significant loss or degradation of marine habitat within … the Bolsa Chica Basin SMCA … would be a significant impact." Therefore, it is possible that the implementation of the full tidal basin overflow alternative may have direct/indirect impacts to marine habitat within the Bolsa Chica Basin SMCA (No Take) that would necessitate additional mitigation beyond what is currently anticipated for the USACE's Recommended Plan.

In addition to the above biological resource concerns, the USACE is also concerned that any proposed construction that might be involved with the implementation of a full tidal basin overflow alternative may result in the permanent reduction in the number of acres of existing mitigation in the BCER full tidal basin. Any permanent reduction in the number of existing acres of mitigation in the BCER full tidal basin, such as due to construction of an overflow weir, would likely require modification to the Bolsa Chica Lowlands Mitigation Agreement. According to the Bolsa Chica Lowlands Mitigation Agreement, 454 acres of landfill mitigation credit were generated through implementation of the Bolsa Chica Lowlands Restoration project.

USACE Response to Fish and Wildlife Coordination Act Recommendations from NMFS

The USACE acknowledges that NMFS considers its EFH-related Conservation Recommendations relevant with respect to the Fish and Wildlife Coordination Act as well. The following additional recommendations were provided to the USACE under the Fish and Wildlife Coordination Act by NMFS. USACE's responses follow the relevant recommendation.

NMFS Recommendation 1: The removal or partial removal of the northern C05 levee at the lower reach bordering the muted tidal pocket. Levee removal may improve estuarine connectivity between C05, muted tidal pocket, and outer and inner Bolsa Bays, and may reduce flow velocities within the lower section of C05.

USACE Response to Recommendation 1: The USACE will further evaluate this recommendation during PED phase. As part of the Conceptual Mitigation Strategy (*Appendix M*) the USACE has proposed breaching the levee between Channel C05 and the BCER muted tidal pocket via a hydraulic stoplog structure. The hydraulic stoplog structure allows for more control over the amount of water flowing into the muted tidal pocket from Channel C05 and allows for continued use of the levee by recreational users. The NMFS proposal is recommending partial or complete removal of the levee with no control over the amount of flow from Channel C05 into the muted tidal pocket. In addition, a recreational trail would no longer be available to the public. During PED, the USACE would work with the NMFS and other appropriate stakeholders to determine if the recommendation of partial or full removal of the northern C05 levee is more preferable and environmentally beneficial over the hydraulic stoplog structure that is currently proposed as part of USACE's compensatory mitigation plan. If so, then the NMFS recommendation may be pursued as compensatory mitigation; however, additional analysis and public review would need to occur to confirm that it is more beneficial as well as to comply with CEQA and NEPA. Within the Final Report, the USACE has included the evaluation of this recommendation during the PED phase, and specifically during the VE study, in *Section 8.10.6, Further Studies*.

NMFS Recommendation 2: The elimination of the proposed sheet pile activities in the lower sections of C05. New sheet pile in these sections may preclude future options to restore hydrological connectivity to the BCLRP. Eliminating the proposed sheet pile installation in these sections may also substantially reduce project costs.

USACE Response to Recommendation 2: The USACE will further evaluate this recommendation during the PED phase when a VE study would be conducted. VE studies are required by USACE policy to evaluate high dollar project components, and fortification of the lower reach of Channel C05 with dual sheet pile meets those requirements. VE is an organized effort directed at analyzing proposed building features, systems, equipment, and material for the purpose of achieving essential functions at the lowest life cycle cost consistent with required performance, quality, reliability, and safety. Within the Final Report, the USACE has included the evaluation of this recommendation during the PED phase, and specifically during the VE study, in *Section 8.10.6, Further Studies*. Depending on the results of the VE study, supplemental CEQA and NEPA analysis may be needed.

NMFS Recommendation 3: Construction of spill over weirs into the BCLRPs Full Tidal Basin that would provide floodwater retention and conveyance through the FTB.

USACE Response to Recommendation 3: The USACE does not accept this recommendation. The USACE views this recommendation as being similar and/or essentially the same as NMFS EFH Conservation Recommendation 6. Therefore, refer to USACE's Response to NMFS EFH Conservation Recommendation 6 (above) for USACE's response as to why this recommendation is not being accepted.

NMFS Recommendation 4: Enhanced trash and debris removal booms upstream of BCER, and trash racks on constructed weirs.

USACE Response to Recommendation 4: The USACE accepts this recommendation. The Recommended Plan already includes trash collection systems within the channels to minimize trash entering the downstream sensitive areas, such as the BCER. During the PED phase, additional detail on the trash collection systems within the channels would be developed. The non-federal sponsor, OCPW, would be responsible for the operation and maintenance of these trash collection systems.

6.3 Consultation with Native American Tribes

A list of potentially interested Native American tribes was obtained for the updated scoping effort that occurred in November 2017. Scoping letters were sent to Augustine Band of Cahuilla Indians, Barona Band of Mission Indians, Cahuilla Band of Indians, Campo Kumeyaay Nation, Ewiiaapaayp Band of Kumeyaay Indians, Inaja-Cosmit Band of Indians, Jamul Indian Village, La Jolla Band of Luiseño Indians, La Posta Band of Mission Indians, Los Coyotes Band of Cahuilla and Cupeño Indians, Mesa Grande Band of Mission Indians, The Morongo Band of Mission Indians, Pala Band of Mission Indians, Pauma Band of Luiseño Indians, Pechanga Band of Luiseño Indians, Ramona Band of Cahuilla, Rincon Band of Luiseño Indians, San Manuel Band of Mission Indians, San Pasqual Band of Mission Indians, Santa Rosa Band of Cahuilla Indians, Santa Ynez Band of Chumash Indians, Iipay Nation of Santa Ysabel, Soboba Band of Luiseño Indians, Sycuan Band of the Kumeyaay Nation, Torres-Martinez Desert Cahuilla Indians, and Twenty-Nine Palms Band of Mission Indians.

The scoping letter, dated November 20, 2017, informed them of the feasibility study and requested any information they may have on areas of traditional cultural interest to their tribal members. Responses were received from the Augustine Band of Cahuilla Indians, Jamul Indian Village of the Kumeyaay

Nation, Pala Band of Mission Indians, and Twenty-Nine Palms Band of Mission Indians. The following are comments from the responses received:

Augustine Band of Cahuilla Indians

- Unaware of specific cultural resources that may be affected by the proposed project.
- Encourage contract with monitor who is qualified in Native American cultural resources identification and who is able to be present on-site full-time during the preconstruction and construction phase of the project.
- Notify immediately is any cultural resources are discovered during development of the proposed project.

Jamul Indian Village of the Kumeyaay Nation

- Area not considered a traditional use area for the Jamul Indian Village of the Kumeyaay Nation.
- Recommend Native American monitoring.

Pala Band of Mission Indians

- Proposed Project is not within the boundaries of the recognized Pala Indian Reservation.
- Proposed Project also beyond the boundaries of the territory that the tribe considers its Traditional Use Area.
- No objection to the continuation of project activities as currently planned.

San Manual Band of Mission Indians

- Proposed Project is outside of Serrano ancestral territory.

Twenty-Nine Palms Band of Mission Indians

- Not aware of any additional archaeological/cultural sites or properties in the project area that pertain to the Twenty-Nine Palms Band of Mission Indians.
- No interest in the project and defers to comments of other affiliated tribes.
- If inadvertent discovery of archaeological remains or resources occurs, construction should stop immediately and the appropriate agency and tribe(s) should be notified.

In addition to scoping, federal and non-federally recognized tribes were sent letters notifying them of the availability of the Draft Report for the 45-day NEPA public review (October 2018) and the 45-day CEQA public review (December 2019). The list of tribes that were sent notification letters can be found in *Appendix J – Coordination.*

6.4 Issues of Known or Expected Controversy

The primary issue of known controversy is the expansion of the Warner Avenue Bridge and the construction of dual sheet pile walls along Reach 1 of the C05 channel. Several agencies, including USFWS, NMFS, and California SLC, have expressed their desire for the USACE to consider an alternative that would spill into the muted tidal pocket and the full tidal basin of the BCER. The agencies feel that this alternative would be less environmentally damaging than the Recommended Alternative and would eliminate the need to expand Warner Avenue Bridge.

The USACE has stated that an alternative that would send waters from Channel C05 into the full tidal basin of the BCER would not be further evaluated. Overflowing into the full tidal basin of the BCER was included as a constraint of the project from the initiation of the study. The constraint was due to the quality of the water in the channels and the potential impact that the water would have to biological resources within the full tidal basin if it were allowed to overflow. Furthermore, when scoping letters were sent out in 2017 to notify stakeholders that the project was being reinitiated, the CDFW noted in their scoping response (letter dated January 12, 2018) that they were specifically concerned about activities that would breach the East Garden Grove-Wintersburg (EGGW) (i.e., Channel C05) levee since breaching the levee would result in an influx of freshwater flow and introduce contaminants directly into the system. The California State Lands Commission also provided a scoping response (letter dated January 12, 2018) that noted concern about any project alternatives that could increase the potential for overtopping of the existing flood control levees with spillover occurring in the west end of the full tidal basin area of the Bolsa Chica Restoration Project. The concern was due to a portion of the core of the Bolsa Chica Restoration Project levees surrounding the full tidal basin and a large overlook containing contaminated soil covered by one meter of clean compacted fill. Should the clean fill be washed away by spillover flooding, the underlying contaminated soil may become exposed to the flood waters and result in deposition of sediment into the west end of the full tidal basin with negative effects for habitat. The USFWS also originally expressed concern about potential contaminants in project levees and potential mobilization of these contaminants into the Bolsa Chica Restoration Project in a mini-Planning Aid Letter (PAL) that was provided to the USACE via email dated April 8, 2019 (*Appendix K – USFWS CAR*).

Although there was initial concern by resource agencies about overflowing into the full tidal basin, in late 2019 this sentiment changed. Therefore, the USACE performed a high level analysis of the proposed full tidal basin overflow alternative. The results of this analysis were provided to NMFS as well as other resource agencies via a white paper (refer to *Appendix L – Environmental Considerations*). The white paper concluded that overflowing into the full tidal basin has a greater potential for environmental impacts, is not significantly more cost effective, and has hazardous, toxic, and radioactive waste (HTRW) policy issues. In addition, the analysis concluded that conveying flood flows from Channel C05 to the full tidal basin would not require regular dredging of the full tidal basin's ocean outlet for flood risk management purposes.

Although it has been suggested by the various resource agencies that overflowing into the full tidal basin would be less environmentally damaging than the USACE's Recommended Plan, no analysis has been provided to validate this suggestion. Without additional analysis on potential impacts, the USACE remains concerned that the full tidal basin overflow alternative may be just as, if not more, environmentally damaging than the USACE's Recommended Plan. Specifically, with regard to potential biological resource impacts, the USACE is concerned about (1) eelgrass, (2) Rabbit Island, and (3) State Marine Conservation Areas (SMCAs).

It is the understanding of USACE that the full tidal basin within the BCER contains approximately 140 acres of eelgrass. The USACE's Recommended Plan is anticipated to only have a potential indirect

impact to approximately 1.7 acres of eelgrass located at the downstream end of Channel C02. If the full tidal basin overflow alternative were pursued, the project would still have a potential indirect impact to approximately 1.7 acres of eelgrass at the downstream end of Channel C02, in addition to a potential direct/indirect impact to an undetermined amount of eelgrass in the full tidal basin. The NMFS has already stated that you are concerned about the potential indirect impact to the 1.7 acres of eelgrass and the subsequent impact to green sea turtle foraging in the area. As stated in the Biological Opinion, green sea turtles (i.e., San Diego Bay and Anaheim Bay populations) appear to be attracted to areas with high concentrations of eelgrass, therefore, NMFS concluded that eelgrass is likely a similarly important habitat feature for green sea turtles in the action area. Because it is known that the full tidal basin in the BCER contains a large amount of eelgrass (approximately 140 acres as noted above), it seems logical that overflowing into the full tidal basin could potentially have a larger impact to eelgrass habitat than the Recommended Plan as well as a potentially larger impact to green sea turtle foraging habitat (e.g., quality, quantity, and availability) and disruption to green sea turtle foraging behavior than the Recommended Plan. Although the above focuses on eelgrass, there could be direct/indirect impacts to other aquatic habitats (e.g., mudflat, saltmarsh, etc.) within the full tidal basin through implementation of the recommended full tidal basin overflow alternative. All of this could necessitate more mitigation, and increased cost, than is currently anticipated with implementation of the USACE's Recommended Plan.

With regard to Rabbit Island, this sensitive area is located within the full tidal basin of the BCER. The CDFW noted in their scoping response letter (letter dated January 12, 2018, *Appendix J – Coordination*), that sensitive plants and plant communities exist on Rabbit Island, including but not limited to coast woolly-heads, red sand verbena, salt marsh bird's-beak, and southern dune scrub. The island also provides nesting habitat for the federally-listed light-footed Ridgway's rail and the state-listed Belding's savannah sparrow. The suggested alternative by the FWS would include the overflow of water from Channel C05 into the full tidal basin, where Rabbit Island is located, via a spillover weir or lowering levee constructed along Channel C05's south levee. Depending on where the levee would be constructed and the length of the levee, construction activities could have a direct impact to Rabbit Island through the excavation of material for construction of the spillover weir or lowering levee. Long-term operation of the spillover weir or lowering the levee could have an indirect impact to Rabbit Island by potentially causing erosion of the habitat where sensitive species are located and/or nest. The CDFW also expressed concern in their scoping letter (letter dated January 12, 2018) about breaching the Channel C05 levee. While the concern was expressed with regard to breaching the levee at the muted tidal pocket, it seems that these same concerns would be relevant to breaching the levee at the full tidal basin. The letter states that breaching the Channel C05 levee would result "in an influx of freshwater flow and introduce contaminants directly into the system." Furthermore, the letter expresses that breaching of the levee would result in a loss of current function and could impact native vegetation.

With regard to SMCAs, the CDFW expressed in all of their comment response letters concern about potential impacts to CDFW managed SMCAs. The full tidal basin is part of the Bolsa Chica Basin SMCA (No Take). In their most recent letter dated February 5, 2020, the CDFW states that "[a]ny significant loss or degradation of marine habitat within … the Bolsa Chica Basin SMCA … would be a significant impact." Therefore, it is possible that the implementation of the full tidal basin overflow alternative may have direct/indirect impacts to marine habitat within the Bolsa Chica Basin SMCA (No Take) that would necessitate additional mitigation beyond what is currently anticipated for the USACE's Recommended Plan.

In addition to the above biological resource concerns, the USACE is also concerned that any proposed construction that might be involved with the implementation of a full tidal basin overflow alternative may result in the permanent reduction in the number of acres of existing mitigation in the BCER full tidal

basin. Any permanent reduction in the number of existing acres of mitigation in the BCER full tidal basin, such as due to construction of an overflow weir, would likely require modification to the Bolsa Chica Lowlands Mitigation Agreement. According to the Bolsa Chica Lowlands Mitigation Agreement, 454 acres of landfill mitigation credit were generated through implementation of the Bolsa Chica Lowlands Restoration project.

With regard to the dual sheet pile walls along Reach 1 of the C05 channel that are included as part of the Recommended Plan, USACE will further evaluate the need for the dual sheet pile walls during the PED phase. During the PED phase a VE study would be conducted per USACE policy to evaluate high dollar project components, of which fortifying the lower reach of Channel C05 with dual sheet pile is a high dollar project component. Value engineering is an organized effort directed at analyzing proposed building features, systems, equipment, and material for the purpose of achieving essential functions at the lowest life cycle cost consistent with required performance, quality, reliability, and safety.

Finally, as part of the USACE's proposed Mitigation Plan (*Appendix M*), the Corps has proposed breaching the levee between Channel C05 and the muted tidal pocket (in the BCER), but via a hydraulic stoplog structure. The hydraulic stoplog structure allows for more control over the amount of water flowing into the muted tidal pocket from Channel C05 and allows for continued use of the levee by recreational users.

7.0 Compliance with Applicable Laws, Policies, and Plans*

The laws, regulations, policies and plans related to the resources discussed in Chapter 2.0 are summarized herein. The proposed project compliance status is also discussed.

7.1 Federal Requirements

7.1.1 Clean Air Act

The Federal Clean Air Act (CAA) (42 USC Section 7401, *et seq.*) authorized the establishment of national health-based air quality standards, and also set deadlines for their attainment. The CAA Amendments of 1990 (1990 CAA) made major changes in deadlines for attaining NAAQS. State and local agencies within areas that exceed the NAAQS are required to develop SIPs to show how they will achieve the NAAQS for nonattainment criteria pollutants by specific dates. SIPs are not single document, but a compilation of new and previously submitted plans, programs (such as monitoring, modeling, permitting, etc.), district rules, state regulations, and federal controls. USEPA is responsible for enforcing the NAAQS primarily through reviewing SIPs that are prepared by each state. As required by the federal CAA, USEPA established and continues to update the NAAQS for specific criteria air pollutants: O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and Pb. Pursuant to CAA Section 176(c) requirements, USEPA promulgated the General Conformity Rule (40 C.F.R. Part 93), which applies to most federal actions including the proposed project.

The General Conformity Rule is used to determine if federal actions meet the requirements of the CAA and the applicable SIP by ensuring that pollutant emissions related to the action do not:

- Cause or contribute to new violations of a NAAQS.
- Increase the frequency or severity of any existing violation of a NAAQS.
- Delay timely attainment of a NAAQS or interim emission reduction.

A conformity determination under the General Conformity Rule is required if the federal agency determines: the action will occur in a nonattainment or maintenance area; that one or more specific exemptions do not apply to the action; the action is not included in the federal agency's "presumed to conform" list; the emissions from the proposed action are not within the approved emissions budget for an applicable facility; and the total direct and indirect emissions of a pollutant (or its precursors) are at, or above, the de minimis levels established in the General Conformity regulations.

A General Conformity analysis was conducted for construction of the LPP including all channel and downstream modifications. Construction emissions were estimated using CalEEMod software, project-specific data, and conservative modeling assumptions. Emission estimates were found to be *de minimis* for all criteria air pollutants except NOx. With Tier 4 mitigation of off-road engines, NOx emissions only exceed the *de minimis* threshold in year 2021. If new haul trucks (built or repowered with new engines after 2010) are used in 2021, NOx emissions are estimated to be 12.9 tons/year but still exceed the *de minimis* level of 10 tons NOx/year. Based on these findings, additional emission reductions must be achieved, or the modeling approach, data, and assumptions reevaluated, in order to rule out the need for a conformity determination. If a General Conformity Determination is required for the 2021 NOx emissions, the SCAQMD is consulted and an additional air quality analysis prepared. Because the AQMP has established general conformity budgets and tracking system for federal actions to ensure that conformity is being met (AQMP, 2016), it is expected the relatively small proposed emission increase (2.9 tons NOx above *de minimis* levels in 2021) is already or can be included in the AQMP. In any case, the proposed project would be in compliance with the Federal General Conformity Rule and CAA.

GHG emission management is regulated by federal, State, and local levels of government. USEPA is responsible for GHG regulation at the federal level. On December 7, 2009, the Final Endangerment and Cause or Contribute Findings for GHGs (endangerment finding) under Section 202(a) of the CAA went into effect. The finding states that current and projected concentrations of the six key GHGs threaten the public health and welfare of present and future generations. Furthermore, the combined emissions of these GHGs from new motor vehicles contribute to the GHG pollution, which threatens public health and welfare (USEPA 2012a). Under the endangerment finding, USEPA is developing vehicle emission standards under the CAA. GHGs under Section 202(a) of the CAA determine whether project emission sources and levels significantly affect air quality based on federal standards established by USEPA and state standards set by the CARB. GHG emissions estimates are below applicable reporting limits for GHGs and in compliance with the CAA.

7.1.2 Clean Water Act

The CWA is the primary federal law governing water pollution. It established the basic structure for regulating discharges of pollutants into waters of the U.S. and gives USEPA authority to implement pollution control programs such as setting wastewater standards for industries (USEPA 2002). In California USEPA has delegated authority to regulate the CWA to state agencies.

Section 401 of the CWA regulates the water quality for any activity that may result in discharge into navigable waters; these actions must not violate federal water quality standards. The Santa Ana RWQCB administers Section 401 in California and either issues or denies water quality certifications that typically include project-specific requirements established by the RWQCB.

Section 404 of the CWA requires that a permit be obtained from USACE when an action will result in discharge of dredged or fill material into wetlands and waters of the U.S. Under Section 404, USACE regulates such discharges and issues individual and/or general permits. Before USACE can issue a permit, it must determine that the project is in compliance with the CWA Section 404(b)(1) guidelines, which specify that “no discharge of dredged or fill material shall be permitted if there is a practical alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences” (40 C.F.R. 230.10[a]).

When conducting its own civil works projects, USACE does not issue permits to itself. Rather, USACE complies with the guidelines and substantive requirements of the CWA, including Section 404 and Section 401. The proposed project could require placement of fill material into waters of the U.S.; therefore, a section 404(b)(1) analysis was conducted on the NED and LPP. Both the NED Plan and LPP would directly adversely impact approximately 0.15 acres of jurisdictional estuarine wetland by the modification of the Warner Avenue Bridge. All impacts to wetlands would be fully mitigated through a combination of onsite or offsite compensatory mitigation (see Appendix M – Conceptual Mitigation Strategy). The discharge of fill material would comply with 404(b)(1) guidelines with the inclusion of appropriate measures to minimize pollution or adverse effects on the aquatic ecosystem. A Section 401 water quality certification will be requested from the Santa Ana RWQCB on a construction project basis. With the completion of a 404(b)(1) analysis, compensatory mitigation for direct impacts to 0.15 acres of estuarine wetland, and the issuance of a Section 401 water quality certification from the Santa Ana RWQCB, this project would be in full compliance with the CWA.

The project would also require a NPDES permit since it would disturb one or more acres of land and involves possible storm water discharges to surface waters. Prior to construction, the contractor would prepare a SWPPP and then submit a NOI to the Santa Ana RWQCB requesting approval of the proposed work. This storm water plan would identify BMPs to avoid or minimize any adverse effects of

construction on surface waters. Once the work is completed, USACE and its contractors will prepare SWPPPs and submit NOIs for individual construction projects to terminate coverage by the NPDES permit.

7.1.3 Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation and Liability Act (known as Superfund) was passed to facilitate the cleanup of toxic waste sites. In 1986, the Act was amended by the Superfund Amendment and Reauthorization Act Title III (community right-to-know laws). Title III states that past and present owners of land contaminated with hazardous substances can be held liable for the entire cost of the cleanup, even if the material was dumped illegally when the property was under different ownership. HTRW materials may be present in the project vicinity. The NFS is responsible for providing all lands, easements, and rights-of-way required for the proposed project. If contaminants exist, these lands would be required to be cleaned up before project implementation. The proposed project would be in full compliance with this Act.

7.1.4 Federal Endangered Species Act of 1973, as Amended

Pursuant to the FESA, USFWS and NMFS has regulatory authority over federally-listed species. Under the FESA, a permit to "take" a listed species is required for any federal action that may harm a listed species. FESA, Section 7 prohibits federal agencies from authorizing, funding, or carrying out activities that are likely to jeopardize the continued existence of a listed species, or destroy or adversely modify its critical habitat. By consulting with USFWS and NMFS before initiating projects, agencies review actions to determine if they could adversely affect listed species or their habitat and design their programs and projects to conserve listed and proposed species. USFWS and NMFS coordination with other federal agencies is important to species conservation. USFWS is the administering agency for non-marine species. NMFS is the administering agency for marine species, including anadromous fish species.

USACE initiated coordination with the USFWS and NMFS with scoping letters which were sent November 30, 2017. In addition, USACE has continued coordinating with these two agencies on a nearly monthly basis regarding direct and indirect impacts to eelgrass and special status species. On November 25, 2019, the USACE formally submitted to USFWS and NMFS a biological evaluation assessing the potential affects of the proposed project on federal special status species as well as EFH. After a review and analysis of listed-species and critical habitat within or adjacent to the proposed project action area and the proposed compensatory mitigation and mitigation measures (see *Appendix M – Conceptual Mitigation Strategy*), the USACE determined that the proposed project would have '*no effect*' on salt marsh bird's-beak and Ventura marsh milk-vetch. The USACE also determined that the proposed project would have a '*may affect, not likely to adversely affect*' on California least tern, coastal California gnatcatcher, light-footed Ridgway's rail, western snowy plover, and green turtle. With regard to EFH, the USACE determined that the proposed project would have an indirect affect on approximately 1.7 acres of eelgrass, for which compensatory mitigation has been proposed (see *Appendix M – Conceptual Mitigation Strategy*).

In a letter dated January 6, 2020 (see *Appendix J – Coordination*), the NMFS stated that they had reviewed the biological evaluation and Draft IFR and were unable to concur with the USACE's effect determination for the green turtle. Therefore, the NMFS and USACE proceeded with formal consultation with regard to the green turtle. Consultation with the NMFS under Section 7 of the Endangered Species Act was completed with the receipt of a biological opinion dated March 27, 2020 (see *Appendix J – Coordination*). With regard to the USFWS, in an email dated December 18, 2019 (see *Appendix J – Coordination*), the USFWS provided their opinion after a preliminary analysis of the biological evaluation. The Service concurred with the USACE's '*no effect*' determination for salt marsh bird's-beak

and Ventura marsh milk-vetch. They also concurred with USACE's '*may affect, not likely to adversely affect*' determination for western snowy plover, coastal California gnatcatcher, and light-footed Ridgway's rail. The USFWS did not concur with USACE's determination for the California least tern. The USACE prepared additional information for the Service to review with regard to the proposed project and the California least tern. This information was provided to the USFWS in a letter dated January 17, 2020 (see *Appendix J – Coordination*). After the provision of this additional information and a follow-up discussion with the USFWS, the USFWS concurred with USACE's determination of 'may affect, not likely to adversely affect' for the California least tern. Consultation with the USFWS under Section 7 of the Endangered Species Act was completed February 10, 2020 (see *Appendix J – Coordination*). With completion of consultation with USFWS and NMFS and implementation of the reasonable and prudent measures, and their associated terms and conditions, set forth in the biological opinion issued by the NMFS, the proposed project is in compliance with Section 7 of the Act.

7.1.5 EO 11990, Protection of Wetlands

Executive Order 11990, signed May 24, 1977, directs all federal agencies to refrain from assisting in or giving financial support to projects that encroach on publicly or privately owned wetlands. It further requires that federal agencies support a policy to minimize the destruction, loss or degradation of wetlands. A project that encroaches on wetlands may not be undertaken unless the agency determines that: 1) there are no practicable alternatives to such construction, 2) the project includes all practicable measures to minimize harm to wetlands that would be affected, and 3) the effect would be minor.

As part of the Feasibility Study, a full range of measures and alternatives to achieve the FRM were developed and assessed. The proposed project includes elements that would impact waters of the U.S., including wetlands. These project elements are channel modifications (i.e., waters of the U.S.), and increasing the span of the Warner Avenue Bridge (i.e., wetlands). A jurisdictional determination was conducted April 2019 and found no jurisdictional wetlands present within the flood control channels. Approximately 0.15 acre of jurisdictional wetland would be adversely impacted by the modification of the Warner Avenue Bridge. All impacts to wetlands would be fully mitigated through a combination of onsite or offsite compensatory mitigation. Once mitigation has been implemented the proposed project will be in compliance with EO 11990.

7.1.6 EO 11988, Floodplain Management

EO 11988 requires federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modifications of flood plains and to avoid direct and indirect support of floodplain development where there is a practicable alternatives. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities" for the following actions: 1) acquiring, managing, and disposing of federal lands and facilities, 2) providing federally-undertaken, financed, or assisted construction and improvements, and 3) conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulation, and licensing activities. The proposed project would occur within the flood plain of the Westminster watershed; however, in areas that have already been developed. Infrastructure (i.e., drainage channels) has been in place since the 1950s/1960s within the watershed. No new development within the floodplain is included as part of the project. The intent of the proposed project is to reduce flooding risk and associated impacts on human safety and structures.

7.1.7 EO 12898, Environmental Justice

EO 12898 requires that environmental analyses of proposed federal actions address any disproportionately high, adverse human health or environmental effects on minority or low-income communities. Federal agencies' responsibility applies equally to Native American populations. Each federal agency must ensure that public documents, notices, and hearings are readily accessible.

No disproportionately high or adverse human health or environmental effects on minority or low-income communities were identified. Mailing notices and distribution of other project information includes property owners and potentially affected persons and institutions without any distinction based on minority or income status. The local community was invited to the public scoping meeting that was held in 2006. In addition, two public meetings were held during the public review period for the draft report to allow all interested parties an opportunity to learn about and comment on the proposed project. Socioeconomic and environmental justice compliance are also discussed in Section 5.11. All public comments were received and addressed, as appropriate. The proposed project is in full compliance with EO 12898.

7.1.8 EO 13045, Protection of Children from Environmental Health Risks and Safety Risks

EO 13045, signed April 21, 1997, directs federal agencies, to the extent permitted by law and as appropriate, to make identifying and assessing environmental health and safety risks that may disproportionately affect children a high priority and to ensure that policies, programs, activities and standards address disproportionate risks to children that result from environmental health or safety risks. Construction projects such as the proposed project include factors that could place children at increased health and safety risk due to the temporary generation of air pollutants, use of toxic materials like petroleum and diesel, and increased truck traffic on surface streets. Implementing BMPs, including close coordination with local communities and their leaders, would reduce these risks. The proposed project is a FRM project designed to reduce the risk of flooding in the highly urbanized Cities of Anaheim, Cypress, Fountain Valley, Garden Grove, Huntington Beach, Los Alamitos, Seal Beach, Stanton, and Westminster. Individual decision-making during disasters is novel and dynamic because of the complexities and uncertainties inherent with disasters, and children are particularly vulnerable. Children may have limited access to evacuation options and limited physical ability to respond to or withstand the rigors of such an emergency. The proposed project would reduce this risk.

7.1.9 Fish and Wildlife Coordination Act of 1958, as Amended (16 U.S.C. 661, *et seq.*)

The FWCA of 1958 requires that all federal agencies consult with USFWS, NMFS, and the affected state wildlife agency for activities that affect, control, or modify surface waters, including wetlands and other waters. Under the FWCA, the USFWS, NMFS, and CDFW have an extended responsibility for project review that encompasses concerns about plant and wildlife species that may not be addressed under NEPA and the federal FESA. This extended responsibility may include a project's secondary effects on jurisdictional waters, including wetlands. USFWS and NMFS review CWA Section 404 permit applications as well as other federal actions perceived to modify waters, and prepare a CAR to document the coordination between the federal agency and the appropriate state regulatory agencies (Cylinder et al. 2004). The USFWS, NMFS, and CDFW have participated in reviewing the recommended project during the public review. In addition, the USFWS provided a Draft CAR which is included in *Appendix K – U.S. Fish and Wildlife Service Coordination Act Report*. The USFWS finalized the Draft CAR and provided the Final CAR to the USACE on March 20, 2020. Recommendations provided in the Final CAR were considered by USACE and incorporated into the Final Report where applicable. With the issuance of the Final CAR by the USFWS, the USACE is in full compliance with this Act.

7.1.10 Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801, *et seq.*)

This Act establishes a management system for national marine and estuarine fishery resources. EFH is defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." It states that migratory routes to and from anadromous fish spawning grounds should also be considered EFH. The phrase "adversely affect" refers to any effects that reduce the quality or quantity of EFH. Federal activities that occur outside an EFH, but that may have an effect on EFH waters and substrate, must also be considered in the consultation process. Effects on habitat managed under the Pacific Salmon Fishery Management Plan must also be considered.

This Act requires federal agencies to consult with NMFS regarding all actions or proposed actions permitted, funded, or undertaken that may adversely affect EFH. In consulting, the action agency must provide a written assessment of the effects of their action on EFH to NMFS. If NMFS determines that a proposed federal or state activity would adversely affect EFH, then NMFS is obligated to provide EFH conservation recommendations to the action agency. The action agency must provide a detailed response in writing to NMFS within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed for avoiding, mitigating, or offsetting the impact of the activity on EFH. If the response is inconsistent with NMFS EFH conservation recommendations, the agency must explain its reasons for not following the recommendations.

EFH for groundfish, coastal pelagic species, and finfish and market squid has been designated in Anaheim Bay, Huntington Harbour, and Inner and OBB. EFH for these species also extends upstream into C02 Reach 23, and C05 Reaches 1 and 2 (see Section 2.8.3). In addition to EFH, eelgrass is present within Huntington Harbour within the vicinity of the outlet of C02. While modifications of the flood control channels are not expected to have direct impacts to eelgrass, increased velocities as a result of the project could have indirect adverse effects to eelgrass survival. USACE coordinated exensively with NMFS regarding impacts to EFH, eelgrass, and green turtle. As part of the Biological Opinion provided to USACE by the NMFS on March 27, 2020 (see *Appendix J – Coordination*), the NMFS provided EFH Conservation Recommendations as set forth in their Magnuson-Stevens Fishery Conservation and Management Act EFH Response. The USACE considered the EFH Conservation Recommendations and the USACE's responses to those recommendations were provided to NMFS in a letter dated April 7, 2020 (see *Appendix J – Coordination*, Section 6.2.2 of the main report). With consideration of the EFH Conservation Recommendations and the submittal of USACE's responses to the recommendations to NMFS, the proposed project is in compliance with this Act.

7.1.11 Migratory Bird Treaty Act of 1918, as Amended (16 U.S.C. 703, *et seq.*)

This Act, as amended, implements treaties and conventions between the United States, Canada, Japan, Mexico, and Russia providing protection for migratory birds as defined in 16 U.S.C. 715j. It establishes hunting seasons and capture limits for game species and protects migratory birds, their occupied nests, and their eggs (16 U.S.C. 703, 50 C.F.R 21, 50 C.F.R. 10). Permits from USFWS are required for both incidental and direct take.

Migratory birds and their nests are likely to occur within, and adjacent to, the footprint of proposed construction. The project is in a very urbanized area where traffic congestion and human activities are very common. Birds have adjusted to the human environment and continue to nest in these areas. To ensure that the construction of the proposed project minimizes impacts to breeding and nesting birds within adjacent high quality areas (e.g., BCER and SBNWR), construction of the downstream elements of the project (e.g., C02 Reach 23, C05 Reach 1, and Warner Avenue Bridge) will occur outside of breeding and nesting season (refer to Section 5.8.3 Mitigation Measures for Biological Resources). If special status bird species including migratory birds and/or other sensitive wildlife species breeding activity/active nests

are found within or directly adjacent to the proposed project's direct footprint during construction (despite efforts to schedule activities outside their breeding season), then all work in the immediate area will be halted and the project biologist will be notified immediately. An appropriate buffer zone around any active nest for exclusion of project-related activities would be specified by the project biologist, in coordination with the USFWS and CDFW. With the implementation of these mitigation measures, the proposed project would be in compliance with this Act.

7.1.12 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) was passed in 1972 and is administered by the National Oceanic and Atmospheric Administration. The Act provides for the management of the nation's coastal resources. The goal is to "preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone." A consistency determination (CD-0008-19) for project consistency with the CZMA was filed with the California Coastal Commission on December 27, 2019 (see Appendix N – Coastal Consistency Determination). The 75-day statutory time limit for commission action ran through March 11, 2020. The USACE formally extended the statutory time limit for commission action to April 21, 2020. The April 21, 2020 date was passed without any commission action, therefore, the consistency determination is presumed to be concurred with, and the proposed project is in compliance with this Act.

7.1.13 National Historic Preservation Act of 1996, as Amended (54 U.S.C. 300101 et seq.)

The NHPA requires federal agencies to consider the effects of a proposed undertaking on properties determined to be eligible for, or included in, the NRHP. The goal of the NHPA is to have federal agencies act as responsible stewards of our national resources when their actions affect historic properties. Section 106 applies when two thresholds are met: (1) there is a federal or federally licensed action, including grants, licenses, and permits; and (2) that action has the potential to affect properties listed in or eligible for listing in the NRHP. Section 106 requires each federal agency to identify and assess the effects of its actions on historic resources and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. The agency must consult with appropriate state and local officials, Native American tribes, applicants for federal assistance, and members of the public, and consider their views and concerns about historic preservation issues when making final project decisions. Effects are resolved by mutual agreement, usually among the affected state's SHPO/THPO, the federal agency, and any other involved parties. The ACHP may choose to participate in controversial or precedent-setting situations.

The USACE submitted a consultation package to the California SHPO on December 23, 2019 (see *Appendix J – Coordination*). The SHPO provided a response on January 21, 2020 requesting additional information in order to make their determination. The USACE prepared the additional information and provided it to the SHPO. After receipt of this additional information, consultation with the SHPO under Section 106 of the National Historic Preservation Act was completed February 18, 2020 (see *Appendix J – Coordination*).

7.1.14 Noise Control Act of 1972, as Amended (42 U.S.C. 4901, *et seq.*)

Inadequately controlled noise presents a growing danger to the health and welfare of the Nation's population, particularly in urban areas. The major sources of noise include transportation vehicles and equipment, machinery, appliances, and other products in commerce. The Noise Control Act of 1972 establishes a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. The Act also serves to: 1) establish a means for effective coordination of federal research and activities in noise control; 2) authorize the establishment of federal noise emission standards for products distributed in commerce; and 3) provide information to the public respecting the noise emission and noise reduction characteristics of such products.

While primary responsibility for control of noise rests with state and local governments, federal action is essential to deal with major noise sources in commerce, control of which requires national uniformity of treatment. EPA is directed by Congress to coordinate the programs of all federal agencies relating to noise research and control. Also, the Act requires that federal agency activities comply with all federal, State, and local laws and regulations that regulate noise levels. The general plans for Orange County, the Cities of Anaheim, Cypress, Fountain Valley, Garden Grove, Huntington Beach, Los Alamitos, Seal Beach, Stanton, and Westminster identify noise emissions thresholds, which were incorporated into the significance thresholds used in the assessment of potential project impacts. Construction related noise could result in intermittent noise impacts to residential uses within 100 feet of construction activities. Truck routes and detours would consider potential impacts to adjacent properties. All construction equipment would be properly maintained. No night-time construction is planned.

7.1.15 Resource Conservation and Recovery Act (42 U.S.C. 6901, *et seq.*)

This Act enables EPA to administer a regulatory project that extends from the manufacture of hazardous materials to their disposal, thus regulating the generation, transportation, treatment, storage, and disposal of hazardous waste at all facilities and sites in the U.S. The proposed project would comply with this Act when transporting or disposing of hazardous material found in the project area.

7.1.16 Executive Order 13751 Safeguarding the Nation from the Impacts of Invasive Species

Executive Order 13751 calls for actions "to prevent the introduction of invasive species and provide for their control and to minimize the economic impact, plant, animal, ecological, and human health impacts that invasive species cause" utilizing the laws of the United States of America, including the NEPA of 1969, as amended (42 USC §4321, et seq.), the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (16 USC §4701, et seq.), the Plant Protection Act (7 USC §7701, et seq.), the Lacey Act, as amended (18 USC §42; 16 USC §3371-3378, et seq.), the Endangered Species Act of 1973, as amended (16 USC §1531, et seq.), the Noxious Weed Control and Eradication Act of 2004 (7 USC §7781, et seq.), and other pertinent statutes.

Executive Order 13112 *Safeguarding the Nation from the Impacts of Invasive Species* predates Executive Order 13751. Executive Order 13112 calls for actions to prevent the introduction of invasive species, and established the National Invasive Species Council (NISC). In 2001, the NISC completed the National Invasive Species Management Plan, Meeting the Invasive Species Challenge (NISC 2001), which served as a comprehensive "blueprint" for federal action on invasive species, as well as the NISC's primary coordination tool. The 2008-2012 National Invasive Species Management Plan (the 2008 Plan) (NISC 2008) was the first revision of the 2001 Plan. The 2008 Plan focused on five strategic goals: prevention, early detection and rapid response, control and management, restoration, and organizational collaboration.

In an effort to comply with the above executive orders, the proposed project should consult the California Invasive Plant Council's (Cal-IPC) weed management guidelines. While weed management strategies are often species specific, hand weeding and mowing is appropriate for relatively small areas. In addition, the CDFW specifically asked in their comment letter on the Draft Report (Sevrens 2018) how the proposed project would prevent the spread of Invasive Shot Hole Borer's (ISHB). It is unlikely that the proposed project would contribute to the spread of ISHB. The proposed project would only use wood products (i.e., precut treated lumber) for concrete form work within the channels. The proposed project does not include the introduction of any other type of wood products for construction activities or for long-term operation. The modification of the channel may require minor ornamental tree-trimming along channel access ramps and maintenance roads in order for construction equipment to safely pass. Tree-trimmings that would be recycled would either be treated on-site before transfer to a recycling facility. If unable to treat the tree-

trimmings on site, the trimmings would be covered while in transportation to a recycling facility. Tree-trimmings that are not recycled would be covered while in transportation to a landfill for disposal.

7.2 State Requirements

7.2.1 Alquist-Priolo Earthquake Fault Zoning Act of 1972 (PRC Section 2621, *et seq.*)

The Alquist-Priolo Earthquake Fault Zoning Act was enacted in 1972 and renamed in 1994. It seeks to reduce the risk to life and property from surface fault rupture during earthquakes. It prohibits the location of most types of structures intended for human occupancy across the traces of active faults, and strictly regulates construction in the corridors along active faults (earthquake fault zones). It also defines criteria for identifying active faults, gives legal weight to terms such as active, and establishes a process for reviewing building proposals in and adjacent to earthquake fault zones. Under the Act, faults are zoned and considered sufficiently active if one or more of its segments or strands shows evidence of surface displacement during the Holocene Epoch (considered present time and defined for purposes of the Act of approximately the last 11,000 years). A fault is considered well defined if its trace can be clearly identified by a trained geologist at the ground surface or in the shallow subsurface using standard professional techniques, criteria and judgment (Hart and Bryant 1997). The western-most reaches of the channel system to be modified as part of the proposed project would be constructed within the Newport-Inglewood Alquist-Priolo Earthquake Fault Zone. The Alquist-Priolo Act prohibits the construction of habitable structures across active faults and within 50 feet of an active fault; however, as the channels are not habitable, they are not subject to compliance with the Alquist-Priolo Act. Therefore, the proposed project is in full compliance with this Act.

7.2.2 California Clean Air Act

The CAA was signed into law in 1988 and, for the first time, clearly spelled out in statute California's air quality goals, planning mechanisms, regulatory strategies, and standards of progress. It provides the state with a comprehensive framework for air quality planning regulations. Prior to passage of the Act, federal law contained the only comprehensive planning framework.

The CAA requires attainment of state ambient air quality standards by the earliest practicable date. For air districts in violation of the state ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide standards, attainment plans were required by July 1991. CARB is responsible for the development, implementation and enforcement of California's motor vehicle pollution control program, GHG state-wide emission estimates and goals and development and enforcement of GHG emission reduction rules. A summary of the major California GHG regulations that will affect the project's GHG emissions requires projects to determine whether emission sources and levels significantly affect air quality based on federal standards established by USEPA, and state standards set by CARB. Compliance with the CAA for GHG emissions is expected with incorporated mitigation measures specified in Section 5.5.4. As a result, full compliance with this Act is expected with coordination with SCAQMD and preconstruction permitting.

7.2.3 California Endangered Species Act

The CESA was enacted in 1984 and prohibits the take of listed endangered, threatened, and candidate species. It defines take as an activity that would directly or indirectly kill an individual of a species; habitat destruction is not included in the State's definition of take. This Act requires the NFS to consider the potential adverse effects to State-listed species. As a joint NEPA/CEQA document, this IFR/EIS/EIR considered the potential effects to State-listed species. CDFW administers the Act and authorizes take through Section 2081 agreements (except for species designated as fully protected). CDFW can adopt a federal biological opinion as a state biological opinion under California Fish and Game Code, Section 2095. In addition, CDFW can write a consistency determination for species that are both federal and state

listed if CDFW determines that the avoidance, minimization, and compensation measures will ensure no take of species.

The project study area falls within the OCTA NCCP/HCP (see Section 2.8.7). It covers an expansive list of species and habitats of interest at federal, State, and local levels. This conservation plan was considered during development of project alternatives and identification of the proposed project. The proposed project is consistent with the conservation plan.

There is the potential for the proposed project to impact state-listed species such as California least tern, Belding's savannah sparrow, black skimmer, and peregrine falcon if nests are present within the proposed project's action area. As stated above in Section 7.1.11, to ensure that construction of the proposed project minimizes impacts to breeding and nesting birds within adjacent high quality areas, construction of the downstream elements of the project (e.g., C02 Reach 23, C05 Reach 1, and Warner Avenue Bridge) will occur outside of breeding and nesting season (refer to Section 5.8.3 Mitigation Measures for Biological Resources). If special status bird species and/or other sensitive wildlife species breeding activity/active nests are found within or directly adjacent to the proposed project's direct footprint during construction (despite best efforts to schedule activities outside their breeding season), then all work in the immediate area will be halted and the project biologist will be notified immediately. An appropriate buffer zone around any active nest for exclusion of project-related activities would be specified by the project biologist, in coordination with the USFWS and CDFW. With the implementation of these mitigation measures, the proposed project would be in compliance with this Act.

7.2.4 California Environmental Quality Act

CEQA applies to an action that is directly undertaken by a California public agency; is supported in whole or part by California public agency contracts, grants, subsidies, loans, or other assistance for a public agency; or involves the issuance by a California public agency of a permit, lease, license, certificate, or other entitlement for use by a public agency. CEQA requires State, regional, and local agencies to prepare environmental documents assessing the significant environmental impacts of the proposed project, to circulate these documents to other agencies and the public for comment, and to consider these comments in their decision-making.

The CEQA lead agency for this project is Orange County. This Final EIS/EIR was prepared jointly with the NEPA and CEQA lead agencies to meet both requirements. OCPW is the lead agency under CEQA and determined that the mitigation measures incorporated would reduce most impacts to less than significant levels; however, impacts to air quality and noise would remain significant. Therefore, a Statement of Overriding Considerations would be prepared.

Upon certifying the document, the CEQA lead agency would adopt a mitigation monitoring reporting program to mitigate or avoid significant environmental effects and a Notice of Determination would be filed.

7.2.5 California Fish and Game Code

CDFW provides protection from take for various species under the CFGC. CDFW also regulates work that will substantially affect resources associated with rivers, streams, and lakes in California, pursuant to CFGC Sections 1600 to 1607. Section 1602 requires project proponents to notify CDFW before any project that would divert, obstruct or change the natural flow, bed, channel, or bank of any river, stream or lake. CDFW's jurisdiction extends to the top of banks and often to the outer edge of riparian vegetation canopy cover. Preliminary notification and project review generally occur during the environmental process. When an existing fish or wildlife resource may be substantially adversely affected, CDFW is

required to propose reasonable changes to the project to protect the resources that are formalized in a streambed alteration agreement that becomes part of the plans, specifications and bid document.

7.2.6 California Global Warming Solutions Act

California Assembly Bill 32, the California Global Warming Solutions Act of 2006, identifies California as a substantial source of GHG emissions and requires a significant emissions reduction. GHG emission levels must be reduced to 2000 levels by 2010, to 1990 levels by 2020 and to 80 percent below 1990 levels by 2050. The emissions reduction is expected to be achieved through the continuation of existing state policies, and through the enforcement of a state-wide GHG emissions limit incorporated in 2012.

Existing policies aimed at limiting GHG emissions include Assembly Bill 1493, which requires CARB to define standards for cars and light trucks manufactured after 2009, and is projected to result in an 18 percent reduction in emissions. In addition, SB 97, enacted in 2007, requires that CEQA guidelines be amended to incorporate analysis and mitigation of GHG emissions in CEQA documents. The Natural Resources Agency adopted the CEQA Guideline Amendments on December 30, 2009, under §15064.4.

The action alternatives would result in a temporary increase in GHG emissions as a result of project-related construction. These impacts would be reduced to less than significant through the incorporation of mitigation measures. Additional analysis of staging area location, truck routes, and detours would be conducted during the PED phase to minimize potential impacts on local traffic. The proposed project could result in minor traffic delays during construction, but would not permanently increase travel times through the affected areas. In fact, air quality in the region over the long term will improve by reduction in traffic delays and detour-related mileage during flood events. The FRM project occurs in a highly developed area, and would not induce or otherwise result in a long-term, indirect increase in vehicle-related GHG emissions.

7.2.7 California Public Utilities Commission (CPUC)

The CPUC regulates privately owned telecommunications, electric, natural gas, water, railroad, rail transit, and passenger transportation companies. CPUC is responsible to ensuring that California utility customers have safe, reliable utility service at reasonable rates, protects utility customers from fraud, and promotes the health of California's economy. CPUC establishes service standards and safety rules, and authorizes utility of power lines by public utilities under its jurisdiction. CPUC works with other state and federal agencies in promoting water quality, environmental protection and safety. The proposed project is in full compliance with CPUC standards and rules when relocating public utilities.

7.2.8 California Seismic Hazards Mapping Act

The California Seismic Hazards Mapping Act of 1990 (California PRC Sections 2690-2699.6) addresses seismic hazards other than surface rupture, such as liquefaction and induced landslides. It specifies that the lead agency for a project may withhold development permits until geologic or soils investigations are conducted for specific sites and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils. As described in Section 2.2.3, there is an active fault within the proposed project area and there is the probability that the proposed project could experience at least one or more earthquakes within the life of the project. Design, construction, and maintenance of the proposed project would comply with the regulatory standards for USACE including requirements for seismic design. The design and construction of the proposed project along with the implementation of mitigation measures, is expected to meet or exceed applicable design standards for static and dynamic stability, seismic ground shaking, liquefaction, subsidence and seepage.

7.2.9 California Water Code

The proposed project is located within the Santa Ana RWQCB's jurisdiction. The preparation and adoption of water quality control plans, or Basin Plans, and State-wide plans, is the responsibility of the SARWQCB. State law requires that Basin Plans conform to policies set forth in the California Water Code beginning with Section 13000 and any state policy for water quality control. These plans are required by the California Water Code (Section 13240) and supported by the federal CWA. Section 303 of the CWA requires states to adopt water quality standards that "consist of the designated uses of the navigable waters involved and the water quality criteria for such waters based upon such uses." According to Section 13050 of the California Water Code, Basin Plans consist of a designation or establishment for the waters within a specified area of beneficial uses to be protected and water quality objectives to protect those uses. Adherence to Basin Plan water quality objectives protects continued beneficial uses of water bodies. Because beneficial uses and corresponding water quality objectives can be defined per federal regulations as water quality standards, the Basin Plans are regulatory references for meeting state and federal requirements for water quality control (40 C.F.R. 131.20). The potential effects of the proposed project on water quality were evaluated and are discussed in Section 5.4. Compliance with the California Water Code will be accomplished by obtaining certifications from the Santa Ana RWQCB and an internal 404 review by USACE.

7.2.10 EO S-3-05

This Order asserts that California is vulnerable to the effects of climate change. It puts forth that increased temperatures could reduce the Sierra Nevada snowpack, further exacerbate California's air quality problems and potentially cause a rise in sea levels. To combat those concerns, the EO established total GHG emissions targets. It also established the following GHG emissions reduction targets:

- By 2010, reduce GHG emissions to 2000 levels.
- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80% below 1990 levels.

The EO directed the Secretary of the CalEPA to initiate a multi-agency effort to reduce GHG emissions to target levels. To comply, the Secretary created a Climate Act Team composed of members of various state agencies and commissions. The Climate Act Team released its first report in March 2006 (California EPA 2006). The report proposes achieving GHG targets through voluntary actions of California businesses, local government and community actions, and state incentive and regulatory projects. The proposed project would fully comply with this EO.

7.2.11 Hazardous Waste Control Act

The Act created the State Hazardous Waste Management Project, which is similar to but more stringent than the Federal Resource Conservation and Recovery Act Project. The Act is implemented by regulations contained in Title 26 CCR, which describes the following elements required for the proper management of hazardous waste:

- Identification and classification;
- Generation and transportation;
- Design and permitting of recycling, treatment, storage, and disposal facilities;
- Treatment standards;
- Operation of facilities and staff training; and

- Closure of facilities and liability requirements.

These regulations list more than 800 materials that may be hazardous and establish criteria for identifying, packaging, and disposing of such waste. Under the Hazardous Waste Control Act and Title 26, the generator of hazardous waste must complete a manifest that accompanies the waste from generator to transporter to the ultimate disposal location. Copies of the manifest must be filed with the California Department of Toxic Substances and Control. The proposed project would properly manage the identification, transport and disposal of hazardous wastes during construction, and therefore, be in full compliance with this Act.

7.2.12 Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1970 established the SWRCB and nine RWQCBs within California. These groups are the primary state agencies responsible for protecting California water quality to meet present and future beneficial uses, and regulating appropriative surface rights allocations. The preparation and adoption of water quality control plans, or Basin Plans, and State-wide plans, is the responsibility of the SWRCB. State law requires that Basin Plans conform to the policies set forth in the California Water Code beginning with Section 13000 and any state policy for water quality control. These plans are required by the California Water Code (Section 13240) and supported by the federal CWA. Section 303 of the CWA requires states to adopt water quality standards which "consist of the designated uses of the navigable waters involved and the water quality criteria for such waters based upon such uses."

According to Section 13050 of the California Water Code, Basin Plans consist of a designation or establishment for the waters within a specified area of beneficial uses to be protected, and water quality objectives to protect those uses. Adherence to Basin Plan water quality objectives protects continued beneficial uses of water bodies. The potential effects of the proposed project on water quality were evaluated and are discussed in Section 5.4.

Prior to construction, USACE would obtain a NPDES general construction permit. Conditions of the permit would require development and implementation of a SWPPP to limit effluent discharge as a result of storm water runoff and performance of inspections of storm water pollution prevention measures during and after construction. The proposed project expects to achieve full compliance with the Act by achieving compliance with RWQCB certification mandates for Section 401 of the federal CWA.

7.3 Local Plans and Policies

7.3.1 Air Pollution Control Districts

California has 35 local air pollution control districts throughout the State. Each district is responsible for establishing and enforcing air pollution regulations in order to attain and maintain all federal and state ambient air quality standards. These districts permit stationary sources of air pollution and implement transportation control measures for their respective regions. In order to combat particular air quality problems within its region, each district adopts its own rules and regulations as the types of sources of air emissions vary from district to district. The SCAQMD is made up of four counties in California's South Coast: Los Angeles County, Orange County, Riverside County, and San Bernardino County. Federal and state laws require emission control measures in areas where air pollution exceeds standards; Orange County is one of these areas. The SCAQMD develops and adopts AQMP which serve as blueprints to bring the area into compliance with federal and state clean air standards. On March 3, 2017, the SCAQMD approved the 2016 AQMP that demonstrates attainment of the 1-hr and 8-hr ozone NAAQS as well as the latest 24-hr and annual $PM_{2.5}$ standards. Previous AQMPs include the 2012 AQMP for the 24-hr $PM_{2.5}$ standards. The proposed project would comply with control measures to mitigate impacts to air

quality to less than significant, including minimization of the construction footprint, wetting of soils, and proper maintenance of construction equipment.

7.3.2 Public Works and Transportation Departments

An encroachment permit must typically be obtained when encroachments are proposed within, under or over a county or city road, or cover rights-of-way. The NFS for the proposed project is the OCPW which issues encroachment permits for Orange County and Orange County Flood Control District (OCFCD). Permits would also need to be obtained from the individual cities where work is occurring. The proposed project includes mitigation measures to ensure public safety and acceptable flow of traffic (refer to Section 5.15.3).

7.3.3 Mosquito Abatement District

The Orange County Mosquito and Vector Control District is responsible for conducting mosquito abatement and vector control in Orange County. OCPW will coordinate with the Orange County Mosquito and Vector Control District to determine if any additional mosquito abatement is required by the proposed project.

7.3.4 Local General Plans

Section 65300 of the California Government Code states that “Each planning agency shall prepare, and the legislative body of each county and city shall adopt, a comprehensive, long term general plan for the physical development of the county or city, and of any land outside its boundaries which in the planning agency’s judgment bears relation to its planning.” The general plan is to consist of seven mandatory elements, and as many optional elements as the local jurisdiction deems desirable. The mandatory elements include land use, circulation, housing, open space, conservation, safety, and noise. Orange County and the Cities of Anaheim, Cypress, Fountain Valley, Garden Grove, Huntington Beach, Los Alamitos, Seal Beach, Stanton, and Westminster General Plans were consulted and considered during development and evaluation of the alternatives. The Recommended Plan, including proposed mitigation measures, will comply with or enhance the achievement of most of the policies and regulations established by the General Plans.

7.4 Summary of Compliance with Applicable Laws, Policies, and Plans

Table 96: Summary of compliance with applicable laws, policies, and plans discussed in Sections 7.1 through 7.3.

Reference	Environmental Statutes/Regulations	Project Compliance[a]
Federal		
42 U.S.C. 7401	Clean Air Act of 1970, as amended	P
33 U.S.C. 1251, et seq.	Clean Water Act of 1977, as amended	P
42 U.S.C. 9601	Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980	C
16 U.S.C. 1531, et seq.	Federal Endangered Species Act of 1973, as amended	C
EO 11990	Protection of Wetlands	C
EO 11988	Floodplain Management	C
EO 12898	Federal Actions to Address Environmental Justice in Minority and Low-Income Populations	C
EO 13045	Protection of Children from Environmental Health Risks and Safety Risks	C
16 U.S.C. 661	Fish and Wildlife Coordination Act, as amended	C
16 U.S.C. 1801, et seq.	Magnuson-Stevens Fish Conservation and Management Act	C
16 U.S.C. 703, et seq.	Migratory Bird Treaty Act of 1918, as amended	C
54 U.S.C. 300101, et seq.	National Historic Preservation Act, as amended	C
42 U.S.C. 4901, et seq.	Noise Control Act	NC
42 U.S.C. 6901, et seq.	Resource Conservation and Recovery Act of 1976, as amended	C
State		
PRC Section 2621, et seq.	Alquist-Priolo Earthquake Fault Zoning Act of 1972, as amended	C
AB 2595	California Clean Air Act of 1988	P
	California Endangered Species Act	C
PRC § 21000 et seq.	California Environmental Quality Act of 1970	C
FGC § 1, et seq.	California Fish and Game Code	C
AB 32	California Global Warming Solutions Act of 2006	C
	California Public Utilities Commission	C
PRC § 2690-2699.6	California Seismic Hazards Mapping Act of 1990	C
WAT § 1 et seq.	California Water Code	C
EO S-03-05	Governor's Executive Order # S-03-05	C
CCR, Title 26	Hazardous Waste Control Act	C
WAT § 7	Porter-Cologne Water Quality Control Act of 1969	C
Local		
	Air Pollution Control Districts	C
	Public Works and Transportation Departments	C
	Mosquito Abatement District	C
	Local General Plans	C

[a] NA = not applicable, C = Compliance, P = Pending, and NC = Non-Compliant

8.0 Recommended Plan*

Based on the cost and benefit analysis of the final array of alternatives, the NED Plan is the Minimum Channel Modifications Plan. This plan is estimated to produce $101,743,000 in AAE benefits at an AAE cost of $24,119,000 (total project cost of $483,856,000), for a benefit to cost ratio (BCR) of 4.2 at the current Federal Discount Rate (FDR) of 2.75%.

The NFS has expressed an interest in pursuing a LPP from one of the final array of alternative plans that was not identified as having the highest average annual net benefits. The LPP is the Maximum Channel Modifications Plan and it is estimated to produce $116,255,000 in AAE benefits at an AAE cost of $58,211,000 (total project cost of 1,224,598,000), for a BCR of 2.0 at the current FDR of 2.75%. LPPs may be selected as the Recommended Plan pending approval from HQUSACE and the Assistant Secretary of the Army for Civil Works (ASA(C)W)), and have a BCR greater than 1. The LPP, or the Maximum Channel Modifications Plan, was approved as the Recommended Plan by the ASA(CW) in a memo dated October 16, 2019: *Westminster, East Garden Grove, California, Flood Risk Management Study – Exception Request for Locally Preferred Plan (LPP).*

Table 97: The LPP is the Recommended Plan. The NED is important for determining the cost-share requirements. Shown at FY 2020 Price Level and 2.75% Federal Discount Rate.

Plan	Name	Total First Cost ($1,000)	Average Annual Equivalent Values ($1,000s)			BCR
			Benefits	Costs	Net Benefits	
NED	Minimum Channel Modifications	483,856	101,743	24,119	77,624	4.2
LPP	Maximum Channel Modifications	1,224,598	116,255	58,211	58,044	2.0

8.1 Components of the NED Plan and LPP

8.1.1 National Economic Development Plan

The NED Plan is the Minimum Channel Modifications Plan (Table 98 and Table 99, and Figure 48). This plan would address flood risk primarily by lining existing drainage channels to improve flow (Section 3.5.3 and Section 3.6.2).

Trapezoidal channel reaches that currently have an earthen bottom and either earthen or riprap banks would be lined with concrete. There would be no alteration to reaches that are rectangular in shape or lined with concrete, nor to reaches of in-channel box and pipe structures.

The leveed areas in the downstream reaches of C02 and C05 (reaches 23 and 1, respectively) would be improved to reduce the risk of levee failure. Modifications in these reaches would include installation of dual-steel sheet pile channel walls and preservation of existing soft bottom, tidally-influenced habitat. In Reach 23, a single line of sheet pile would be driven at the crest of the existing levee along the entire south side of the channel within the reach and tied back into C04 near Bolsa Chica Street. This would reduce the risk of levee failure in this reach.

Additional downstream measures would be combined with the in-channel measures to address existing flooding in Outer Bolsa Bay and to compensate for increased flow volumes that result from increased conveyance capacity in the channels. This downstream area is not considered a separable element, as discussed in 3.4.3. Preliminary design of the downstream measures included in this plan is based upon

hydraulic modeling carried out during the study, and specifically the increased amount of stormwater that will need to be controlled or passed through Outer Bolsa Bay to compensate for additional flow volumes and velocities caused by channel modifications upstream in C05/C06.

The tide gates on C05 would be removed in order to improve the flow conditions through the lower reaches of the C05 channel. The current tide gates leak and therefore allow saltwater habitat to exist upstream in C05 in the future without project condition. This saltwater influence extends upstream of Outer Bolsa Bay for approximately 2.5 miles. Due to these factors, the tide gate replacement measure was screened out because it would represent an unnecessary project feature and cost.

This alternative also includes the widening of the Outer Bolsa Bay channel just upstream of the Warner Avenue Bridge. Widening of the channel would require that the Warner Avenue Bridge and the pedestrian bridge at the Bolsa Chica Conservancy be expanded. Widening of the Outer Bolsa Bay channel would improve conveyance as well as the hydraulic efficiency of the lower reaches of C05. Initial plan formulation considered total replacement of the structure, but based on more detailed design, the NED Plan currently includes expanding the bridge in place (to the west) with the installation of additional pile structures. See the *Appendix B - Civil Engineering* for more detail and drawings related to this design.

This alternative also includes the nonstructural measure of removing of impediments to flow. This would reduce residence time of floodwaters in the study channels.

The NED promotes compatible recreation by maintaining, and in places improving, walking trails, particularly in the downstream end of C05 and elsewhere in the vicinity of Outer Bolsa Bay. C05 Reach 1 will be modified to match the condition of the already-completed dual steel sheet pile channel further upstream between Graham Street and Warner Avenue. The associated maintenance lanes on top of the sheet pile channel configuration represent a more resilient, accessible, and safe walking surface for recreational use than the existing earthen and riprap levees. This alternative would also include replacement of existing, and deteriorating, recreation infrastructure that would be affected by implementation; this includes the existing pedestrian bridge near the Bolsa Chica Ecological Center and the path on top of the existing tide gates.

Table 98: The Minimum Channel Modifications Plan (NED Plan) is composed of the following channel modifications in C02/C04 on a reach-by-reach basis compared to existing conditions.

C02/C04			
Channel	**Reach**	**EXISTING CONDITIONS**	**MINIMUM CHANNEL MODIFICATIONS ALTERNATIVE**
C02	23	Earthen trapezoidal	Single steel sheet pile driven at levee crest on south side of channel only. No excavation of material of material in the channel. Top of sheet pile may extend ~3 feet above current levee crest elevation. Tie back into C04 at Bolsa Chica Street.
C04	20	Riprap lined trapezoidal from C02 to Bolsa Chica Street; Earthen & riprap trapezoidal from Bolsa Chica Street to Graham Street; Earthen trapezoidal from Graham Street to McFadden Avenue; Riprap trapezoidal from McFadden Avenue to Bolsa Avenue; Earthen & riprap trapezoidal from Bolsa Avenue to Edwards Street Concrete lined rectangular from Edwards Street to I-405	Concrete lined trapezoidal from C02 to Edwards Street; Concrete lined rectangular from Edwards Street to I-405 (existing);
C04	21	Concrete lined rectangular	No Action
C04	22	Concrete lined compound from Beach Blvd to Magnolia Street; Concrete rectangular with soft bottom from Magnolia Street to Brookhurst; Riprap trapezoidal from Brookhurst Street to Westminster Avenue; Concrete lined trapezoidal from Westminster Avenue to SR-22	Concrete lined compound from Beach Blvd to Magnolia Street; Concrete rectangular from Magnolia Street to Brookhurst; Concrete lined trapezoidal from Brookhurst Street to SR-22;

Table 99: The Minimum Channel Modifications Plan (NED Plan) is composed of the following channel modifications in C05/C06 on a reach-by-reach basis compared to existing conditions.

C05/C06			
Channel	**Reach**	**EXISTING CONDITIONS**	**MINIMUM CHANNEL MODIFICATIONS ALTERNATIVE**
C05	1	Earthen levee from tide gates to Warner Avenue w/ some SSP on south bank near Graham Street; SSP rectangular from Graham Street to Warner Avenue; Earthen levees from Warner Avenue to 1,300 ft upstream of Edwards Avenue	Sheet pile/soft bottom/splash walls (various heights) from tide gates to existing rectangular channel west of Golden West Street 3 crossings replaced of different sizes
C05	2	Concrete lined rectangular	Concrete rectangular with 1' splash walls from Goldenwest to Gothard St; Concrete rectangular from Gothard Street to C05/C06 confluence
C05	3	Riprap lined trapezoidal from C05/C06 confluence to Woodruff Street; Concrete rectangular from Woodruff Street to I-405	Concrete lined trapezoidal from confluence with C06 to Beach Blvd; Concrete lined rectangular from Beach Blvd. to I-405
C05	4	Concrete lined rectangular from I-405 to Quartz Street; Riprap lined trapezoidal from Quartz Street to Bushard Street	from I-405 to Quartz Street; concrete lined trapezoidal from Quartz Street to Bushard Street
C05	5	Riprap lined trapezoidal from Bushard St to Brookhurst St; 1,300 ft of concrete lined trapezoidal upstream of Brookhurst Street; Riprap lined trapezoidal to 3rd St	Concrete lined trapezoidal
C05	6	Concrete lined trapezoidal	No Action
C05	7	Covered concrete conduit	No Action
C05	8	Concrete lined trapezoidal	No Action
C05	9	Concrete lined trapezoidal	No Action
C05	10	Covered concrete conduit	No Action
C05	11	Covered concrete conduit	No Action
C05	12	Concrete lined trapezoidal (first 1400') and covered concrete conduit (next 1000')	No Action
C06	13	Earthen trapezoidal from C05/C06 confluence to Bolsa Avenue/RT-39; Riprap lined trapezoidal from Bolsa Avenue/RT-39 to Ross Lane	Concrete lined trapezoidal
C06	14	Concrete lined rectangular	No Action
C06	15	Covered concrete conduit	No Action
C06	16	Concrete lined rectangular	No Action
C06	17	Earthen and riprap lined trapezoidal	Concrete lined trapezoidal
C06	18	Mile Square Park-concrete low flow v-channel	No Action
C06	19	Riprap lined trapezoidal	Concrete lined trapezoidal

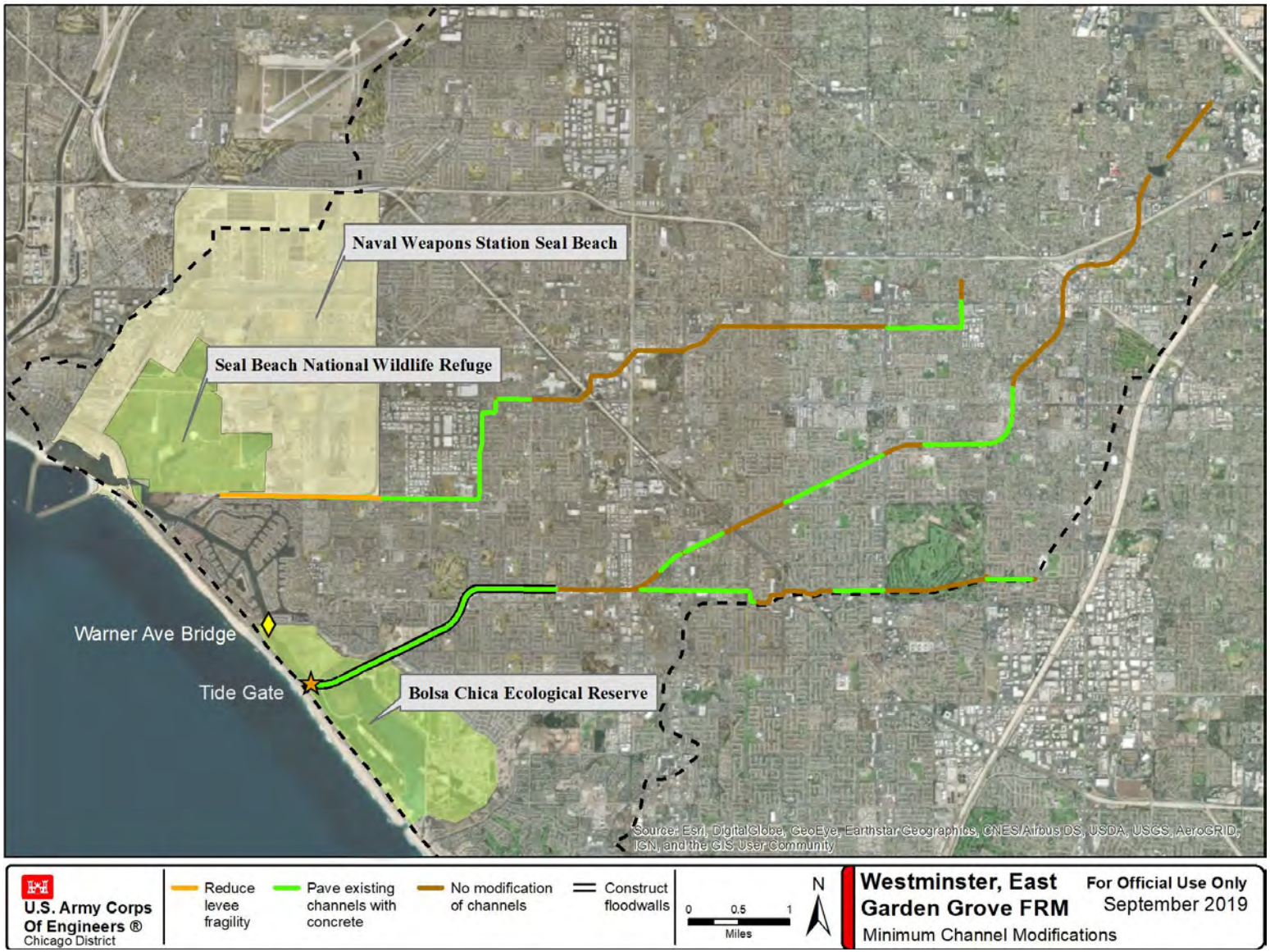


Figure 48: The Minimum Channel Modifications Plan is the NED Plan.

Page intentionally left blank
for double-sided printing

8.1.2 Locally Preferred Plan

The LPP is the Maximum Channel Modifications Plan (Table 100 and Table 101, and Figure 49). The Maximum Channel Modifications Alternative would address flood risk by altering the geometry of existing drainage channels (i.e. maximizing channel capacity within the right of way) to improve capacity and flow.

Under the Maximum Channel Modifications Plan, trapezoidal channels would be reconfigured to have a rectangular cross sectional geometry. This would increase both conveyance efficiency and capacity. This alternative is designed to contain the 1% ACE storm event. For reaches that do not contain the 1% ACE event after conversion to a concrete rectangular channel, floodwalls would be added. This alternative would also allow the NFS to meet their goal of containing the 1% ACE storm event throughout the study area. As a potential LPP, this plan would require the NFS to provide 100% of the increased cost difference from the identified NED Plan.

Trapezoidal channel reaches would be replaced with rectangular concrete (or steel sheet pile) channels. This would also necessitate making alterations to existing crossings (roads and pedestrian paths) to accommodate the new channel geometry.

Floodwalls would be constructed in the existing channel right of way where necessary to contain the 1% ACE storm event. Soft channel bottoms would be preserved in the tidally influenced downstream reaches of C02 and C05 to reduce impacts to marine habitat.

The leveed areas in the downstream reaches of C02 and C05 (reaches 23 and 1, respectively) would be improved to reduce the risk of levee failure. Modifications in Reach 1would include installation of dual-steel sheet pile channel walls and preservation of existing soft bottom, tidally-influenced habitat. In Reach 23, a sheet pile and anchor system would be installed on the south side of the channel, and the existing channel slope would be excavated. This would increase channel capacity (and soft-bottom habitat) as well as the risk of levee failure in this reach.

Where altering channel geometry is not feasible or would not contain the 1% ACE storm event, the Maximum Channel Modifications Alternative would utilize other retained flood damage risk reduction measures (diversion/bypass channels) to provide the additional capacity required. A Diversion Channel Westminster Mall would be constructed to reduce flows at the restriction on C04 reach 21 where the existing drainage channel goes underground at I-405.

Additional downstream measures would be combined with the in-channel measures to address existing flooding in Outer Bolsa Bay and to compensate for increased flow volumes that result from increased conveyance capacity in the channels. This downstream area is not considered a separable element, as discussed in 3.4.3. Preliminary design of the downstream measures included in this plan is based upon hydraulic modeling carried out during the study, and specifically the increased amount of stormwater that will need to be controlled or passed through Outer Bolsa Bay to compensate for additional flow volumes and velocities caused by channel modifications upstream in C05/C06.

The tide gates on C05 would be removed in order to improve the flow conditions through the lower reaches of the C05 channel. The current tide gates leak and therefore allow saltwater habitat to exist upstream in C05 in the future without project condition. This saltwater influence extends upstream of Outer Bolsa Bay for approximately 2.5 miles. Due to these factors, the tide gate replacement measure was screened out because it would represent an unnecessary project feature and cost.

This alternative also includes the widening of the Outer Bolsa Bay channel just upstream of the Warner Avenue Bridge. Widening of the channel would require that the Warner Avenue Bridge and the pedestrian bridge at the Bolsa Chica Conservancy be expanded. Widening of the Outer Bolsa Bay channel would improve conveyance as well as the hydraulic efficiency of the lower reaches of C05. Initial plan formulation considered total replacement of the structure, but based on more detailed design, the LPP currently includes expanding the bridge in place (to the west) with the installation of additional pile structures. See the Civil Engineering Appendix for more detail and drawings related to this design.

This alternative also includes the nonstructural measure of removing of impediments to flow. This would reduce residence time of floodwaters in the study channels.

The LPP promotes compatible recreation by maintaining, and in places improving, walking trails, particularly in the downstream end of C05 and elsewhere in the vicinity of Outer Bolsa Bay. C05 Reach 1 will be modified to match the condition of the already-completed dual steel sheet pile channel further upstream between Graham Street and Warner Avenue. The associated maintenance lanes on top of the sheet pile channel configuration represent a more resilient, accessible, and safe walking surface for recreational use than the existing earthen and riprap levees. This alternative would also include replacement of existing, and deteriorating, recreation infrastructure that would be affected by implementation; this includes the existing pedestrian bridge near the Bolsa Chica Ecological Center and the path on top of the existing tide gates.

Table 100: Reach-by-reach description of modifications to C02/C04 in the Maximum Channel Modifications Plan (LPP)

C02/C04			
Channel	**Reach**	**EXISTING CONDITIONS**	**MAXIMUM CHANNEL MODIFICATIONS ALTERNATIVE**
C02	23	Earthen trapezoidal	Sheet pile with anchor system located at existing levee crest on south side of channel only. Excavation of material on the channel side of the sheet pile.
C04	20	Riprap lined trapezoidal from C02 to Bolsa Chica Street; Earthen & riprap trapezoidal from Bolsa Chica Street to Graham Street; Earthen trapezoidal from Graham Street to McFadden Avenue; Riprap trapezoidal from McFadden Avenue to Bolsa Avenue; Earthen & riprap trapezoidal from Bolsa Avenue to Edwards Street Concrete lined rectangular from Edwards Street to I-405	80' Concrete rectangular with middle 48' left earthen from C02 to McFadden Avenue; 68' Concrete rectangular with middle 40' left earthen from McFadden Avenue to Bolsa Avenue; 55' Concrete rectangular from Bolsa Avenue to Edwards Street; 3 crossings replaced of different dimensions
C04	21	Concrete lined rectangular	Diversion Channel at Westminster Mall *(See Appendix B – Civil Engineering)*
C04	22	Concrete lined compound from Beach Blvd to Magnolia Street; Concrete rectangular with soft bottom from Magnolia Street to Brookhurst; Riprap trapezoidal from Brookhurst Street to Westminster Avenue; Concrete lined trapezoidal from Westminster Avenue to SR-22	Base of concrete lined channel increased to 35' from Beach Blvd to Magnolia Street; Soft bottom channel from Magnolia Street to Brookhurst Street concrete lined; Concrete lined trapezoidal from Brookhurst Street to Westminster Avenue; 18' Concrete rectangular from Westminster Avenue to SR-22; 12 crossings replaced of different dimensions

Table 101: Reach-by-reach description of modifications to C05/C06 in the Maximum Channel Modifications Plan (LPP)

C05/C06			
Channel	**Reach**	**EXISTING CONDITIONS**	**MAXIMUM CHANNEL MODIFICATIONS ALTERNATIVE**
C05	1	Earthen levee from tide gates to Warner Avenue w/ some SSP on south bank near Graham Street; SSP rectangular from Graham Street to Warner Avenue; Earthen levees from Warner Avenue to 1,300 ft upstream of Edwards Avenue	Sheet pile/soft bottom/splash walls (various heights) from tide gates to existing rectangular channel west of Golden West Street 3 crossings replaced of different sizes
C05	2	Concrete lined rectangular	Concrete rectangular with 1' splash walls from Goldenwest St to Gothard St; Concrete rectangular from Gothard Street to C05/C06 confluence
C05	3	Riprap lined trapezoidal from C05/C06 confluence to Woodruff Street; Concrete rectangular from Woodruff Street to I-405	Concrete lined rectangular; Some section of 1' splash wall between Beach Blvd and Woodruff Road; 2 crossings replaced of different sizes
C05	4	Concrete lined rectangular from I-405 to Quartz Street; Riprap lined trapezoidal from Quartz Street to Bushard Street	Concrete lined rectangular with splash walls (various heights); 3 crossings replaced of different sizes
C05	5	Riprap lined trapezoidal from Bushard St to Brookhurst St; 1,300 ft of concrete lined trapezoidal upstream of Brookhurst Street; Riprap lined trapezoidal to 3rd St	Concrete lined rectangular with splash walls (various heights); 6 crossings replaced of different dimensions
C05	6	Concrete lined trapezoidal	Concrete lined rectangular; 1 crossing replaced
C05	7	Covered concrete conduit	Replace crossing at New Hope & Hazard
C05	8	Concrete lined trapezoidal	Concrete lined rectangular; 3 crossings replaced of different sizes
C05	9	Concrete lined trapezoidal	Concrete lined rectangular; 5 crossings replaced of different sizes
C05	10	Covered concrete conduit	Replace crossing at Aspenwood; Haster Basin inlet culverts modified
C05	11	Covered concrete conduit	No Action
C05	12	Concrete lined trapezoidal (first 1400') and covered concrete conduit (next 1000')	No Action
C06	13	Earthen trapezoidal from C05/C06 confluence to Bolsa Avenue/RT-39; Riprap lined trapezoidal from Bolsa Avenue/RT-39 to Ross Lane	Concrete lined rectangular at confluence; Concrete lined trapezoidal from confluence to Ross Street; 2 crossings replaced of different sizes
C06	14	Concrete lined rectangular	Concrete lined rectangular from Ross Street to Asari Lane; Concrete lined rectangular with splash walls (1.5-2') from Asari Lane to Riverbend Drive
C06	15	Covered concrete conduit	Covered concrete conduit; 1 crossing replaced
C06	16	Concrete lined rectangular	Concrete lined rectangular, widened to 30’
C06	17	Earthen and riprap lined trapezoidal	Concrete lined trapezoidal, ~1ft splash walls
C06	18	Mile Square Park-concrete low flow v-channel	No Action
C06	19	Riprap lined trapezoidal	Concrete lined trapezoidal

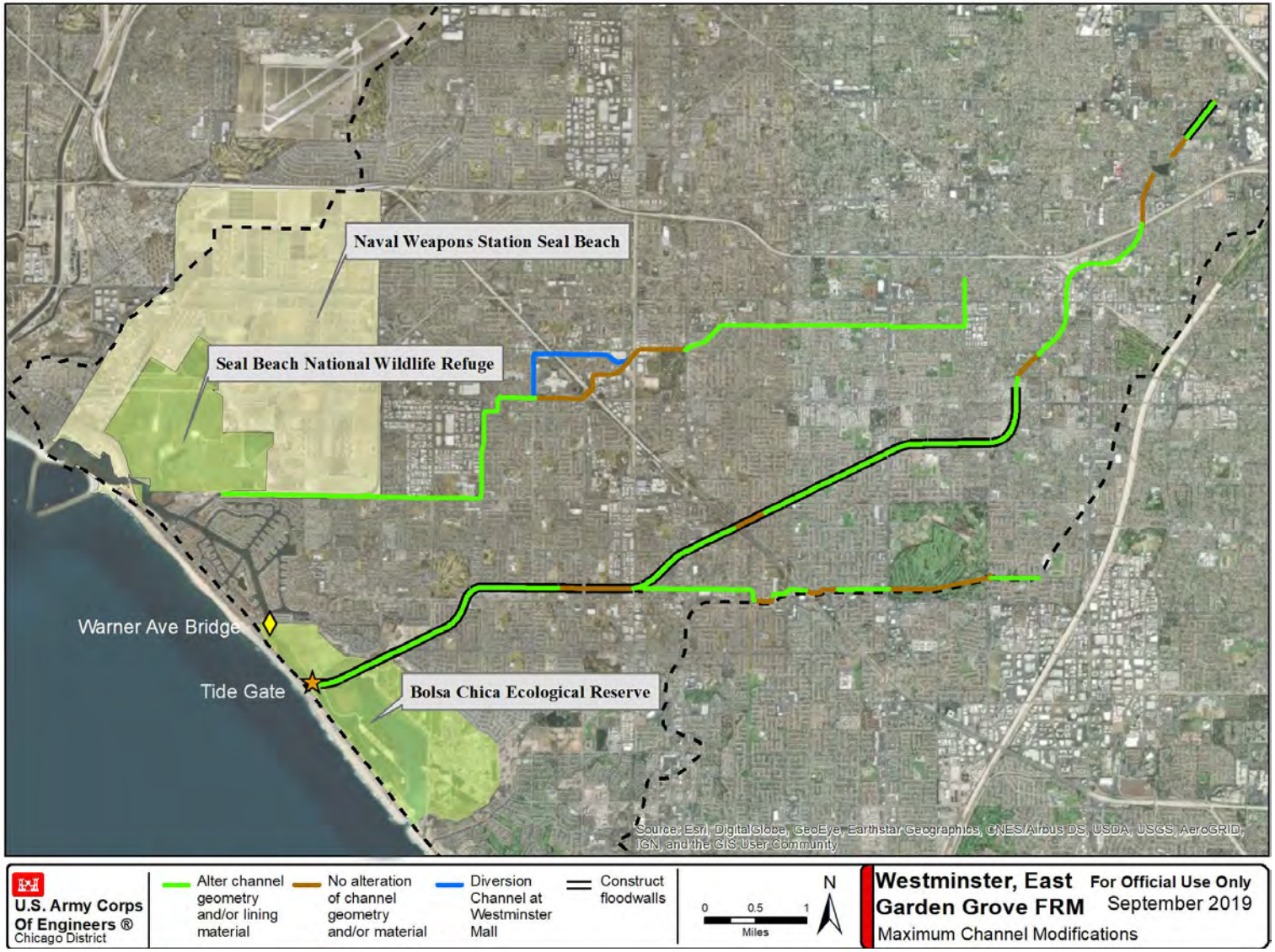


Figure 49: The Maximum Channel Modifications Plan is the Locally Preferred Plan.

Page intentionally left blank
for double-sided printing

8.2 Mitigation

Mitigation includes all measures that would avoid, minimize, offset or compensate for potential environmental effects. When considered under the Endangered Species Act, these measures may be referred to as conservation measures. As required under NEPA, potential mitigation and conservation measures for each resource are described in Chapter 5.0.

8.2.1 Mitigation Measures

Mitigation measures are relatively standardized and compulsory best practices that represent sound and proven methods to avoid or reduce potential effects. Although mitigation measures fall within the NEPA definition of mitigation through avoidance and minimization, the costs for implementing these measures are accounted for within the PED or Construction accounts, as appropriate, and are not included in the fish and wildlife habitat mitigation account. The mitigation measures identified in Table 102 would be implemented to avoid or reduce short-term construction-related effects.

Page intentionally left blank
for double-sided printing

Table 102: Mitigation Measures.

Mitigation Measure	Timing	Responsible Party
Earth Resources		
Consistent with the requirements of the California Construction General Permit Order (currently 2009-0009-DWQ; subject to update), each individual construction project shall have a Stormwater Pollution Prevention Plan (SWPPP) prepared by certified Qualified SWPPP Developer. SWPPP requirements will be integrated into the Environmental Protection Plan, which will be maintained on site and updated throughout the construction project.	Prior to construction	USACE, in coordination with the construction contractor.
Areas temporarily disturbed by construction would be returned to preconstruction conditions by grading and re-vegetating.	Post construction	Construction contractor
A qualified paleontologist would be notified and retained when earth-moving activities are anticipated to impact undisturbed deposits in the project site. The designated Paleontologist should be present during the pre-grade meeting to discuss paleontological sensitivity and to assess whether scientifically important fossils have the potential to be encountered. The extent of monitoring activities would be determined at the meeting in consultation with the OCPW. If any scientifically important large fossil remains are uncovered during earth-moving activities, the Paleontological Monitor would divert heavy equipment away from the fossil site until s/he has had an opportunity to examine the remains. Any identified paleontological artifacts will be preserved in accordance with applicable laws before construction resumes.	During construction	USACE, in coordination with the construction contractor.
Water Resources		
A SWPPP shall be prepared to reduce the potential for accidental release of fuels and other toxic materials. The SWPPP would be reviewed and approved by appropriate Corps team members. Consistent with federal and state regulations, BMPs shall be implemented to control the erosion of sediments into water courses, prevent or contain spills from storage locations or equipment used. This plan shall include the designation of refueling locations, emergency response procedures, and definitions of reporting requirements for any spill that occurs. Equipment for immediate cleanup will be kept at the staging area for immediate use. Measures identified within the SWPPP will be complied with during construction activities. The SWPPP and necessary containment and clean-up materials shall be kept within the construction area during all construction activities. Workers shall be educated on measures included in the SWPPP at the preconstruction meeting or prior to beginning work in the Proposed Action Area.	Prior to construction	USACE, in coordination with the construction contractor.

Mitigation Measure	Timing	Responsible Party
All construction contracts will require the Contractor to prepare, update, and maintain on site two documents related to spill prevention and contaminant control: a Spill Control Plan that includes the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by 40 C.F.R. 68, 40 C.F.R. 302, 40 C.F.R. 355, and/or regulated under State or Local laws and regulations; and a Contaminant Prevention Plan that identifies potentially hazardous substances to be used on the job site, identifies the intended actions to prevent introduction of such materials into the air, water, or ground, and details provisions for compliance with federal, State, and local laws and regulations for transportation, storage, and handling of these materials. These plans will include best practices to prevent the release of contaminants to the environment and to respond to any unforeseen releases. BMPs include such actions as having hazardous waste clean-up equipment and spill kits staged on-site, using the appropriate size and gauge drip pans and absorbent diapers, continual monitoring of refueling operations, good maintenance of equipment to prevent leaks or spills, and prompt and appropriate disposal of all waste materials.	Prior to construction	Construction contractor
Stockpile sites, parking areas, and staging areas shall be located to avoid erosion into open water and locations shall be approved by appropriate USACE team members.	During construction	USACE, in coordination with the construction contractor.
A Water Quality Mitigation and Monitoring Plan will be developed as needed for CWA 404/401 compliance. The plan shall meet the requirements of the SAWQCB. Monitoring and reporting will be proposed based on the estimated construction duration and extent associated for work in the ocean receiving waters.	Prior to construction	USACE
Turbidity curtains shall be used in instances when construction activities are adjacent to open water and during high flow periods when construction activities must continue. Turbidity curtains may consist of a floating line of buoys with a subsurface material curtain that can contain areas of in water disturbance or turbid run-off.	During construction	Construction contractor
Additional actions would be considered to provide practicable mitigation if plans or design modifications cause detrimental impacts on water quality conditions.	Prior/During construction	USACE, in coordination with the construction contractor.
Contract documents will include specifications about how a contractor shall respond to forecasted extreme weather events.	Prior to construction	USACE
Air Quality		
The project applicant shall require that all off-road diesel-powered equipment that is greater than 50 horsepower and utilized during implementation of the NED Plan or LPP shall be	Prior/During construction	Construction contractor

Mitigation Measure	Timing	Responsible Party
registered with CARB and labelled detailing that the equipment meets Tier 4 Final emissions standards.		
The project applicant shall require that all haul trucks utilized during implementation of the NED Plan or LPP shall be licensed in California and shall meet the model year 2010 (Tier 4 Final) or newer emissions standards.	Prior/During construction	Construction contractor
The project applicant shall require mitigation measures to reduce PM_{10} and $PM_{2.5}$ emissions. BMPs for controlling fugitive dust and pollutant emissions shall include the following techniques: • Water active construction sites to reduce fugitive dust, including locations where grading is to occur • All trucks hauling dirt, sand, soil, or other loose materials are to be covered or should maintain at least two feet of freeboard, according to the requirements of California Vehicle Code (CVC) 7 Section 23114 • During construction, the off-road equipment, vehicles, and trucks shall not idle more than five minutes in any one hour • The off-road construction equipment drivers shall have proper training in operating the equipment efficiently, taking into account ways to reduce the hours of equipment operation and/or operating the equipment at a lower load factor • Pave construction access roads at least 100 feet onto the site from main road • Reduce construction traffic speeds to 15 mph or less on unpaved surfaces • Sweep streets once a day if visible soil materials are carried to adjacent streets	Prior/During construction	Construction contractor
Energy		
Phase haul-in/haul-out of materials to avoid empty haul-back and reduce number of trips.	During construction	Construction contractor
The number of pieces of construction equipment operating simultaneously shall be minimized through efficient management practices to ensure that the smallest practical number are operating at any one time.	During construction	Construction contractor
Substitute electric equipment or alternative fuels whenever possible for diesel- or gasoline-powered equipment.	During construction	Construction contractor
Maintain all equipment as recommended by manufacturers' manuals.	During construction	Construction contractor
Construction worker trips should be minimized by requiring carpooling and by providing for lunch onsite.	During construction	Construction contractor
Shut down any equipment when not in use.	During construction	Construction contractor
Maintain on-road and off-road vehicle tire pressures to manufacturer specifications. Check tires and re-inflate at regular intervals.	During construction	Construction contractor

Mitigation Measure	Timing	Responsible Party
Use locally made materials for construction to the extent feasible.	During construction	Construction contractor
Noise		
The contractor will prepare a construction noise and vibration plan prior to construction. The noise and vibration plan will detail BMPs to be incorporated such as use of construction equipment equipped with noise-reduction devices, use of electrically powered equipment when feasible, and use of silent-pile driver where applicable. The plan will also detail the location of stationary noise-generating equipment such as generators, cement batch plant, etc., and the location of temporary sound walls that will be installed to minimize noise levels during construction activities. The plan will also detail how noise complaints will be received and resolved by the contractor.	Prior to construction	Construction contractor
Before construction activity begins within 50 feet of one or more residences or businesses, the local sponsor (i.e., OCPW) shall provide written notification to the potentially affected residents or business owners, identifying the type, duration, and frequency of construction activities. A noise disturbance coordinator shall be designated and contact information shall be provided in the notices and posted near the project area in a conspicuous location that is clearly visible to nearby receptors most likely to be disturbed. The coordinator shall manage complaints and concerns resulting from noise-generating activities. The severity of the noise concern would be assessed by the coordinator and if necessary, evaluated by a qualified noise control engineer.	Prior to construction	Construction contractor
To minimize noise impacts the following measures will be implemented: • Place portable acoustic panels next to residential areas, sensitive receptors, or other locations where heavy equipment is operating to minimize construction noise levels. Portable acoustic panels are anticipated to result in a minimum 5 dB of noise reduction. • All construction equipment will be equipped with noise reduction features, such as mufflers and engine shrouds. • Onsite generators and booster pumps will be enclosed entirely. • Use of quieter than standard equipment, including electrically powered equipment instead of internal combustion equipment, where use of such equipment is a readily available substitute that accomplishes project tasks in the same manner as internal combustion equipment.	During construction	Construction contractor

Mitigation Measure	Timing	Responsible Party
A silent pile driver may be used instead of an impact or vibratory pile driver where sensitive ecological resources, where sensitive receptors are nearby, or other locations where applicable.	During construction	Construction contractor
The use of bells, whistles, alarms and horns shall be restricted to safety warning purposes only.	During construction	Construction contractor
Biological Resources		
USACE will implement the reasonable and prudent measures, and their associated terms and conditions, set forth in the Biological Opinion issued by the NMFS on March 27, 2020 (see *Appendix J – Coordination*). • The USACE shall implement measures to monitor, document, and report all incidental take of green turtles resulting from the proposed project. • The USACE shall implement measures to minimize the extent of disturbance and disruption of normal foraging and behavior patterns of green sea turtles as well as risk of injury during the proposed project. USACE will also implement the following EFH Conservation Recommendations as set forth in the NMFS's Magnuson-Stevens Fishery Conservation and Management Act EFH response: • In order to offset adverse impacts to eelgrass habitat, the USACE should implement their proposed conceptual mitigation paln, which includes eelgrass establishment within Outer Bolsa Bay and out-of-kind kelp and rocky reef restoration and enhancement offshore the Palos Verdes peninsula, after revising the functional assessment, and finalizing the mitigation site selection and rocky reef mitigation approach, in collaboration with NMFS, USFWS, CDFW, and other interested regulatory agencies. • Prior to construction, the USACE should conduct an updated eelgrass survey in the downstream portion of C02 and its confluence with Huntington Harbour, and in Huntington Harbour near the Warner Avenue Bridge, in accordance with the California Eelgrass Mitigation Policy. The updated eelgrass survey should be used to determine whether eelgrass distribution and abundance has increased beyond the area assumed to be adversely affected by the project. If survey results indicate an increase in eelgrass habitat that may be affected by the project, then the USACE should adjust their compensatory mitigation approach accordingly. • Prior to construction, the USACE should survey Outer Bolsa Bay to delineate shallow subtidal, mudflat, and tidal salt marsh habitat areas. This survey should serve as a	Prior/During Construction	USACE/Construction contractor

Mitigation Measure	Timing	Responsible Party
baseline for assessing direct impacts associated with excavation activities and indirect impacts due to altered hydrology in Outer Bolsa Bay. In addition, the USACE should develop a monitoring plan capable of detecting habitat loss and/or conversion associated with the project. If post-construction monitoring indicates impacts have exceeded current assumptions, then the USACE should adjust their compensatory mitigation approach accordingly. • During the PED period, the USACE should conduct a hydrodynamic and sediment transport study to evaluate the potential effects of increased flow velocities on intertidal and shallow subtidal habitats in Outer Bolsa Bay. The USACE should provide NMFS a report summarizing the analysis, results, and conclusions, prior to finalizing the habitat monitoring plan discussed above. If the study indicates that additional habitat loss and/or conversion may occur beyond what is currently anticipated, then the USACE should adjust their compensatory mitigation approach accordingly.		
All demolition and construction activities and the operation of heavy construction equipment within OBB, C02 Reach 24 and C05 Reach 1 (including the tide gates at the downstream end of C05 Reach 1) will be carried out between October 1 and February 28, outside of bird nesting season.	During construction	Construction contractor
To minimize impacts to wildlife species, a biologist that meets USFWS standard qualifications will conduct a biological resource sweep of the work area prior to any ground disturbing activities, dewatering activities, during project construction, and during demobilization of construction equipment. The biological resource sweep will include the following activities: • Inspect the work area, including along access roads, for any wildlife species and prepare a list of species observed and record their activity during construction of the project. • Implement exclusionary or avoidance measures and/or relocate sensitive species if possible, and ensure that the quality of adjacent habitat outside of the construction zone is maintained. • In the event that sensitive (protected) wildlife species are present, determine if the activity would cause adverse impacts that have not been previously considered and evaluated. If it is determined that the activity could have the potential to adversely affect wildlife species in a manner not authorized by Federal or State permits, the activity will cease until the species is no longer in harm's way or is relocated outside of the construction activity impact area.	During construction	USACE, in coordination with the construction contractor

Mitigation Measure	Timing	Responsible Party
A qualified biologist(s) will: • Prior to initiating construction activities, prepare a monitoring plan for minimizing and avoiding the impacts of project activities on sea turtles and marine mammals. • Conduct flora and fauna surveys one week prior to the start of initial construction activities within a designated reach to identify the occurrence of any special status species within the project action area. • During construction activities, will visually monitor for the presence of green turtle in reaches or areas where the species may be present. The biologist will record the presence and behavior of green turtles that are observed within and around the project area. To the extent possible, the biologist will attempt to photograph surfacing sea turtles observed in the project area and provide the images to NMFS. If a green turtle is observed within the project area where construction is occurring, construction activities in that area will immediately be halted until the turtle has moved from the area. Construction activities within areas of the project that green turtles are known to utilize will be staged to the extent possible to occur when the green turtle would not be expected to be present. The green turtle is typically present between late spring through fall, so construction activities within OBB, Reach 23 of C02, and Reach 1 of C05 may be staged to occur outside this window. • Will be responsible for overseeing compliance with avoidance measures for the biological resources, including green turtle, during construction activities within designated areas. • Prepare an annual report on observations of biological resources, including green turtle, and effectiveness of monitoring and avoidance measures. This report will be provided to NMFS and USFWS for review.	Prior/During construction	USACE, in coordination with the construction contractor
An employee education program will be developed. Each employee (including temporary, contractors, and subcontractors) will participate in a training/awareness program prior to working on the proposed project. Prior to the onset of construction activities, the Contractor will provide all personnel who will be present on work areas within or adjacent to the project area the following information: • A detailed description of all listed species including color photographs;	Prior to construction	USACE, in coordination with the construction contractor

Mitigation Measure	Timing	Responsible Party
• The protection listed species receive under the Endangered Species Act and possible legal action that may be incurred for violation of the Act; • The avoidance measures being implemented to conserve all listed species during construction activities associated with the proposed project; and • A point of contact if listed species are observed. • Provisions of water quality BMPs and provisions of the SWPPP will be provided along with consequences for violations incurred by non-compliance with BMP and SWPPP provisions. • Issue identification cards to shift supervisors with photos, descriptions, and actions to be taken upon sighting for the listed species that may be encountered during construction. • Discuss roles and responsibilities of Biologists hired to perform surveys and monitoring.		
A silent pile driver may be used instead of an impact or vibratory pile driver where sensitive ecological resources are nearby, especially within the vicinity of Warner Avenue Bridge, C02 Reach 23, and C05 Reach 1.	During construction	Construction contractor
To minimize noise impacts to biological resources the following measures will be implemented: • During nesting season portable acoustic panels will be placed where heavy equipment is operating to minimize construction noise levels. • If needed during the nesting season, portable acoustic panels will be placed along the perimeter of the channels where construction is occurring to reduce construction noise levels. • All construction equipment will be equipped with noise reduction features, such as mufflers and engine shrouds. • Onsite generators and booster pumps will be enclosed entirely.	During construction	Construction contractor
To minimize accidental hazardous material spill impacts to biological resources the following measures will be implemented: • Prior to and during operation of heavy construction equipment, a spill prevention and contingency plan will be prepared and implemented. The plan will include measures to prevent or avoid incidental leaks or spills, including identification of materials necessary for containment and clean up. Oil-absorbing floating booms will	During construction	Construction contractor

Mitigation Measure	Timing	Responsible Party
also be kept onsite and the contractor will respond to any aquatic spills during construction. • Vehicles and equipment will be kept in good repair, without leaks of hydraulic or lubricating fluids. If such leaks or drips do occur, they will be cleaned up immediately. Equipment maintenance and/or repair will be confined to one location. Runoff in this area will be controlled to prevent contamination of soils and water. • Vehicles and other equipment will be fueled, cleaned, and maintained in designated areas away from OBB and the BCER to eliminate risk of pollution from spills and contamination. • Standard BMPs accepted by the SARWQCB will be implemented to avoid degrading water quality. These BMPs include procedures to avoid leaks and spills and to contain and clean up contaminants in the unlikely event that a spill does occur. The project would employ dewatering or water routed around equipment to avoid and minimize release of contaminants during project activities.		
Construction personnel will utilize designated access roads or previously disturbed areas for vehicle access and staging of construction equipment.	During construction	Construction contractor
Speed limits of 15 miles per hour or less will be required at all times to avoid potential injury to wildlife in the area.	During construction	Construction contractor
Project-related vehicle travel and construction activities will be limited to daylight hours, as wildlife and some special-status species could be found on roadways primarily at dusk/night.	During construction	Construction contractor
Cultural Resources		
Preparing and implementing a discovery plan; if previously undiscovered resources are identified during an undertaking, suspend work while the resource is evaluated and adverse effects are mitigated to avoid any further impact. Continue to consult with Native American groups to identify any traditional cultural properties or resource uses and address impacts.	Prior to construction	USACE, in coordination with the construction contractor.
In the event that previously unknown cultural resources are uncovered, work within a specified distance (generally 100 feet) of the find would cease until the requirements in 36 C.F.R. 800.13 are complied with. The on-site supervisor shall contact an approved archaeological consultant immediately.	During construction	Construction contractor
Protecting exposed archaeological sites from vandalism and erosion with fencing and re-vegetation, or capping sites in an approved manner with appropriate material.	During construction	Construction contractor

Mitigation Measure	Timing	Responsible Party
If human remains are encountered during excavations associated with this Proposed Action, all work must halt, and the County Coroner must be notified (Section 7050.5 of the California Health and Safety Code). The coroner will determine whether the remains are of forensic interest. If the coroner, with the aid of the supervising archaeologist, determines that the remains are prehistoric, the coroner will contact the Native American Heritage Commission (NAHC). The NAHC will be responsible for designating the most likely descendant (MLD), who will be responsible for the ultimate disposition of the remains, as required by Section 5097.98 of the Public Resources Code. The MLD should make his/her recommendations within 48 hours of their notification by the NAHC. This recommendation may include A) the nondestructive removal and analysis of human remains and items associated with Native American human remains; (B) preservation of Native American human remains and associated items in place; (C) relinquishment of Native American human remains and associated items to the descendants for treatment; or (D) other culturally appropriate treatment.	During construction	Construction contractor
Tribal Cultural Resources		
Preparing and implementing a discovery plan; if previously undiscovered resources are identified during an undertaking, suspend work while the resource is evaluated and mitigated to avoid any further impact. Continue to consult with Native American groups to identify any traditional cultural properties or resource uses and address impacts.	Prior to construction	USACE in coordination with the construction contractor.
In the event that previously unknown tribal cultural resources are uncovered, work in the immediate area would cease until the requirements in 36 C.F.R. 800.13 are complied with. The on-site supervisor shall contact an approved archaeological consultant immediately. The on-site supervisor shall additionally divert all proposed project-related activities to other areas until the discovery has been evaluated by the approved archaeological consultant, who will determine if further mitigation measures are warranted.	During construction	Construction contractor
Protecting exposed tribal cultural sites from vandalism and erosion with fencing and re-vegetation, or capping sites in an approved manner with appropriate material.	During construction	Construction contractor
Hazards and Hazardous Materials		
Compliance with all applicable local, regional, state, and Federal laws, policies, and regulations regarding the transportation, storage, handling, management, and disposal of hazardous materials and wastes.	During construction	Construction contractor
Construction contractors are responsible for development of an Environmental Protection Plan to ensure that all environmental resources are protected during construction and that all construction activities conducted on the project site comply with Federal, State, and local	Prior to construction	Construction contractor

Mitigation Measure	Timing	Responsible Party
environmental laws and regulations. The Contractors solid and hazardous materials and waste management plan will be included in the Environmental Protection Plan.		
Contractors are responsible for development of an accidental spill prevention and response plan for all hazardous materials that may be used onsite. In the event of a spill or release of hazardous substances at the construction site, the contaminated soil shall be immediately contained, excavated, and treated per Federal and state regulations developed by the USEPA, as well as local hazardous waste ordinances.	Prior to construction	Construction contractor
A comprehensive HTRW Phase I Environmental Site Assessment, including a complete review of the EDR database search results will be conducted in PED, when project footprints are defined, to determine the scope and scale of REC occurrences that may exist in the surrounding areas, and if RECs will have an impact on the implementation of the proposed project. Site reconnaissance, review of historical maps, review of previous HTRW assessments and recommendations, and review of existing information will be conducted as part of this investigation.	Prior to construction	USACE
Prior to the start of construction the applicant would prepare an Emergency Evacuation Plan that contains procedures for the demobilization of construction equipment and evacuation of personnel from the study area in the event of a pending significant storm event or other emergency that jeopardizes the safety of personnel or equipment.	Prior to construction	Construction contractor
Prior to the start of construction the applicant would prepare a traffic control plan that would be approved by the City and County. The traffic control plan will include provisions for notification of emergency services prior to construction.	Prior to construction	Construction contractor
Aesthetics		
Work and staging areas would be kept orderly and free of trash and debris.	During construction	Construction contractor
Screen construction areas including borrow sites, staging areas, access roads, and work areas from public view.	During construction	Construction contractor
Construction lighting fixtures would be shielded by providing side flaps on lights. Onsite construction lighting would be arranged so that direct rays would not shine in or produce glares to nearby residential uses.	During construction	Construction contractor
If the onsite construction lighting creates a lighting or glare problem for residential properties, OCPW would implement corrective measures to resolve the problem. Such corrective measures would include raising the height of temporary construction walls or providing other shielding for lighting such as shielding on the light fixtures or relocating light fixtures.	During construction	Construction contractor
Transportation		

Mitigation Measure	Timing	Responsible Party
The contractor shall prepare a *Traffic Safety Management Plan* (Plan) for the Proposed Project in coordination with the local jurisdictions having authority over specific roadways. The Plan would be submitted and approved by the various jurisdictions before any on-site construction commences. The Plan would include the following provisions: • Temporary traffic control devices shall be identified in accordance with CalTrans' *California Manual on Uniform Traffic Control Devices.* This may include slow-moving-vehicle warning signs, barriers for separating construction and non-construction traffic, use of traffic control flagmen, and any additional measures required for safely passing non-construction traffic through and around construction areas and access points. • Schedule construction truck traffic during non-peak traffic periods. • Schedule worker shift changes to minimize existing background traffic peak periods if feasible. • Bulk hauling of borrow material commence as soon as on-site storage and staging areas are developed minimizing impacts to existing facilities by spreading out the required import operation over a longer period of time. • Establish procedures for coordinating with local emergency response agencies to ensure dissemination of information regarding emergency response vehicle routes affected by Project construction. Proper notification and coordination with the local emergency response agencies will be critical for these road closures to ensure that emergency vehicle access is not affected. • Provide dedicated turn lanes for vehicles entering and exiting the Project site from local roadways to minimize impacts to vicinity traffic.	Prior to construction	Construction contractor

8.2.2 Compensatory mitigation

Compensatory mitigation means the restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of wetlands, streams and other aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Mitigation would be required for both the NED Plan and the LPP to compensate for unavoidable adverse impacts to natural resources as a result of implementing the plans. A conceptual mitigation plan is included in *Appendix M – Conceptual Mitigation Strategy*, which summarizes the type and extent of impacted natural resources as a result of implementing the NED Plan or the LPP and lays out a detailed plan for compensating for those impacts.

Both the NED Plan and LPP would include potential impacts to foraging and nesting behavior of special status bird species, potential indirect impacts to green turtle, direct impacts to wetlands, and indirect impacts to eelgrass. Table 103 provides a summary of the direct and indirect impacts associated with the two alternatives.

Table 103: Impacts Requiring Mitigation for the NED Plan and LPP.

Category	Alternative Plan			
	NED Plan		LPP	
	Direct Impact	Indirect Impact	Direct Impact	Indirect Impact
Special Status Species				
C05 Reach 1	Yes-foraging	-	Yes-foraging	-
Wetlands				
Warner Avenue Bridge	Yes-0.15 acre	-	Yes-0.15 acre	-
Eelgrass				
C02 Reach 23	-	Yes-1.70 acre	-	Yes-1.70 acre

To offset temporary direct adverse impacts to special status species, direct adverse impacts to wetlands, and indirect adverse impacts to eelgrass, a conceptual mitigation strategy was prepared (refer to *Appendix M – Conceptual Mitigation Strategy*). The conceptual mitigation strategy proposes hydrological enhancement of the muted tidal pocket at the BCER, enhancement of the tern islands at BCER to withstand future sea level rise, and in-kind and out-of-kind mitigation for eelgrass. In addition, recommendations for eelgrass mitigation provided by NMFS have been incorporated into the Final IFR as discussed in Section 6.2.2.

8.3 Operation, Maintenance, Repair, Replacement, and Rehabilitation

Once construction activities are completed, the project will be turned over to the NFS. Operation, Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R) of the channels and inlet/outlet structures will be the responsibility of Orange County, and specifically OCFCD. OMRR&R activities would include periodic inspections, mowing, debris removal and litter control, vermin control, and repair of structures as needed, in addition to supporting emergency efforts during flood events. OCPW and local municipalities will be responsible for outreach to communities, residents, and businesses in the floodplain about project risks and the development of an emergency action/ response plan. The channels in the project area will be inspected at least once a year and following major flooding events.

8.4 Monitoring and Adaptive Management

After implementing mitigation components, the mitigation site(s) would be monitored until specified success criteria are met. Monitoring costs are estimated to be approximately $50,000 for 10 years and $25,000 for 40 years of monitoring post-construction. Monitoring will be both quantitative and qualitative and be conducted by a qualified ecologist, botanist, or biologist. The monitor should be objective and independent from the contractor responsible for maintenance of the site. If the monitoring results show that the mitigation sites are not meeting their success criteria, then adaptive management measures may be required. Adaptive management, if required, is estimated to cost approximately $150,000 per year for five years. The costs for monitoring and adaptive management are included in the cost-shared federal project.

8.5 Real Estate Considerations

Real estate interests within the project footprint include the cities within the watershed, Orange County, the State of California, OCFCD, California Department of Transportation (Caltrans), OCTA, and utility companies. The channels are completely within OCFCD right of way, while the roadway crossings have a mix of interested parties including the county, cities, and Caltrans. The segment of C05 that passes through the BCER is included in a flood control easement that grants OCFCD the right to maintain the channel. Outer Bolsa Bay and the constriction at Warner Avenue are within the BCER, which is owned by the California State Lands Commission.

Additional details regarding real estate considerations are available in *Appendix D – Real Estate*.

8.6 Costs and Benefits

8.6.1 Project Costs

The preliminary project cost estimates are provided below. The lands, easements, rights-of-way, relocation, and disposal areas (LERRDs) costs include the cost of replacing bridges and an estimate of the value of the channel right of way, and staging areas for construction. Additionally, the project base year of 2035 was determined under the assumption that construction will occur from downstream to upstream and benefits will begin to accrue as soon as the first sections are completed. It is assumed that construction could occur simultaneously on the downstream ends of C02 and C05 (covering channel reaches 1, 2, and 3). Since significant work has already been completed in these reaches, an initial construction period of 36 months was used for a preliminary Interest During Construction (IDC) estimate. This too will be revised as more work is done to define construction methods and timing considerations.

Table 104: Alternative Plan Average Annual Costs in FY 2020 Price Levels ($000) (Excluding the No Action Plan).

Cost Category	Plan	
	Minimum Plan, 2.75%	**Maximum Plan, 2.75%**
Construction Costs[1]	414,590	860,532
LERRDs	69,266	364,065
Total First Costs	**483,856**	**1,224,598**
Interest During Construction	169,181	343,293
Gross Investment	653,037	1,567,891
Interest and Amortization	24,189	58,076
OMRR&R	-70	135
Total Annual Costs[2]	**24,119**	**58,211**

[1] *Includes PED, S&A, and contingency costs*
[2] *Negative OMRR&R costs represents a reduction in such costs relative to without project conditions.*

8.6.2 Cost Sharing

A NFS must support all phases of the project. Feasibility Study costs are typically shared 50% federal and 50% non-federal. However, this study received FY 2018 supplemental disaster recovery funding under the Bipartisan Budget Act of 2018 (Public Law 115-123) to complete the study at 100% federal cost.

Design and implementation phases are cost-shared, with the NFS providing a minimum of 35% of the total. Additionally, the NFS must provide all LERRDs. While the sponsor may receive credit toward this cost-share for work-in-kind and LERRDs, a minimum cash contribution of 5% is required. Once a project has been implemented, OMRR&R of the project is a 100% non-federal responsibility.

8.7 Risk Analysis

8.7.1 Uncertainty and Associated Risks

In general, the ability of the plan to provide the expected accomplishments depends on the following: the validity of pertinent assumptions, base data, and analytical techniques used in this study; the successful completion of future studies, designs, and construction; and appropriate OMRR&R after construction.

Based upon engineering and economic modeling results, the Recommended Plan reduces expected annual damages by over 99% relative to without project conditions. In addition, the annual probability of flooding in the highest risk areas is reduced from over 50% to less than 1%.

8.7.2 Residual Risk

The risk to life and property is not eliminated by any of the proposed with-project conditions outlined within this report and each potential plan carries some level of residual risk. Residual risk is the flood risk that remains after a proposed flood risk management project is implemented. Residual risk includes the consequence of capacity exceedance as well as consideration of project performance, robustness, and resiliency. The “Risk Assessment for Flood Risk Management Studies” (ER 1105-2-101) dated 17 July 2017 clearly defines two types of residual risks to consider when comparing the potential with-project condition to the without project condition. These subsets of residual risk are identified as transformed and transferred.

- Transformed risk – a risk that emerges or increases as a result of mitigating another risk.
- Transferred risk – a relocated or increased risk from one region within a study area to another region of a study area as a result of an action within the study area.

The with-project conditions for this study considered each of these types of residual risk in addressing the inadequate condition of the existing levees and channel capacity within the watershed. Constructing levees where none currently exist would pose a transformed risk, as development may be encouraged (without proper land use restrictions). The risk could also be transformed by altering the flood characteristics from something which could be observed as the water rises out of the channel banks, to something that is hidden from view (by a constructed levee), resulting in the risk of catastrophic failure and inundation of increased depths and velocities. In the case of the leveed reaches in this watershed, the probability of experiencing a transformed risk was minimized as the existing levees are anticipated to be improved both by reducing the probability of failure prior to overtopping and increasing the crest elevations so the probability of overtopping is reduced even further.

Transferred risk is a concern in portions of the study area where potential channel conveyance modifications are identified. However, by implementing any conveyance modifications at the downstream end first, the with-project condition takes into account transferred risk of conveyance modifications upstream, ensuring the additional upstream flow could be contained on the downstream end. This practice

of moving downstream-to-upstream when implementing potential modifications reduces the possibility of transferring risk from one region within the watershed to another.

While managing residual risk was a part of the plan formulation and preliminary design processes, it was not completely eliminated under the potential with-project conditions. Any reach of channel identified to receive maximum channel modifications (leveed or channel only) were designed and evaluated as being able to contain and convey the 1% ACE event, with 2-3 feet of assurance. This means any portion of the system being modified to the maximum condition would be anticipated to contain the 1% ACE event with at least 95% confidence. However, this also means that these portions of the system could still be exceeded by the 1% ACE event 5% of the time, and that the system could still be overwhelmed by events even larger than the 1% ACE event. Those working or living within the watershed will need to maintain awareness of significant rain events and be ready to react if needed.

The following tables outline the probability of flooding for each reach as currently modeled for the without project condition, as well as the minimum and maximum channel modification conditions. The minimum channel modifications results were based on modeling the entire system as minimally modified, while the maximum channel modifications results were based on modeling the entire system as receiving maximum channel modifications.

The conditional probability of design non-exceedance, or assurance, refers to the probability that a system can contain a certain event. For example, the probability that the 1% ACE event (100 year recurrence interval) would be contained by the existing levee for reach C02_1 is approximately 45%. Inversely, that means there is a 55% chance that the 1% ACE event would exceed the current levee (either through breach or overtopping) and inundate the leveed area. This probability of assurance is increased to over 87% when the system is modified to minimum condition and to 99% with maximum channel modifications.

The columns in the tables below are defined as:

- Reach: This refers to the economic reaches, or impact areas
- AEP: The annual exceedance probability, or probability that a flood will inundate the specified impact area in any given year
- Long-Term Risk
    - 10 year: The probability that an impact area will be inundated at least once in a 10 year period
    - 30 year: The probability that an impact area will be inundated at least once in a 30 year period
    - 50 year: The probability that an impact area will be inundated at least once in a 50 year period
- Assurance
    - 2.00%: The probability that the existing infrastructure (levee or channel) will contain, or not be exceeded by a 2.00% ACE flood event (50 year recurrence interval)
    - 1.00%: The probability that the existing infrastructure (levee or channel) will contain, or not be exceeded by a 1.00% ACE flood event (100 year recurrence interval)
    - 0.20%: The probability that the existing infrastructure (levee or channel) will contain, or not be exceeded by a 0.20% ACE flood event (500 year recurrence interval)

Table 105: Without project performance (%).

Economic Impact Area[1]	AEP[2]	Long-Term Risk[3]			Assurance[4]		
		10 year	30 year	50 year	2.00%	1.00%	0.20%
C02-C04							
C02_1	6.37	48.20	86.10	96.30	48.43	44.88	43.95
C04_1	0.01	0.12	0.37	0.62	99.96	99.95	99.94
C04_2	0.01	0.11	0.34	0.56	99.98	99.97	99.97
C04_3	0.03	0.32	0.95	1.58	99.00	99.00	99.00
C04_4a	9.34	62.49	94.72	99.26	36.98	34.38	20.60
C04_4b	3.03	26.48	60.26	78.52	74.91	73.99	66.36
C05-C06							
C05_1a	0.86	8.23	22.71	34.90	97.02	96.77	96.26
C05_2a	9.01	61.12	94.12	99.00	68.24	66.98	62.43
C05_2b	16.94	84.38	99.00	99.00	19.89	17.35	11.02
C05_2c	4.28	35.42	73.07	88.77	62.28	57.65	44.20
C05_2d	25.53	94.75	99.00	99.00	4.11	2.96	1.40
C05_3a	6.91	51.11	88.31	97.21	74.64	73.78	67.98
C05_3b	14.36	78.78	99.04	99.00	28.49	24.90	21.74
C05_3c	0.01	0.12	0.36	0.60	99.00	99.00	99.00
C05_3d	1.82	16.83	42.46	60.19	90.88	90.14	88.42
C05_4a	10.08	65.45	95.87	99.00	72.92	71.01	65.48
C05_4b	0.38	3.70	10.70	17.19	98.32	98.26	98.07
C05_5	60.57	99.00	99.00	99.00	24.34	23.92	23.23
C05_6	72.46	99.00	99.00	99.00	16.49	16.11	15.49
C06_1a	99.00	99.00	99.00	99.00	0.01	0.01	0.01
C06_1b	0.35	3.46	10.02	16.13	95.15	92.14	87.38
C06_2	0.02	0.18	0.54	0.90	99.95	99.95	99.94

[1]Economic Impact Areas are shown in Figure 40
[2]Probability that flooding will occur in any given year
[3]Probability the target stage is exceeded during the period of time listed below
[4]Probability that no flooding occurs, given that a flood event of the frequency listed below has occurred

Table 106: With-project minimum channel modifications performance (%).

Economic Impact Area[1]	AEP[2]	Long-Term Risk[3]			Assurance[4]		
		10 year	30 year	50 year	2.00%	1.00%	0.20%
C02-C04							
C02_1	0.94	8.97	24.58	37.51	89.24	87.72	87.23
C04_1	0.01	0.10	0.30	0.50	99.00	99.00	99.00
C04_2	0.01	0.10	0.30	0.50	99.00	99.00	99.00
C04_3	0.01	0.11	0.33	0.55	99.00	99.00	99.00
C04_4a	0.41	4.05	11.68	18.69	96.33	91.98	81.89
C04_4b	0.05	0.52	1.55	2.56	99.39	98.58	96.55
C05-C06							
C05_1a	0.03	0.32	0.95	1.57	99.00	99.00	99.00
C05_2a	5.05	40.45	78.89	92.51	74.44	72.87	69.59
C05_2b	10.62	67.47	99.00	99.00	18.74	15.34	7.18
C05_2c	1.39	13.06	34.29	50.34	81.57	74.93	56.01
C05_2d	14.01	77.89	98.92	99.00	2.20	1.45	0.14
C05_3a	3.08	26.86	60.88	79.07	82.92	81.79	79.33
C05_3b	8.80	60.18	99.00	99.00	28.40	23.18	11.79
C05_3c	0.01	0.10	0.31	0.51	99.00	99.00	99.00
C05_3d	0.02	0.17	0.52	0.87	99.00	99.00	99.75
C05_4a	0.23	2.27	6.67	10.86	99.00	99.00	99.00
C05_4b	0.01	0.10	0.30	0.50	99.00	99.00	99.00
C05_5	0.01	0.10	99.00	99.00	99.99	99.99	99.98
C05_6	0.01	0.10	0.30	99.00	99.99	99.99	99.98
C06_1a	99.00	99.00	99.00	99.00	0.01	0.01	0.01
C06_1b	0.29	2.87	8.35	13.53	99.00	99.00	91.50
C06_2	0.01	0.11	0.32	0.53	99.00	99.00	99.00

[1]Economic Impact Areas are shown in Figure 40
[2]Probability that flooding will occur in any given year
[3]Probability the target stage is exceeded during the period of time listed below
[4]Probability that no flooding occurs, given that a flood event of the frequency listed below has occurred

Table 107: With-project maximum channel modifications performance (%).

Economic Impact Area[1]	AEP[2]	Long-Term Risk[3]			Assurance[4]		
		10 year	30 year	50 year	2.00%	10 year	30 year
C02-C04							
C02_1	0.02	0.22	0.66	1.10	99.99	99.94	99.82
C04_1	0.01	0.10	0.30	0.50	100.00	100.00	100.00
C04_2	0.01	0.10	0.30	0.50	100.00	100.00	100.00
C04_3	0.01	0.10	0.31	0.52	100.00	100.00	100.00
C04_4a	0.02	0.20	0.61	1.01	100.00	99.97	99.82
C04_4b	0.08	0.81	2.40	3.97	99.98	99.47	98.59
C05-C06							
C05_1a	0.02	0.24	0.72	1.20	99.97	99.97	99.92
C05_2a	0.50	4.90	14.00	22.23	99.84	98.51	94.53
C05_2b	0.45	4.37	12.54	20.01	99.94	98.47	93.53
C05_2c	0.03	0.27	0.82	1.36	100.00	99.96	99.75
C05_2d	0.04	0.35	1.06	1.76	100.00	99.99	99.62
C05_3a	0.36	3.53	10.23	16.47	99.95	99.30	95.49
C05_3b	0.41	4.06	11.68	18.70	99.93	98.59	94.08
C05_3c	0.10	0.96	2.85	4.70	100.00	99.81	98.82
C05_3d	0.01	0.10	0.31	0.51	100.00	100.00	100.00
C05_4a	0.06	0.61	1.80	2.99	99.99	99.79	99.22
C05_4b	0.02	0.16	0.48	0.80	100.00	99.96	99.90
C05_5	0.02	0.18	0.54	0.89	99.99	99.95	99.88
C05_6	0.01	0.13	0.38	0.64	100.00	99.99	99.96
C06_1a	99.90	100.00	100.00	100.00	0.00	0.00	0.00
C06_1b	1.64	15.27	39.17	56.33	95.84	88.54	77.71
C06_2	0.01	0.10	0.30	0.50	100.00	100.00	99.98

[1]Economic Impact Areas are shown in Figure 40
[2]Probability that flooding will occur in any given year
[3]Probability the target stage is exceeded during the period of time listed below
[4]Probability that no flooding occurs, given that a flood event of the frequency listed below has occurred

8.8 Environmental Operating Principles (EOPs)

The Recommended Plan supports each of the seven USACE EOPs. The EOPs and the ways the project meets them are as follows:

- Foster sustainability as a way of life throughout the organization:
  Project avoids or minimizes environmental impacts while maximizing future safety and economic benefits to the community. The PDT has coordinated with resource agencies to minimize impacts to the environment.

- Proactively consider environmental consequences of all USACE activities and act accordingly:
  Project avoids or minimizes environmental impacts while maximizing future safety and economic benefits to the community. The PDT has coordinated and will continue to coordinate with resource agencies to minimize impacts to the environment.

- Create mutually supporting economic and environmentally sustainable solutions:
  Project avoids or minimizes environmental impacts while maximizing future safety and economic benefits to the community. The PDT has coordinated and will continue to coordinate with resource agencies to minimize impacts to the environment.

- Continue to meet our responsibility and accountability under the law for activities undertaken by USACE, which may impact human and natural environments:
  Project avoids or minimizes environmental impacts while maximizing future safety and economic benefits to the community. The PDT has coordinated and will continue to coordinate with resource agencies to minimize impacts to the environment.

- Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs:
  The PDT has coordinated and will continue to coordinate with resource agencies to minimize impacts to the environment.

- Leverage scientific, economic, and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner:
  All pertinent, best available information was used during plan formulation and selection.

- Employ an open, transparent process that respects views of individuals and groups interested in USACE activities:
  Held scoping meeting and stakeholder meetings during plan formulation and feasibility. Coordination will continue during public review of the draft report as well as during preparation of the final report.

8.9 USACE Campaign Plan

The mission of USACE is to provide vital public engineering services in peace and war to strengthen the Nation's security, energize the economy and reduce the risks from disasters. In order to meet this mission, the agency has developed the USACE Campaign Plan (FY13-18) as a component of the corporate

strategic management process to establish priorities, focus on the transformation initiatives, measure and guide progress, and adapt to the needs of the future. The goals of the Campaign Plan are:

Goal 1 - Support National Security
Objective 1a – Support Combatant Commands and other U.S. government agencies
Objective 1b – Partner with Installation Management Communities
Objective 1c – Achieve National/Army energy security and sustainability goals
Objective 1d – Support the Engineer Regiment

Goal 2 - Transform Civil Works
Objective 2a – Modernize the Civil Works project planning program and process
Objective 2b – Enhance Civil Works budget development with a systems Watershed–Informed approach
Objective 2c – Deliver quality solutions and services
Objective 2d – Deliver reliable, resilient and sustainable infrastructure systems

Goal 3 - Prepare for Tomorrow
Objective 3a – Enhance interagency disaster response and risk reduction capabilities
Objective 3b - Enhance interagency disaster recovery capabilities
Objective 3c - Enhance interagency disaster mitigation capabilities
Objective 3d – Strengthen Domestic Interagency Support

Goal 4 - Reduce Disaster Risk
Objective 4a – Maintain and advance DoD and Army critical enabling technologies
Objective 4b – Build trust and understanding with strategic engagement, communication, and cyber-security
Objective 4c – Streamline USACE business, acquisition and governance processes
Objective 4d – Build ready and resilient people and teams through talent management / leader development

The Recommended Plan is responsive to these goals and objectives by accomplishing the following:

Deliver reliable, resilient and sustainable infrastructure systems.

- Designing a project which avoids or minimizes environmental impacts while maximizing future safety and economic benefits to the community.

Deliver quality solutions and services.

- Designing a project which provides flood risk management for public safety within Orange County and the Cities of Anaheim, Cypress, Fountain Valley, Garden Grove, Huntington Beach, Los Alamitos, Seal Beach, Stanton, and Westminster.
- The study employed the use of District Quality Control, ATR, Risk Analysis, and IEPR to assist in the review and development of a technically sound recommendation of Federal Interest.

Build trust and understanding with strategic engagement, communication, and cyber-security.

- The team organized and participated in scoping and stakeholder meetings and will continue coordination to achieve a balance of project goals and public concerns.

8.10 Plan Implementation

This section describes the remaining steps to potential authorization of the proposed project by Congress.

8.10.1 Report Completion

The Draft IFR was circulated for public and agency review for 45 days. Two public meetings were held in November, 2018. Since completion of the public review period, comments have been considered and incorporated into the integrated report and EIS, as appropriate *(Appendix J – Coordination)*. The Final Integrated Report was provided to each public agency that provided comments on the Draft Report. OCPW is responsible for certifying that the EIR has been prepared in compliance with CEQA.

8.10.2 Report Approval

After its review of this Final Integrated Report and EIS, including consideration of public comments, USACE HQ will prepare the Chief of Engineers' Report (Chief's Report). This report will be submitted to the ASA(CW), who will coordinate with the Office of Management and Budget (OMB) and submit the report to Congress when the appropriate reviews are completed. Signature of an approved Chief's Report is scheduled to occur on 30 April 2020.

8.10.3 Project Authorization and Construction

The ASA(CW) transmits the Chief's Report to the Office of Management and Budget (OMB) for review. Upon completion of the OMB review, the report is submitted to Congress for authorization. If the project is authorized by Congress, Preconstruction Engineering and Design would begin, followed by real estate acquisition, if necessary, and construction.

8.10.4 Division of Responsibilities

Federal Responsibilities

Following authorization of the proposed project, USACE would enter the PED phase to develop detailed design and cost estimates for the approved project. Once the project is authorized and funds are appropriated, a Project Partnership Agreement (PPA) would be signed with OCPW as the NFS. After the sponsor provides its cash contribution, lands, easements, rights-of-way, relocations, and disposal areas, as well as assurances, the Federal Government would begin construction of the project.

Non-Federal Responsibilities

A list of responsibilities of the NFS is included in Chapter 9.0.

Views of Non-Federal Sponsor

OCPW is supportive of the study and the feasibility-level findings included in this report. Throughout development of this feasibility report, there has been significant coordination with OCPW, its contractor, relevant federal agencies, the State of California, and other stakeholders.

Cost Sharing

Table 108: Federal and non-federal cost sharing for the NED Plan and the LPP.

Project Description	Federal Contribution[1] $1000	Non-Federal Contribution $1000	Total $1000
NED Plan			
LERRD	$0	$69,266	$69,266
Construction	$406,777	$0	$406,777
Environmental Mitigation	$7,813	$0	$7,813
Total	$414,590	$69,266	$483,856
Non-Federal Minimum Cash Contribution (5%)	-$24,193	$24,193	$0
Additional Non-Federal Cash Contribution	-$75,891	$75,891	$0
Total Cost Share - NED Plan	**$314,506**	**$169,349**	**$483,856**
	65%	**35%**	**100%**
Incremental Costs - LPP			
LERRD	$0	$294,800	$294,800
Construction	$0	$445,942	$445,942
Environmental Mitigation	$0	$0	$0
Total	$0	$740,742	$740,742
Total Costs - LPP	**$314,506**	**$910,091**	**$1,224,598**
	26%	**74%**	

FY2020 Price Levels ($000)

[1] The federal share is the same for both plans and is based on 65% of the NED Plan

Financial Capability of Sponsor

The total estimated non-federal first cost (35% minimum) of the project is $169,349,600 for the NED Plan including LERRDs, at the 2020 price level. Actual costs may be slightly greater at the time of construction due to inflation. The total estimated value for the project lands, including LERRDs, for the NED Plan is $2,605,000.

The total estimated non-federal first cost for the LPP is $910,091,600 including LERRDs, at the 2020 price level. Actual costs may be slightly greater at the time of construction due to inflation. The total estimated value for the project lands, including LERRDs, for the LPP is $4,257,000.

The NFS will be required to provide self-certification of financial capability for the final report as required by USACE guidance.

Project Cost-Sharing Agreements

Prior to PED, a Design Agreement must be executed between USACE and the NFS in order to cost share the development of detailed plans and specifications. Before construction is started, USACE and the NFS would execute a PPA. This agreement would define responsibilities of the NFS for project construction as well as OMRR&R, and other assurances. The scope for this project includes OMRR&R directly required for project features defined in this report as well as indirectly required to ensure the ongoing operation of

the project as designed. As part of signing the PPA, OCPW would assume eventual OMRR&R responsibilities for the completed project.

8.10.5 Schedule

Table 109: Study schedule.

Item	Date
Feasibility Cost Sharing Agreement Signed	September 2003
Alternatives Milestone Briefing	February 2014
Alternative Milestone Approved	June 2014
TSP Milestone	25 July 2018
Draft Report Released for Public Review	19 October 2018
Agency Decision Milestone	04 February 2019
Senior Leader Briefing	13 March 2020
Chief of Engineer's Report Signed	21 May 2020
Record of Decision Signed	26 June 2020

8.10.6 Further Studies

The Corps' Planning Modernization initiative resulted in the development of SMART Planning Processes. The streamlined process utilizes risk informed decision making to make decisions earlier in the study process, using best available information and professional judgment.

The engineering work completed for this report is at a conceptual or feasibility level. Therefore, significant uncertainties remain in the plans as currently outlined in this document. Due to schedule and budget constraints, minimal field data were obtained during the feasibility phase, and minimal engineering analysis of the recommended measures was completed. Instead, technical experts were called upon to determine whether recommended measures were viable features that could be designed and constructed. If the project proceeds to the USACE's Preconstruction Engineering and Design (PED) phase, all recommended engineering measures would be analyzed and several additional studies will be conducted to support development of detailed designs for the project implementation. These include, but are not limited to:

- Additional geotechnical analysis of underlying substrates and estimate potential localized subsidence rates.
- Additional hydraulic analysis.
- Updating H&H models to reflect the most current and refined project plan.
- Tidal modeling and field data collection in Outer Bolsa Bay, Inner Bolsa Bay, and the Muted Tidal Pocket.
- Topographic and ground surveys for project design, as necessary.
- Preconstruction surveys to avoid direct impacts to nesting birds and other sensitive species.
- Preconstruction surveys of existing natural communities in Outer Bolsa Bay, Inner Bolsa Bay, and the Muted Tidal Pocket.
- Preconstruction surveys of eelgrass to determine potential direct and indirect effects.
- Water quality analysis of construction activities and methods.

- Additional Phase I Environmental Site Assessment activities to identify potential hazardous materials and wastes within the project area; Phase II if necessary based on the final Phase I results.
- Value Engineering (VE) Study to determine whether the proposed dual sheet pile on the north levee of Reach 01 in C05 adjacent to the Muted Tidal Pocket is necessary. It may benefit the project from a cost savings perspective and the mitigation plan not to install the dual sheet pile design in the final plans and specs.
- During VE Study, USACE will also coordinate with environmental stakeholders regarding the sequencing of tide gate removal relative to channel improvements in reach 01.
- During VE Study, USACE will also coordinate with environmental stakeholders regarding the potential benefits of removing the north levee on the downstream end of channel improvements in reach 01.
- Intensive cultural resources survey, evaluations, and mitigation as appropriate, in consultation with SHPO, Native American Tribes, and other interested parties.
- During the PED phase, additional analysis would be conducted that would evaluate various features with the potential to improve fish habitat within the channels, specifically C05 Reach 1 which runs through the BCER. Additional H&H analysis would have to ensure habitat features for fish can be placed in the channel without impacting flow and conveyance capacity. Potentially improving fish habitat within C05 Reach 1 would be anticipated to improve forage fish availability in the channel for sensitive avian species in the BCER. The fish habitat features could include but are not limited to features such as toe stone piles, textured sheetpile, residual rock shelf, or other in-channel structures. If implemented, monitoring of the fish habitat features would occur to ensure the habitat is achieving identified success criteria. If the fish habitat is not meeting the identified success criteria, adaptive management measures, such as adding in additional substrate, would be undertaken.
- During the PED phase, a full Habitat Restoration and Monitoring Plan will be developed in coordination with the USFWS and CDFW.
- During the PED phase, a mitigation monitoring and report program (MMRP) will be developed.

8.11 Project Implementation

8.11.1 Design and Construction

The Feasibility Phase terminates on the date the feasibility report is submitted to the Office of Management and Budget by the Assistant Secretary of the Army for Civil Works (ASA (CW)) for review of consistency with the policies and programs of the President. During PED, detailed design work would result in formal construction documents and a final detailed cost estimate for implementation.

8.11.2 Project implementation strategy

A preliminary best-case construction schedule was developed for the Maximum Channel Modifications alternative and resulted in an estimate of 14 years and 11 months of more or less continuous construction, assuming availability of funding (Figure 50). This alternative was chosen as the proxy for developing a conceptual schedule because it involved the highest amount of potential work. For that reason, this schedule forms a rough baseline for estimating the duration of project implementation.

Construction would begin in the downstream reaches and progress upstream. This implementation strategy serves dual purposes. First, if upstream reaches were modified first, it could potentially increase

flooding downstream, inducing damages and exacerbating erosion and backwater conditions in BCER and Outer Bolsa Bay. Second, the downstream reaches, PCH floodwall, tide gates, and Warner Avenue Bridge expansion represent the most expensive portions of the project. Prioritizing these areas early in the implementation process reduces IDC, thus increasing the benefit to cost ratio.

8.11.3 Operation, Maintenance, Repair, Replacement, and Rehabilitation

Once construction activities are completed, USACE will send a notice of completion to the NFS, and will furnish the NFS with an OMRR&R Manual for the performance of its responsibilities. OMRR&R activities would include security, periodic inspections, vegetation control, debris removal and litter control, and repair of drainage channels, maintenance roads, and floodwalls. The sponsor will also be responsible for outreach to communities, residents, and businesses in the leveed area about the project risks and the development of an emergency action/ response plan.

PROJECT SCHEDULE: **DESIGN - BID - BUILD**

ID	Task Name	Duration	Start	Finish
1	Westminster Watershed Project	3875 days	Wed 1/1/20	Tue 11/7/34
2	C02-C04	2555 days	Wed 1/1/20	Tue 10/16/29
3	REACH 23_C02	690 days	Wed 1/1/20	Tue 8/23/22
9	REACH 20_C04	1135 days	Wed 6/2/21	Tue 10/7/25
25	REACH 21_C04	745 days	Wed 7/17/24	Tue 5/25/27
32	REACH 22_C04	945 days	Wed 3/4/26	Tue 10/16/29
48	C05	3875 days	Wed 1/1/20	Tue 11/7/34
49	REACH 1a	675 days	Wed 1/1/20	Tue 8/2/22
55	REACH 1b	530 days	Wed 5/12/21	Tue 5/23/23
62	REACH 2 (completed)	0 days	Tue 5/23/23	Tue 5/23/23
64	REACH 3	715 days	Wed 3/2/22	Tue 11/26/24
75	REACH 4	645 days	Wed 9/6/23	Tue 2/24/26
82	REACH 5	1185 days	Wed 12/4/24	Tue 6/19/29
98	REACH 6	500 days	Wed 3/29/28	Tue 2/26/30
104	REACH 7 (completed)	0 days	Wed 2/27/30	Wed 2/27/30
106	REACH 8	700 days	Wed 12/6/28	Tue 8/12/31
117	REACH 9	880 days	Wed 5/22/30	Tue 10/4/33
128	REACH 10 (completed)	0 days	Wed 10/5/33	Wed 10/5/33
130	REACH 11	460 days	Wed 7/14/32	Tue 4/18/34
136	REACH 12	465 days	Wed 1/26/33	Tue 11/7/34
142	C06	2015 days	Wed 3/2/22	Tue 11/20/29
143	REACH 13	715 days	Wed 3/2/22	Tue 11/26/24
154	REACH 14	465 days	Wed 9/6/23	Tue 6/17/25
160	REACH 15	520 days	Wed 3/27/24	Tue 3/24/26
167	REACH 16	470 days	Wed 1/1/25	Tue 10/20/26
173	REACH 17	535 days	Wed 7/30/25	Tue 8/17/27
179	REACH 18	710 days	Wed 5/27/26	Tue 2/13/29
185	REACH 19	520 days	Wed 11/24/27	Tue 11/20/29

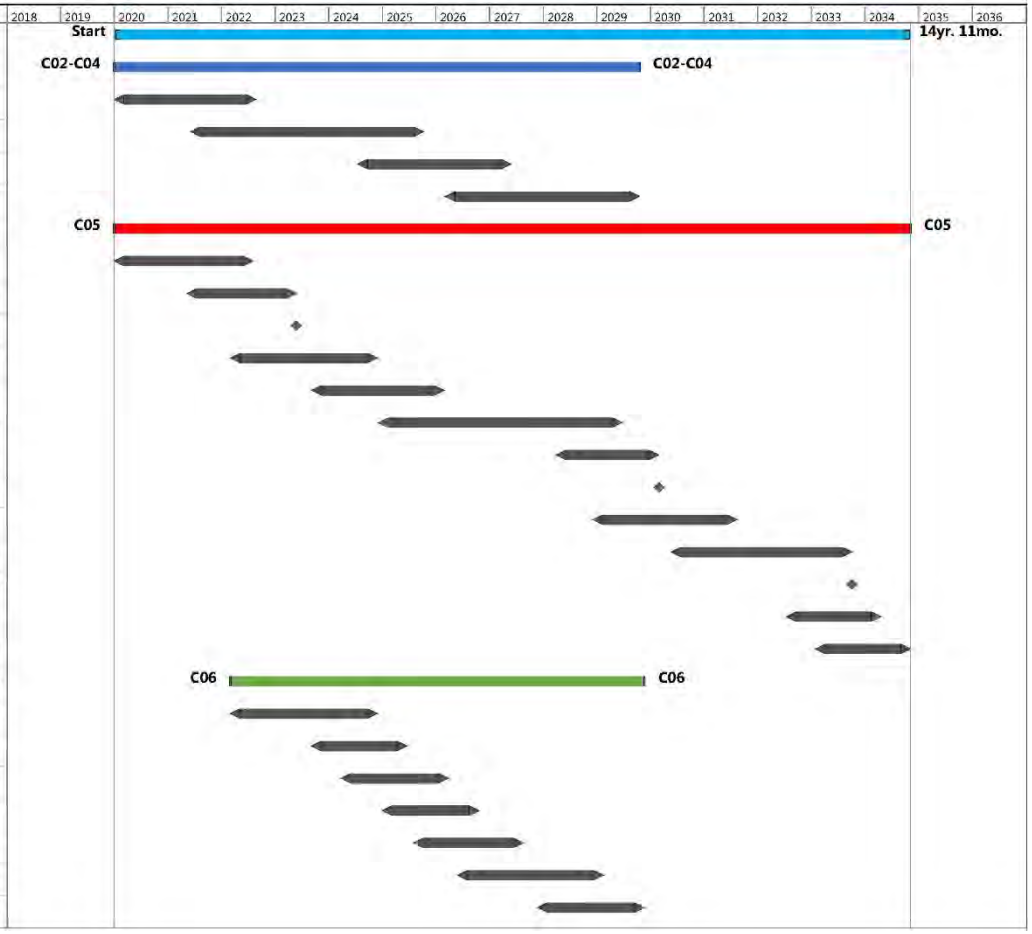


Figure 50: Preliminary best-case implementation strategy based on the Maximum Channel Modifications Plan.

Page intentionally left blank
for double-sided printing

9.0 Recommendations for Implementation*

This chapter describes the Items of Cooperation for the proposed flood risk management project. Two plans have been identified that meet the objectives of the study and could potentially be recommended for implementation.

The NED Plan has been identified as the Minimum Channel Modifications Plan. The estimated first cost (2020 price level) of the NED Plan is $483,856,000 with an estimated maximum federal cost of $314,506,400. This would equate to an estimated non-federal cost of $169,349,600 to implement the NED Plan, with an estimated annual OMRR&R cost of -$70,000 (2020 price levels). The negative OMRR&R cost represents a reduction in such costs relative to without project conditions.

Based on the NFS's goals for this study, a Locally Preferred Plan (LPP) has been identified to provide flood damage risk reduction within the drainage channels of the Westminster watershed up to and including the 1% ACE storm event. The Maximum Channel Modifications Plan meets this objective and is, therefore, the LPP. The LPP represents a larger plan with a higher costs and lower net benefits than the NED Plan. In order to be recommended for implementation, LPPs must be approved by the Assistant Secretary of the Army for Civil Works. Approval of the LPP waiver was memorialized in a memo dated October 16, 2019: *Westminster, East Garden Grove, California, Flood Risk Management Study – Exception Request for Locally Preferred Plan (LPP)*. At that time, the LPP became identified as the Recommended Plan. The Principle Features of the Recommended Plan include:

a) Modification of approximately 25 miles of existing drainage channels to increase storage capacity and improve conveyance efficiency. This Locally Preferred Plan is designed to contain the one-percent annual exceedance probability (AEP) storm event. For the C02/C04 channel system, the plan includes conversion of approximately 11,600 linear feet of trapezoidal channel to rectangular concrete channel walls with soft bottom maintained in the center of the channel; creation or improvement of 15,000 linear feet of concrete rectangular channels; 5,000 linear feet of paving existing trapezoidal channels; and creation of a 7,500 linear foot diversion channel near the Westminster Mall along an abandoned U.S. Navy rail line and Edwards Street. Additionally, approximately 9,000 linear feet of sheet pile will be installed with subsequent excavation of the existing toe along the south bank of the marine-influenced C02 channel, preserving and expanding soft bottom habitat through this reach. For the C05/C06 channel system, the project includes conversion of approximately 25,000 linear feet of trapezoidal channel to rectangular concrete channel; 2,300 linear feet of paving existing trapezoidal channels; installing steel sheet pile channel walls in 14,500 linear feet of channel while preserving soft bottom marine influenced habitat at the downstream end of the system; and installing up to 40,000 linear feet of one-foot to two-foot floodwalls for reaches that do not contain the one-percent ACE event within the canal after conversion to a concrete rectangular channel. In addition to in-channel work, the Locally Preferred Plan includes replacement of 43 different roadway crossings, and replacement of pedestrian channel crossings.

b) Widening the restriction at Warner Avenue Bridge to improve conveyance in Outer Bolsa Bay as well as the hydraulic efficiency of the downstream reaches of the C05 Channel. It will also compensate for increased flow volumes that result from increased conveyance capacity in the channels. Widening of the channel in Outer Bolsa Bay would also require a pedestrian bridge at the Bolsa Chica Conservancy to be replaced.

c) Tide gate removal on the C05 Channel to improve flow conditions through the lower reaches of the channel. The existing tide gates leak and allow saltwater habitat to exist upstream, making replacement of the tide gate structure unnecessary. However, the current tide gates includes

vehicle access across it. Therefore a replacement bridge structure will be installed at this location to allow for continued access for pedestrians, maintenance, and emergency response.

Cost sharing for the project is based on the NED Plan. The NFS is responsible for 100% of the cost increase above the NED plan, as well as a 35% minimum cost share of the NED Plan. The estimated first cost (2020 price level) of the LPP is $1,224,598,000 with an estimated federal cost of $314,506,400 (based on the identified NED Plan). This would equate to an estimated non-federal cost of $910,091,600 to implement the LPP, with an estimated annual OMRR&R cost of $135,000 (2020 price levels).

Federal implementation of a recommended plan would be subject to the NFS complying with applicable federal laws and policies, including but not limited to:

a. Provide a minimum of 35 percent (based on the NED Plan), but not to exceed 50 percent of total project costs as further specified below:

    1. Provide 35 percent of design costs in accordance with the terms of a design agreement entered into prior to commencement of design work;

    2. Provide, during construction, a cash contribution of funds equal to 5 percent of total project costs;

    3. Provide all lands, easements and rights-of-way, including those required for relocations, the borrowing of material and the disposal of dredged or excavated material; perform or ensure the performance of all relocations; and construct all modifications required on lands, easements and rights-of-way to enable the disposal of dredged or excavated material all as determined by the Government to be required or to be necessary for the construction and O&M of the project;

    4. Provide, during construction, any additional funds necessary to make its total contribution equal to at least 35 percent of total project costs;

b. Shall not use funds from other federal programs, including any non-federal contribution required as a matching share, to meet any of the non-federal obligations for the project unless the federal agency providing the federal portion of such funds verifies in writing that expenditure of such funds for such purpose is authorized;

c. Not less than once each year, inform affected interests of the extent of protection afforded by the project;

d. Agree to participate in and comply with applicable federal floodplain management and flood insurance programs;

e. Comply with Section 402 of the Water Resources Development Act of 1986, as amended (33 U.S.C. 701b-12), which requires a non-federal interest to prepare a floodplain management plan within 1 year after the date of signing a project cooperation agreement, and to implement such plan not later than 1 year after completion of construction of the project;

f. Publicize floodplain information in the area and provide this information to zoning and other regulatory agencies for use in adopting regulations, or taking other actions to prevent unwise future development and to ensure compatibility with protection levels provided by the project;

g. Prevent obstructions or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) such as any new developments on project lands, easements and rights-of-way or the addition of facilities that may reduce the level of protection the project affords, hinder O&M of the project, or interfere with the project's proper function;

h. Comply with all applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended (42 U.S.C. 4601-4655), and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements and rights-of-way required for construction and O&M of the project, including those necessary for relocations, borrowing of material or disposal of dredged or excavated material; and inform all affected persons of applicable benefits, policies and procedures in connection with said Act;

i. For so long as the project remains authorized, OMRR&R the project, or functional portions of the project, including any mitigation features, at no cost to the Federal Government in a manner compatible with the project's authorized purposes and in accordance with applicable federal and state laws and regulations, and any specific directions prescribed by the Federal Government;

j. Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the NFS owns or controls for access to the project for the purpose of completing, inspecting, operating, maintaining, repairing, rehabilitating, or replacing the project;

k. Hold and save the U.S. free from all damages arising from the construction, OMRR&R of the project and any betterments, except for damages due to the fault or negligence of the U.S. or its contractors;

l. Keep and maintain books, records, documents, or other evidence pertaining to costs and expenses incurred pursuant to the project, for a minimum of three years after final accounting;

m. Comply with all applicable federal and state laws and regulations, including but not limited to: Section 601 of the Civil Rights Act of 1964 (42 U.S.C. 2000d) and Department of Defense Directive 5500.11 issued pursuant thereto; the Age Discrimination Act of 1975 (42 U.S.C. 6102); the Rehabilitation Act of 1973, as amended (29 U.S.C. 794) and Army Regulation 6007 issued pursuant thereto; and 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (labor standards originally enacted as the Davis-Bacon Act, the Contract Work Hours and Safety Standards Act, and the Copeland Anti-Kickback Act);

n. Perform, or ensure performance of, any investigations that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Public Law 96-510, as amended (42 U.S.C. 9601-9675), that may exist in, on or under lands, easements or rights-of-way that the Federal Government determines to be required for construction and O&M of the project. However, for lands that the Federal Government determines to be subject to the navigation servitude, only the Federal Government shall perform such investigations unless the Federal Government provides the NFS with prior specific written direction, in which case the NFS shall perform such investigations in accordance with such written direction;

o. Assume, as between the Federal Government and the NFS, complete financial responsibility for all necessary cleanup and response costs of any hazardous substances regulated under CERCLA that are located in, on or under lands, easements or rights-of-way that the Federal Government determines to be required for construction and O&M of the project;

p. Agree, as between the Federal Government and the NFS, that the NFS shall be considered the operator of the project for the purpose of CERCLA liability, and to the maximum extent practicable, OMRR&R the project in a manner that will not cause liability to arise under CERCLA; and

q. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended (42 U.S.C. 1962d-5b), and Section 103(j) of the Water Resources Development Act of 1986, Public Law 99-662, as amended (33 U.S.C. 2213(j)), which provides that the Secretary of the Army shall not commence the construction of any water resources project, or separable element thereof, until each non-federal interest has entered into a written agreement to furnish its required cooperation for the project or separable element.

The recommendations contained herein reflect the information available at this time and current Departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to Congress as proposals for authorization and implementation funding. However, prior to transmittal to Congress, the sponsor, the State, interested federal agencies, and other parties will be advised of any modifications and will be afforded an opportunity to comment further.

04/16/2020
Date

Aaron W. Reisinger
Colonel, U.S. Army
District Commander

10.0 Bibliography*

Ablaza, K., May 27, 2014, The wild side of Seal Beach Naval Weapons Station, *The Orange County Register*. Available at https://www.ocregister.com/2014/05/27/the-wild-side-of-seal-beach-naval-weapons-station/.

Avery, J., 2018, email from Avery (U.S. Fish and Wildlife Service) to S. Herleth-King (U.S. Army Corps of Engineers), July 24.

Bolsa Chica Land Trust, 2015, 2015 bird breeding season summary. Available at http://bclandtrust.org/2015-bird-breeding-season-summary/. Accessed Jan. 22, 2018.

Bryant, W.A., and E.W. Hart, 2007, Fault-Rupture Hazard Zones in California: Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zones Maps, California Geological Survey Special Publication 42, 48 pp.

Burton, C.A., L.R. Brown, and K. Belitz. 2005. Assessing water source and channel type as factors affecting benthic macroinvertebrate and periphyton assemblages in the highly urbanized Santa Ana River Basin, California. American Fisheries Society Symposium 47: 239-262.

California Department of Finance, 2017, Department of Finance Releases New State Population Projections. Available at http://www.dof.ca.gov/Forecasting/Demographics/Projections/documents/P_PressRelease.pdf. Accessed Dec. 13, 2017.

California Emergency Management Agency, California Geological Survey, and University of Southern California, 2009, Tsunami Inundation Map for Emergency Planning Los Alamitos Quadrangle/Seal Beach Quadrangle. Available at: https://www.conservation.ca.gov/cgs/tsunami/maps/orange

California Air Resources Board (CARB), 2017, Area designations maps/state and national. Available at https://www.arb.ca.gov/design/adm/adm.htm. Accessed Dec. 20, 2017.

CalRecycle. 2019. SWIS Facility/Site Search. Available at: https://www2.calrecycle.ca.gov/SWFacilities/Directory/

CARB, 2014, 2020 business-as-usual (BAU) emissions projection 2014 edition. Available at https://www.arb.ca.gov/cc/inventory/data/tables/scoping_plan_forecast_2014-05-22.pdf. Accessed Jan. 3, 2018.

California Department of Fish and Wildlife (CDFW), 2018, Natural Diversity Database. April 2018. Special Animals List. Periodic publication. 66 pp.

CDFW, 2016/2017, NCCP Plan Summary – Orange County Transportation Authority NCCP/HCP. Available at https://www.wildlife.ca.gov/Conservation/Planning/NCCP/Plans/OCTA. Accessed Jan. 2, 2018.

CDFW, 2005, California least tern breeding survey, 2004 season. California Department of Fish and Game, Habitat Conservation and Planning Branch, Species Conservation and Recovery Program Report, 2005-01, Sacramento, CA.

California Division of Mines and Geology (CDMG), 1986a, Special Studies Zones Map of the Newport Beach Quadrangle, California, scale 1:24,000.

CDMG, 1986b, Special Studies Zones Map of the Seal Beach Quadrangle, California, scale 1:24,000.

California Environmental Protection Agency (CEPA), 2017, Impaired Water Bodies. Available at https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml?wbid=CAX8011100019991013153527. Accessed Jan. 3, 2018.

California Geological Survey (CGS), 2002, Zones of Required Investigations, GIS dataset downloads for applicable 7.5' Quadrangles. Available at http://www.quake.ca/gov/maps/WH/regulatorymaps.htm. Accessed May 2016.

California Native Plant Society, Rare Plant Program, 2018, Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Available at http://www.rareplants.cnps.org. Accessed Aug. 14, 2018.

California State Lands Commission, 2015, Bolsa Chica Lowlands Restoration Project. Available at http://www.slc.ca.gov/Programs/Bolsa_Chica.html. Accessed Feb. 2, 2018.

City of Fountain Valley, 1995, Fountain Valley General Plan Update. City of Fountain Valley, Fountain Valley, California. Available at: https://www.fountainvalley.org/413/General-Plan

City of Garden Grove, 2008, Garden Grove General Plan. City of Garden Grove, Garden Grove, California. Available at: https://ggcity.org/planning/general-plan

City of Huntington Beach, 2012, Warner Avenue Bridge Preventive Maintenance Project (over Bolsa Chica Channel). City of Huntington Beach Planning & Building Department Environmental Assessment No. 12-06. Available at: https://www.huntingtonbeachca.gov/government/departments/planning/environmental-reports/files/Mitigated-Negative-Declaration-12-006.pdf

City of Huntington Beach. 2008. Huntington Harbour Bulkhead Repair Mitigated Negative Declaration. Available at: https://www.huntingtonbeachca.gov/government/departments/planning/PJB/eac/HuntingtonHarbour.cfm

City of Santa Ana, 1982, Santa Ana General Plan. City of Santa Ana, Santa Ana, California. Available at: https://www.santa-ana.org/general-plan/current-general-plan

Dahl, T.E. and C.F. Johnson, 1991, Status and trends of wetlands in the conterminous United States: mid-1970's to mid-1980's. U.S. Fish and Wildlife Service, Washington, D.C.

Dalton, J.C., 2017, "Further Advancing Project Delivery Efficiency and Effectiveness of USACE Civil Works [Memorandum]," U.S. Department of the Army, Washington, D.C.

Federal Emergency Management Agency (FEMA), 2017, President Trump Approves Major Disaster Declaration for California. Available at https://www.fema.gov/news-release/2017/03/16/president-trump-approves-major-disaster-declaration-california. Accessed Sept. 11, 2018.

Ford, R. and M.F. Platter-Reiger, 1986, Effects of Underwater Sound from Pile Driving on Behavior of Northern Anchovy (*Engraulis mordax*) and Topsmelt (*Atherinops affinis*) in San Diego Bay. Report to the U.S. Navy.

Foreign Staff, December 13, 2014, Third death in California storms as two-storey houses buried by rockslides, *The Telegraph*. Available at https://www.telegraph.co.uk/news/worldnews/northamerica/usa/11291735/Third-death-in-California-storms-as-two-storey-houses-buried-by-rockslides.html.

Hildebrandt, W.R., 2016, *An Assessment of Prehistoric Archaeological Sites Associated with the Goodell and Signal Landmark Properties, Bolsa Chica, California*. On file at Far Western Anthropological Research Group, Inc., Davis, California.

ICF Jones & Stokes, 2009, Final Mitigated Negative Declaration for the Westminster Channel (C04) From Hoover Street to Beach Boulevard Project. ICF Jones & Stokes prepared for County of Orange, Public Works, Santa Ana, California. 131 pp.

Institute for Water Resources (IWR), July 2017, Planning Manual Part II: Risk-Informed Planning, IWR Report 2017-R-03, Institute for Water Resources, U.S. Army Corps of Engineers, Washington D.C.

Leonard, M., 2012, Erratum to Earthquake Fault Scaling: Self-Consistent Relating of Rupture Length, Width, Average Displacement, and Moment Release: Bulletin of the Seismological Society of America 102(6): 2797.

Leonard, M., 2010, Earthquake fault scaling: self-consistent relating of rupture length, width, average displacement, and moment release. Bulletin of the Seismological Society of America 100(5A): 1971-1988.

Marsh, P.C. and C.R. Stinemetz. 1983. Benthic Invertebrates of the Earthen Coachella Canal, California. California Fish and Game 69(2):77-83.

Merkel & Associates, Inc., 2014, 2013 Southern California Bight Regional Eelgrass Surveys: Alamitos Bay, San Gabriel River, Anaheim Bay/Huntington Harbour, Agua Hedionda Lagoon, Batiquitos Lagoon, and San Dieguito Lagoon, Prepared for NOAA/National Marine Fisheries Resources Division.

Merkel & Associates, Inc., 2013, Bolsa Chica Lowlands Restoration Project Monitoring Program, Annual Report 2013, Monitoring Years 4-7, Prepared for California State Lands Commission.

Miller, R.V. and R. Corbaley, 1981, Mineral land classification of the greater Los Angeles area, part III classification of sand and gravel resources areas, Orange County-Temescal Valley production-consumption region. California Division of Mines and Geology, Special Report 143.
Orange County Health Care Agency, 2018, West Nile Virus. Available at http://www.ochealthinfo.com/phs/about/dcepi/epi/dip/prevention/disease_listing_a_z/wn. Accessed Feb. 5, 2018.

NBC Los Angeles, 2012, Available at https://www.nbclosangeles.com/news/local/Wayward-Dolphin-Bolsa-Chica-Wetlands-Huntington-Beach-149496715.html. Accessed September 2019.

NBC Los Angeles, 2013, Available at https://www.nbclosangeles.com/news/local/Dolphin-Trapped-Wetlands-Huntington-Beach-194287241.html. Accessed September 2019.

Orange County. 2003. Drainage Area Management Plan (DAMP). July 1, 2003. Accessed at: http://www.ocwatersheds.com/documents/damp/mapplan on August 17, 2018.Orange County Public Works (OCPW), 2018, Our Watersheds: Anaheim Bay Huntington Harbour. Available at http://www.ocwatersheds.com/programs/ourws/anaheim_bay_huntington_harbour. Accessed Feb. 5, 2018.

Orange County Public Works (OCPW), 2018, Our Watersheds: Anaheim Bay Huntington Harbour. Available at http://www.ocwatersheds.com/programs/ourws/anaheim_bay_huntington_harbour. Accessed Feb. 5, 2018.

Orange County Public Works, 2005, County of Orange General Plan. Orange County, California. Available at: http://www.ocpublicworks.com/ds/planning/generalplan

OC Register, 2013, Available at https://www.ocregister.com/2013/05/22/sea-otter-spotted-in-huntington-harbour/. Accessed September 2019.

Orange County Transportation Authority (OCTA), 2017, 2017 Orange County Congestion Management Program. Available at http://www.octa.net/pdf/2017%20Final%20CMP.pdf. Accessed Aug. 10, 2018.

Orange County Sewer District (OCSD), 2005, Ellis Avenue Pumping Station Replacement. OCSD Job No. I-10, ESA 201168 (2005).

O'Reilly, K., 2018, personal communication from O'Reilly (Bolsa Chica Ecological Reserve Manager, CDFW) to S. Herleth-King (Biologist and Planner, USACE), May 31, 2018.

Pacific Fishery Management Council, 2016, Pacific Coast Groundfish Fishery Management Plan – For the California, Oregon, and Washingotn Groundfish Fishery. Pacific Fishery Management Council, Portland, OR. 160 pp. Available at: http://www.pcouncil.org/wp-content/uploads/2017/03/GF_FMP_FinalThruA27-Aug2016.pdf

PlaceWorks and Fehr & Peers Transportation Consultants, 2016, Westminster General Plan Update. PlaceWorks and Fehr & Peers Transportation Consultants prepared for City of Westminster, Westminster, California. 205 pp. Available at: https://www.westminster-ca.gov/our_city/depts/cd/planning/general_plan/default.asp

Poland, J.F. and A.M. Piper, 1956, Ground-water geology of the coastal zone Long Beach-Santa Ana area, California. Geological Survey Water-Supply Paper 1109, United States Government Printing Office, Washington, D.C.

Popper, A.N., T.J. Carlson, A.D. Hawkins, B. L. Southall, and R.L. Gentry, 2006, Interim Criteria for Injury of Fish Exposed to Pile Driving Operations: A White Paper.

Regional Water Quality Control Boards (RWQCB), 2018, Final 2014/2016 California Integrated Report (Clean Water Act Section 303(d) List/305(b) Report). Accessed at: https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml on August 17, 2018.

Santa Ana Region Water Quality Control Board, 2019, Water Quality Control Plan Santa Ana River Basin. Available at: https://www.waterboards.ca.gov/santaana/water_issues/programs/basin_plan/

Schwebke, S., January 9, 2018, Man found dead in Westminster flood control channel, *The Orange County Register*. Available at https://www.ocregister.com/2018/01/09/man-found-dead-in-westminster-flood-control-channel/.

Sea and Sage Audubon Society, 2016, The least tern project 2016 nesting season: reports and photos. Available at LeastTerns/2016/GenInfo/2015_CLTE_Productivity%20Report.pdf. Accessed Jan. 2, 2018.

Sevrens, G.K., 2018, letter from Sevrens (California Department of Fish and Wildlife) to S. Herleth-King (U.S. Army Corps of Engineers), January 12.

South Coast Air Quality Management District (SCAQMD), 2016, Annual Air Quality Monitoring Network Plan. Authored by R.M. Bermudez, B. Vlasich, and J. Low. Available at: https://www.epa.gov/sites/production/files/2017-12/documents/caplan2016_-_southcoast.pdf. Accessed Dec. 20, 2017.

Southern California Earthquake Data Center (SCDEC), 2004, Historic earthquakes in southern California. Available at http://www.data.scec.org/clickmap.html. Accessed Jan. 2, 2018.

SWANA. 2018. OC Waste & Recycling's Prima Deshecha Landfill. Available at: https://swana.org/Portals/0/Awards/2018/Winners/Excellence2018-LM-gold1.pdf

Tiner, R.W., 1984, Wetlands of the United States: current status and recent trends. U.S. Fish and Wildlife Service, Habitat Resources, Newton Corner, MA.

United Nations Climate Change, 2014, Global warming potentials. 2014 United Nations Framework Convention on Climate Change. Available at http://unfccc.int/ghg_data/items/3825.php. Accessed Jan. 3, 2018.

U.S. Army Corps of Engineers. ER 1165-2-132, Hazardous, Toxic, and Radioactive Waste (HTRW) Guidance for Civil Works Projects. 1992.

U.S. Army Corps of Engineers. ER 1110-2-8159, Life Cycle Design and Performance. 1997.

U.S. Army Corps of Engineers. ER 1105-2-100, Planning Guidance Notebook. 2000.

U.S. Army Corps of Engineers. ER 1100-2-8162, Incorporating Sea Level Change in Civil Works Programs. 2013.

U.S. Army Corps of Engineers. ETL 1100-2-1, Procedures to Evaluate Sea Level Change: Impacts, Responses, and Adaptation. 2014.

U.S. Army Corps of Engineers. PB 2016-01, Subject: Clarification of Existing Policy for USACE Participation in Nonstructural Flood Risk Management and Coastal Strom Damage Reduction Measures. 2015.

U.S. Army Corps of Engineers. Engineering and Construction Bulletin (ECB) 2018-14. Subject: Guidance for Incorporating Climate Change Impacts to Inland Hydrology in Civil Works Studies, Designs, and Projects, 16 Sep 2016.

U.S. Army Corps of Engineers. ER 1105-2-101, Risk Assessment for Flood Risk Management Studies. 2017.

U.S. Army Corps of Engineers. ETL 1100-2-3, Guidance for Detection of Nonstationarities in Annual Maximum Discharges. 2017.
U.S. Army Corps of Engineers. EP 1110-1-8, Construction Equipment Ownership and Operating Expense Schedule, Region V. 2018.

United States Census Bureau, 2017, American FactFinder. Available at https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml. Accessed Dec. 13, 2017.

United States Department of the Interior (USDOI), 1994, The impact of federal programs on wetlands, vol. II. A report to Congress by the Secretary of the Interior, Washington, D.C.

United States Department of Transportation (USDOT), 2006, Construction Noise Handbook. U.S. Department of Transportation, Washington, D.C. Available at: https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook00.cfm

United States Environmental Protection Agency (USEPA), 2019, Greenhouse Gas Emissions from a Typical Passenger Vehicle). Available at: https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle

United State Fish and Wildlife Service (USFWS), 2012, Seal Beach National Wildlife Refuge Final Comprehensive Conservation Plan. Prepared by USFWS Pacific Southwest Region, Sacramento, CA and San Diego National Wildlife Refuge Complex, Chula Vista, CA. Available at https://www.fws.gov/uploadedFiles/Region_8/NWRS/Zone_1/San_Diego_Complex/Seal_Beach/Sections/What_We_Do/Conservation/PDFs/Volume%201%20sm.pdf. Accessed Aug., 20, 2018.

USFWS, 1998, Draft Recovery Plan for the Least Bell's Vireo. U.S. Fish and Wildlife Service, Portland, OR. 139 pp. Available at https://ecos.fws.gov/docs/recovery_plan/980506.pdf.

United States Geological Survey (USGS). 2019. Mineral Resources Online Spatial Data: Geologic Maps. California Geologic Map Data.
Available at: https://mrdata.usgs.gov/geology/state/map-us.html. Accessed May 29, 2019.

Walsh, M., 2012a, "U.S. Army Corps of Engineers Civil Works Feasibility Study Program Execution and Delivery [Memorandum]," U.S. Department of the Army, Washington, D.C.

Walsh, M., 2012b, "U.S. Army Corps of Engineers Civil Works Planning Capability Training [Memorandum]," U.S. Department of the Army, Washington, D.C.

Wells, D.L., and K.J. Coppersmith, 1994, New Empirical Relationships Among the Magnitude, Rupture Length, Rupture Width, Rupture Area, and Surface Displacement. Bulletin of the Seismological Society of America 84:974-1002.

Zembal, R., B.W. Massey, and J.M. Fancher, 1989, Movements and activity patters of the light-footed clapper rail. *Journal of Wildlife Management* 53:39-42.

Zembal, S., J. Hoffman, J. Konecny, C. Gailband, L. Conrad, and M. Mace, 2008, Light-footed clapper rail management study and propagation in California, 2007. Report to Nancy Frost, Associate Biologist,

California Department of Fish and Game, South Coast Region, Sensitive Bird and Mammal Monitoring Program, and Sandy Marquez, U.S. Fish and Wildlife Service.

Zembal, R. and S.M. Hoffman, 2010, A survey of the Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) in California 2010. Final report to California Department of Fish and Game, Nongame Wildlife Program Report No. 2010-10. Available at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=24503. Accessed Jan. 22, 2018.

11.0 List of Report Preparers*

This report was prepared by the USACE, Chicago and Los Angeles Districts, with participation from Chambers Group, Inc. consulting, and OCPW. The following sections identify individuals who prepared technical analyses, wrote sections of the Draft Report or provided technical or policy review of the final report.

11.1 USACE

Name	Discipline/Expertise	Role
Sue Davis	Water Resources Plan Formulation	Technical and Policy Review
Jeremiah Gadbois	Civil Engineering	Cost Engineering, Technical Appendix Preparation
Kelly Granberg	Environmental Engineering	NEPA/CEQA Analysis, Report Writing, and Technical Appendix Preparation
Shawna Herleth-King	Water Resources Plan Formulation/Biology	NEPA/CEQA Analysis, Report Writing, and Technical Appendix Preparation
Alex Hoxsie	Planning	Report Writing, and Technical Appendix Preparation
Joe Kissane	Civil Engineering	Geotechnical Engineer, NEPA/CEQA Analysis, and Technical Appendix Preparation
Michael Hallisy	Economics	Economist and Consequence Analyst, Report Writing, and Technical Appendix Preparation
Dan Linkowski	Water Resources Plan Formulation/Economics	Economist and Consequence Analyst, Report Writing, and Technical Appendix Preparation
Elizabeth Batty	Economics	Economist and Consequence Analyst, Report Writing, and Technical Appendix Preparation
Dena Abou-El-Seoud	Economics	Economist and Consequence Analyst, Technical Review
Jennifer Miller	Environmental Engineering	NEPA/CEQA Analysis, 404(b)(1) Analysis, Report Writing
Rana Mishra	Civil Engineering	Cost Engineering, Technical Appendix Preparation
Mike Padilla	Project Management	Project Management and Report Review
Casey Pittman	Environmental Engineering	NEPA/CEQA Analysis, HTRW, Report Writing, and Technical Appendix Preparation
Mike Rohde	Real Estate	Senior Real Estate Specialist and Technical Appendix Preparation
Joel Schmidt	Hydrology and Hydraulics	Hydraulics and Flood Risk Analysis, Technical Appendix Preparation, and NEPA/CEQA Analysis

Name	Discipline/Expertise	Role
Joe Schulenberg	Civil Engineering	Geotechnical Engineer, NEPA/CEQA Analysis, and Technical Appendix Preparation
Stuart Strum	Water Resources Plan Formulation	Project Management
Laura Vanden Berg	Civil Engineering	Engineering Technical Lead; Technical Appendix Preparation
Nick Barkowski	Fisheries Biologist	Resource Agency Coordination
Jason Zylka	Water Resources Plan Formulation/Botany	NEPA/CEQA Analysis, Report Writing, and Technical Appendix Preparation

11.2 Chambers Group, Inc. Consulting

Name	Discipline/Expertise	Role
Lisa Louie	Biologist	NEPA/CEQA Marine Impacts Analysis, and Draft Coastal Consistency Determination Preparation

11.3 Orange County Public Works

Name	Discipline/Expertise	Role
Justin Golliher	Engineering	Project Management
Penny Lew	Engineering	Project Management
Kevin Shannon	Development Services	CEQA Analysis, Technical Review
Cindy Salazar	Development Services	CEQA Analysis, Technical Review

12.0 Index*

A

adaptive management, 127, 400, 401, 402, 403, 687
Air Quality Management Plan, 217, 239, 241
AQMP, 217, 234, 237, 238, 239, 240, 241, 242, 245, 246, 645, 657

B

BCER, ii, iii, iv, v, vii, viii, 1, 7, 8, 9, 14, 15, 16, 17, 18, 21, 28, 30, 32, 36, 49, 50, 54, 55, 56, 60, 61, 62, 63, 64, 66, 67, 68, 69, 75, 96, 98, 104, 114, 121, 127, 137, 143, 264, 265, 267, 268, 271, 272, 276, 277, 278, 281, 283, 285, 289, 298, 299, 300, 301, 302, 303, 304, 305, 310, 311, 316, 320, 331, 332, 336, 339, 342, 343, 344, 345, 346, 347, 348, 349, 427, 458, 472, 473, 474, 475, 477, 478, 483, 484, 492, 494, 497, 498, 499, 500, 503, 508, 523, 566, 602, 603, 604, 605, 606, 607, 608, 611, 616, 617, 619, 620, 626, 630, 650, 681, 686, 687, 699
Bolsa Chica Ecological Reserve, ii, 1, 7, 13, 14, 15, 18, 29, 32, 54, 95, 96, 307, 308, 493, 495, 544, 616, 709

C

California Department of Fish and Wildlife, 1, 299, 320, 706, 710
California Environmental Quality Act, i, vi, 1, 217, 220, 295, 365, 654, 659
CDFW, 1, 54, 55, 56, 58, 60, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 117, 295, 296, 321, 322, 615, 616, 627, 630, 649, 651, 653, 654, 706, 709
CEQA, i, vi, 1, 3, 18, 80, 81, 85, 86, 97, 136, 137, 140, 173, 174, 175, 176, 177, 178, 179, 180, 216, 217, 220, 221, 222, 223, 225, 237, 238, 248, 249, 250, 251, 254, 263, 295, 296, 363, 364, 365, 366, 386, 399, 414, 471, 490, 518, 552, 553, 554, 555, 577, 608, 610, 611, 623, 624, 626, 627, 653, 654, 655, 695, 713, 714
cost, i, ii, i, vi, vii, viii, x, 3, 5, 92, 106, 116, 117, 118, 119, 126, 127, 130, 132, 135, 225, 231, 232, 253, 520, 523, 524, 530, 532, 542, 550, 613, 647, 660, 661, 666, 687, 688, 695, 696, 698, 699, 702, 703, 704
Cumulative Impacts, 136, 610, 619

D

diversion channel, 78, 84, 130, 148, 149, 156, 157, 163, 168, 172, 178, 179, 188, 189, 195, 203, 204, 209, 210, 215, 216, 225, 278, 279, 280, 290, 291, 294, 339, 350, 356, 362, 374, 379, 384, 385, 393, 397, 398, 425, 426, 435, 436, 445, 446, 453, 456, 467, 468, 471, 476, 482, 487, 490, 500, 501, 506, 512, 517, 518, 549, 550, 551, 563, 564, 575, 576, 581, 582, 585, 587, 595, 596, 600, 601

E

EFH, 2, 50, 54, 59, 60, 311, 312, 313, 314, 316, 318, 321, 323, 324, 325, 326, 327, 329, 330, 342, 344, 346, 347, 348, 349, 647, 650
EIR, 1, i, vi, 2, 3, 16, 137, 364, 365, 613, 619, 623, 626, 627, 653, 654, 695
EIS, i, vi, 2, 3, 4, 16, 624, 626, 653, 654, 695
Environmental Impact Report, 2, i, 2, 3, 225
Environmental Impact Statement, 2, i, 2, 3
Essential Fish Habitat, 2, 50, 59, 60

F

final array, 19, 126, 136, 137, 660
Flood Risk Management, 2, i, ix, 3, 16, 20, 108, 111, 126, 134, 135, 611, 660, 688, 702
future without project, 109, 119, 122, 124, 165, 166, 167, 168, 661, 666

G

goal, 6, 17, 107, 123, 134, 220, 362, 398, 651, 666

H

HTRW, v, 1, 2, 92, 415, 416, 417, 418, 419, 420, 421, 423, 424, 425, 426, 428, 430, 431, 433, 434, 435, 447, 448, 450, 451, 452, 453, 603, 606, 647, 684, 713

I

IFR, i, ii, i, 2, 3, 18, 136, 137, 624, 626, 653, 695
incremental, 106, 610
Integrated Feasibility Report, 2, i, 2, 3

L

Locally Preferred Plan, i, vii, ix, 2, 126, 134, 225, 660, 666, 670, 702
LPP, i, ii, i, vii, viii, ix, 2, 126, 134, 135, 136, 137, 138, 140, 141, 146, 147, 148, 149, 154, 157, 160, 161, 162, 163, 166, 168, 171, 172, 176, 177, 178, 179, 180, 186, 189, 192, 193, 195, 201, 204, 208, 210, 213, 216, 224, 225, 226, 229, 231, 232, 235, 236, 237, 238, 240, 241, 242, 245, 246, 247, 248, 249, 251, 252, 253, 254, 256, 257, 258, 259, 260, 263, 274, 280, 287, 291, 293, 294, 296, 315, 317, 320, 326, 330, 336, 337, 338, 339, 346, 347, 348, 349, 350, 354, 356, 360, 362, 366, 370, 371, 374, 378, 379, 383, 384, 385, 386, 387, 391, 393, 396, 397, 398, 399, 401, 402, 403, 410, 411, 412, 413, 414, 415, 422, 426, 432, 436, 441, 446, 451, 454, 455, 456, 457, 462, 468, 471, 474, 475, 477, 480, 482, 486, 488, 489, 490, 491, 498, 501, 504, 505, 507, 510, 512, 516, 518, 532, 552, 555, 556, 561, 564, 570, 576, 577, 580, 582, 584, 585, 587, 588, 592, 593, 596, 599, 601, 608, 609, 610, 611, 612, 617, 619, 620, 621, 622, 623, 624, 625, 628, 645, 646, 660, 666, 667, 668, 669, 675, 676, 686, 696, 702

M

Maximum Channel Modification, 133
measures, i, vi, vii, 4, 6, 16, 19, 33, 102, 106, 107, 108, 111, 112, 113, 114, 115, 116, 117, 119, 120, 121, 122, 123, 124, 126, 127, 136, 137, 141, 150, 151, 152, 153, 154, 155, 156, 157, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 197, 199, 200, 202,203, 204, 210, 211, 216, 217, 219, 220, 221, 224, 231, 234, 237, 238, 239, 241, 242, 245, 246, 249, 252, 253, 254, 256, 257, 258, 264, 266, 268, 270, 272, 273, 275, 276, 277, 278, 279, 280, 283, 285, 287, 288, 291, 294, 295, 296, 297, 298, 301, 302, 304, 310, 311, 315, 316, 317, 320, 321, 340, 341, 345, 350, 364, 366, 375, 377, 379, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 398, 399, 400, 401, 402, 415, 427, 429, 430, 431, 432, 433, 434, 435, 436, 439, 440, 442, 444, 445, 457, 458, 460, 461, 464, 466, 467, 468, 471, 474, 475, 480, 486, 489, 491, 492, 494, 498, 504, 505, 510, 513, 514, 515, 516, 517, 519, 521, 522, 529, 531, 532, 540, 541, 548, 549, 551, 552, 555, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 568, 569, 570, 572, 574, 575, 576, 577, 580, 584, 587, 592, 593, 599, 608, 609, 611, 612, 619, 620, 621, 622, 623, 625, 626, 630, 646, 648, 650, 651, 653, 654, 655, 657, 658, 660, 666, 672, 674, 676, 677, 679, 680, 681, 683, 684, 685, 687, 697
Mitigation, vii
Mitigation measures, 427, 429, 430, 431, 432, 433, 434, 435, 436, 439, 440, 442, 444, 445
monitoring, 30, 33, 36, 37, 38, 40, 50, 75, 86, 93, 141, 181, 183, 184, 185, 187, 188, 298, 312, 314, 317, 318, 324, 328, 343, 345, 347, 349, 367, 375, 387, 388, 389, 390, 391, 392, 393, 394, 641, 645, 654, 674, 675, 680, 687

N

national economic development, 133
National Environmental Policy Act, i, vi, 1, 3, 218
National Marine Fisheries Service, 54, 295
Naval Weapons Station Seal Beach, 1, 7, 77, 614
NED, i, ii, i, vii, viii, 1, 17, 121, 126, 134, 135, 136, 137, 138, 140, 141, 142, 143, 144, 145, 146, 150, 151, 154, 158, 159, 160, 164, 165, 166, 169, 170, 171, 173, 174, 175, 176, 180, 182, 186, 187, 190, 192, 193, 196, 200, 201, 205, 207, 208, 210, 213, 224, 225, 231, 232, 233, 234, 237, 238, 239, 241, 242, 243, 244, 245, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 258, 259, 263, 264, 273, 274, 281, 287, 292, 293, 296, 299, 313, 315, 321, 326, 331, 332, 333, 334, 335, 336, 340, 341, 342, 343, 344, 345, 346, 351, 354, 357, 359, 360, 366, 368, 369, 371, 372, 373, 375, 377, 378, 380, 381, 382, 383, 386, 387, 388, 391, 394,

396, 397, 399, 400, 401, 402, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 422, 427, 432, 437, 441, 446, 450, 451, 454, 455, 456, 457, 461, 462, 469, 471, 472, 474, 475, 477, 480, 483, 485, 486, 488, 489, 490, 491, 492, 498, 501, 504, 505, 507, 510, 513, 516, 518, 520, 531, 532, 552, 554, 555, 556, 560, 561, 565, 569, 570, 577, 578, 580, 582, 584, 585, 586, 587, 588, 592, 593, 596, 597, 598, 599, 600, 608, 609, 610, 611, 612, 617, 619, 620, 621, 622, 623, 624, 625, 628, 646, 660, 661, 662, 663, 664, 666, 675, 676, 686, 696, 702, 703
NEPA, i, vi, 1, 3, 4, 18, 85, 97, 136, 140, 180, 218, 221, 222, 231, 254, 263, 296, 363, 364, 366, 386, 399, 403, 414, 471, 490, 518, 577, 608, 610, 623, 624, 626, 649, 653, 654, 672, 713, 714
NFS, 1, 3, 6, 117, 126, 134, 135, 414, 417, 418, 420, 421, 423, 425, 426, 429, 430, 431, 433, 434, 435, 647, 653, 658, 660, 666, 686, 688, 695, 696, 699, 702, 703, 704, 705
NMFS, 54, 59, 67, 295, 627, 647, 649, 650
No Action, i, vi, vii, 20, 103, 121, 127, 134, 135, 136, 138, 140, 141, 142, 143, 144, 145, 147, 148, 149, 150, 157, 163, 168, 172, 180, 181, 182, 189, 196, 204, 210, 224, 231, 238, 241, 243, 247, 249, 252, 254, 255, 258, 263, 264, 280, 291, 296, 299, 320, 331, 339, 351, 356, 366, 367, 375, 386, 387, 394, 399, 400, 401, 404, 414, 416, 427, 436, 446, 454, 457, 468, 471, 472, 477, 483, 488, 490, 491, 501, 507, 512, 518, 519, 552, 556, 565, 577, 582, 585, 588, 596, 625, 662, 663, 669, 687
nonstructural, ii, 111, 112, 116, 120, 121, 123, 124, 661, 667
NWSSB, 1, 7, 9, 13, 20, 21, 50, 56, 58, 69, 93, 96, 138, 374, 379, 448, 451, 614, 615, 620

O

objective, vii, 17, 111, 179, 648, 687, 702
OCPW, i, 1, 3, 6, 8, 21, 51, 60, 86, 92, 104, 115, 117, 123, 141, 225, 226, 231, 238, 240, 249, 263, 479, 480, 481, 482, 491, 492, 494, 496, 497, 498, 499, 500, 502, 503, 505, 506, 609, 619, 626, 627, 654, 658, 674, 677, 684, 686, 695, 697, 709, 713
OMRR&R, 1, 686, 687, 688, 696, 699, 702, 703, 704, 705
opportunities, i, ii, 4, 16, 18, 106, 117, 139, 253, 400, 401, 616, 626, 627
Orange County Public Works, ii, i, 1, 3, 225, 709, 714

P

PAL, 67, 628
PED, 2, 87, 415, 417, 418, 420, 421, 423, 425, 426, 428, 430, 431, 433, 434, 435, 448, 449, 450, 451, 452, 623, 655, 672, 684, 687, 695, 696, 697
Planning Aid Letter, 1
Preconstruction Engineering and Design, 2, 87, 695, 697
Problems, 16
purpose, i, 4, 18, 47, 70, 76, 77, 85, 113, 139, 196, 197, 198, 199, 200, 201, 202, 203, 204, 217, 218, 221, 222, 248, 252, 255, 256, 365, 408, 412, 471, 477, 478, 479, 480, 481, 482, 610, 626, 703, 704, 705

R

Real Estate, 1, 76, 133, 687, 713
Residual Risk, 688

S

SBNWR, 2, 7, 13, 29, 56, 57, 58, 59, 62, 63, 64, 66, 67, 69, 93, 96, 104, 269, 270, 274, 275, 284, 287, 299, 302, 305, 311, 316, 320, 331, 342, 343, 344, 345, 346, 347, 348, 349, 473, 475, 496, 498, 499, 500, 611, 614, 615, 616, 620, 650
SCAQMD, 2, 37, 216, 217, 220, 221, 222, 223, 224, 225, 238, 239, 240, 241, 242, 243, 244, 246, 248, 249, 250, 251, 252, 253, 620, 645, 653, 657, 710
Seal Beach National Wildlife Refuge, iv, 2, 7, 13, 21, 54, 56, 96, 603, 606, 615, 711
SHPO, 2, 79, 362, 363, 369, 370, 372, 373, 375, 387, 388, 389, 390, 391, 392, 393, 394, 609, 651, 698
South Coast Air Quality Management District, 2, 37, 216, 225, 710
State Historic Preservation Office, 2

T

Tentatively Selected Plan, 2

TSP, 2, 3, 697

U

U.S. Environmental Protection Agency, 2, 20
U.S. Fish and Wildlife Service, iv, viii, 1, 2, 13, 296, 299, 320, 603, 606, 628, 649, 706, 707, 710, 711, 712
US Environmental Protection Agency, 216
USEPA, 2, 20, 39, 46, 179, 182, 183, 184, 185, 216, 217, 218, 221, 222, 231, 255, 257, 404, 408, 410, 412, 414, 415, 416, 417, 419, 420, 422, 424, 425, 427, 428, 430, 431, 433, 434, 435, 627, 645, 646, 653, 684, 711
USFWS, 2, 13, 21, 50, 56, 57, 58, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 75, 96, 139, 295, 296, 304, 615, 616, 627, 628, 629, 631, 632, 633, 634, 647, 649, 650, 651, 654, 679, 711

W

Westminster watershed, i, ii, iv, v, 4, 6, 7, 8, 16, 17, 18, 20, 21, 22, 24, 27, 29, 30, 32, 33, 47, 51, 65, 66, 97, 106, 108, 115, 116, 117, 121, 126, 127, 142, 183, 184, 185, 187, 188, 196, 340, 351, 356, 457, 468, 472, 477, 483, 488, 491, 501, 507, 512, 519, 577, 603, 606, 608, 619, 624, 648, 702