2 REVISED ADDITIONAL ENVIRONMENTAL ANALYSIS

Chapter 2 of the Final Environmental Analysis (Final AEA) presents updated versions of the environmental analysis and mitigation measure descriptions originally published in the Draft Additional Environmental Analysis (Draft AEA) for the greenhouse gas (GHG) analysis (Section 2.1 herein, formerly Chapter 2 of the Draft AEA) and unarmored threespine stickleback (Section 2.2 herein, formerly Chapter 3 of the Draft AEA). Specific revisions to these sections since the Draft AEA public circulation are shown with text deletions noted by ~~strikethrough~~ and text additions noted by underline. The revisions originate from either responses to public comments and/or clarifying information from the project applicant or California Department of Fish and Wildlife (CDFW). All information provided by the project applicant has been independently reviewed and analyzed prior to use in the Final AEA, consistent with CEQA Guidelines Section 15084(e).

The information contained within this chapter clarifies and expands on information in the Draft AEA and does not constitute "significant new information" requiring recirculation. Revisions do not involve identification of any new significant impacts, substantial increase in the severity of previously identified significant impacts, or feasible mitigation or alternative considerably different from those previously analyzed that the applicant declines to implement. (Public Resources Code Section 21092.1; CEQA Guidelines Section 15088.5.)

Sections 2.1, Global Climate Change/Greenhouse Gas Emissions, and Section 2.2, Unarmored Threespine Stickleback, are provided below.

2.1 GLOBAL CLIMATE CHANGE/GREENHOUSE GAS EMISSIONS

Section 2.1, Global Climate Change/Greenhouse Gas Emissions, was originally published as Chapter 2 of the Draft AEA. It is presented in its entirety in this section of the Final AEA with all updates and changes occurring since the publication of the Draft AEA. Section numbering and subheading levels have been adjusted herein to align with the organization of the Final AEA; however, table numbers, impact conclusion numbers, and mitigation measure numbers remain the same as published in the Draft AEA to keep them identical for ease of cross comparisons.

This section presents a summary of the current state of climate change science and greenhouse gas (GHG) emissions sources in California; a summary of applicable laws, regulations, and executive orders (EOs); quantification of project-generated GHG emissions; and discussion about their potential contribution to the cumulative impact of global climate change. The significance of the GHG emission impact of implementing the Newhall Ranch Resource Management and Development Plan (RMDP) and Spineflower Conservation Plan (SCP), collectively called the project herein, is assessed prior to the consideration of mitigation measures. Mitigation measures to reduce a potentially significant GHG impacts are described, based on independent review and analysis by CDFW, in consultation with ARB, of information and materials submitted by the project applicant.

Through the implementation of mitigation measures, including both emission reduction actions and offset projects/credits, the project applicant has committed to achieve zero net GHG emissions to eliminate the project's contribution of GHG emissions to the cumulative impact of climate change. The analysis in this section evaluates whether substantial evidence exists to demonstrate the feasibility and reliability of achieving the proposed zero net GHG emissions. Project emissions are analyzed at full buildout, which is planned to occur in 2030.

Table 2-1, shows project-generated GHG emissions, itemized by sector, including the unmitigated emissions, proposed reductions by mitigation measures, and post-mitigation emissions. Detailed analysis of project emissions and mitigation measures is provided in Section 2.1.3, Environmental Impacts and Mitigation Measures.

Table 2-1 Summary of Unmitigated and Post-Mitigation Annual Greenhouse Gas Emissions Associated with the Project at Full Buildout in the Planned Buildout Year (2030)

Emissions Activity/Mitigation Measure	Emissions (MT CO_2e/year)		
	Unmitigated	Reduction	Post Mitigation[1]
Mobile Sources	403,814		
		201,803	
			202,011
Electricity[2]	39,393		
		44,274	
			-4,880[3]
Natural Gas[2]	43,386		
		35,194	
			8,192
Area Sources	367		
		0	
			367
Water Consumption and Wastewater Treatment	8,190		
		0[4]	
			8,190
Solid Waste Generation	23,179		
		0[4]	
			23,179
Vegetation Removal	1,335		
		1,335	
			0
Construction	6,437		
		6,437	
			0
Sub-Total Annual Emissions (without MM 2-13)[5, 6]	**526,103**	**289,043**	**237,059**
MM 2-13 GHG Reductions		**-237,059**	
Total Annual Emissions	**526,103**		**0**

Notes: MT CO_2e/year = metric tons of carbon dioxide equivalent per year; TDV=Time Dependent Valuation; CEC=California Energy Commission; ZNE=Zero Net Energy

[1] Post mitigation emissions are calculated by subtracting estimated reductions from mitigation measures for each emission source from the unmitigated emission quantities, i.e., Post Mitigation Emissions = Unmitigated Emissions – Emissions Reductions.

[2] Reported unmitigated electricity and natural gas emissions are combined emissions from the CalEEMod output and the swimming pool calculations. To reflect compliance with the 2016 Title 24 Standards, CalEEMod default values were adjusted. The ZNE mitigation measures are split by assuming 78 percent of the mitigation will offset electricity and 22 percent will offset natural gas, consistent with actual emissions reductions from the 2016 Title 24 Standards. Emissions reductions from offsite building retrofits are split assuming 50 percent electricity reduction and 50 percent natural gas reduction. Refer to Technical Report Section 2.3.2 and Tables 2-13a through 2-14b of Draft AEA Appendix 1 for more detailed assumptions.

[3] Emissions reductions from direct and indirect energy consumption appear as a negative to represent TDV energy savings from use of photovoltaics combined with variations in natural gas pricing consistent with CEC's TDV model to achieve ZNE. Refer to Technical Report Tables 4-1a through 4-2d and Technical Report Appendix J of Draft AEA Appendix 1 for more detail.

[4] Emissions reductions from the area sources and water and wastewater treatment sectors were achieved through incorporation of emissions reducing project design features, and, therefore, are not quantified as mitigation reductions.

[5] Sub-Total Annual Emissions shown do not yet account for compensatory reductions proposed by the project applicant through use of direct measures and/or purchase of offset credits required by the GHG Reduction Plan in MM 2-13 except for MM 2-10. The project applicant has proposed commitment to achieve zero net GHG emissions, which would include direct measures and the use of offsets. Please refer to Section 2.3 for further explanation.

[6] Summarized emissions by mitigation measure are rounded to the nearest whole number; however, total emissions reflect the sum of exact emissions levels.

Source: Modeling conducted by Ramboll Environ in 2016. See Draft AEA Appendix 1 for detailed calculations.

2.1.1 Environmental Setting Relevant to GHG Emissions

GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

Global climate change refers to changes in average climatic conditions (e.g., temperature, wind patterns, precipitation, and storms). Global warming, which is one aspect of climate change, is the observed increase in the average temperature of the Earth's surface and atmosphere. One identified cause of global warming is an increase of GHGs in the atmosphere; these gases allow the sun's rays to enter the Earth's atmosphere but trap the energy that is radiated back into space, resulting in a warming of the atmosphere called the "greenhouse effect."

The Physical Scientific Basis

Emissions of carbon dioxide (CO_2) are a leading cause of global climate change, with other pollutants such as methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons, and sulfur hexafluoride also contributing. (See Health & Saf. Code, Section 38505(g).) The magnitude of GHG impacts on global climate change differs because each GHG has a different global warming potential (GWP) (i.e., certain compounds have, on a pound-for-pound basis, greater contributions to global climate change than others). The impact of each GHG is measured as a combination of the volume of its emissions and its GWP using one pound of CO_2 as the common equivalent measure of GWP. (CO_2 has the greatest impact on global climate change because of the relatively large quantities of CO_2 emitted into the atmosphere.) Thus, GHG emissions are typically measured in terms of megagrams or metric tonnes (MT) of CO_2 equivalent (CO_2e). For the purposes of this analysis, a "tonne" refers to a metric ton (i.e., 1,000 kilograms or 2,204.6 pounds). GHG emissions are typically expressed as metric tons of carbon dioxide equivalent (MT CO_2e), where emissions of other GHGs are normalized with respect to the GWP of CO_2.

Greenhouse Gas Emission Sources

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the transportation, industrial/manufacturing, utility, residential, commercial, and agricultural emissions sectors (ARB 2014a). In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation (ARB 2014a). Emissions of CO_2 are byproducts of fossil fuel combustion. CH_4, a highly potent GHG, primarily results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) and is largely associated with agricultural practices and landfills. N_2O is also largely attributable to agricultural practices and soil management. CO_2 sinks, or reservoirs, include vegetation and the ocean, which absorb CO_2 through sequestration and dissolution (CO_2 dissolving into the water), respectively, two of the most common processes for removing CO_2 from the atmosphere.

The existing project site generally consists of vacant land, some agricultural uses, water wells, active oil and gas operations, abandoned oil wells, and associated access roads. As illustrated in Table 2.1-1, Summary of Existing On-Site GHG Emissions, the existing condition emissions inventory is estimated at approximately 11,021 MT CO_2e per year. Detailed calculations are shown in Technical Report Table ES-1 and Technical Report Appendix A, contained in Draft AEA Appendix 1.

Table 2.1-1 Summary of Existing On-Site GHG Emissions

Emissions-Generating Activity	Existing Emissions (MT CO_2e/year)
Methane emissions associated with oil wells	3,790
Energy use associated with oil wells	3,682
Energy use associated with water	2,987
N_2O emissions associated with fertilizer use	412
Emissions associated with diesel fuel usage	152
Total Existing On-Site GHG Emissions	**11,021**

Notes: MT CO_2e/year = metric tons of carbon dioxide equivalent per year; N_2O=nitrous oxide

Source: Modeling conducted by Ramboll Environ in 2016. See Technical Report Appendix A, contained in Draft AEA Appendix 1 for detailed calculations.

EFFECTS OF CLIMATE CHANGE ON THE ENVIRONMENT

Globally, climate change has the potential to impact numerous environmental resources through anticipated, though uncertain, impacts related to future air temperatures and precipitation patterns.

Scientific modeling predicts that the continued emissions of GHGs at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. At the end of the 21st century, global surface temperature change is likely to exceed 1.5°C (relative to 1850-1900 levels) in all of the four assessed climate model projections but one (Intergovernmental Panel on Climate Change [IPCC] 2014).

The understanding of the role that GHG emissions plays on global climate trends is complex and involves varying uncertainties and a balance of different impacts. In addition to uncertainties about the extent to which human activity rather than solar or volcanic activity is principally responsible for increased warming, there also is evidence that some human activity has cooling, rather than warming, impacts, as discussed in publications by IPCC. IPCC is the leading international and intergovernmental body for the assessment of climate change and was established – in 1988 – by the United National Environment Programme and World Meteorological Organization to provide the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socio-economic impacts. Nonetheless, when all impacts and uncertainties are considered together, there is general scientific consensus that human activity contributes significantly to global climate change.

Acknowledging uncertainties regarding the rate at which anthropogenic (i.e., human-caused) GHG emission may continue to increase, and the impact of such emissions on climate change, IPCC devises emission scenarios that use various assumptions about the rates of economic development, population growth, and technological advancement over the course of the next century. These uncertainties are attributable to various factors under human control, such as future population growth and the locations of that growth; the amount, type, and locations of economic development; the amount, type, and locations of technological advancement; adoption of alternative energy sources; legislative and public initiatives to curb emissions; and public awareness and acceptance of methods for reducing emissions. For the IPCC Fifth Assessment Report, a set of four new scenarios, denoted Representative Concentration Pathways (RCP), were developed. RCPs are based on a combination of integrated assessment models, simple climate models, atmospheric chemistry and global carbon cycle models. The four RCPs include a mitigation scenario, two stabilizing scenarios, and one scenario with very high GHG emissions. “The RCPs can thus represent a range of 21st century climate policies, as compared with the no-climate policy of the Special Report on Emissions Scenarios (SRES) used in the AR3 and the AR4.”

While the projected impacts of global climate change on weather and climate are uncertain and likely to vary regionally, the following impacts are expected by IPCC:

- it is very likely that the Arctic sea ice cover will continue to shrink and thin, with the Northern Hemisphere spring snow cover and global glacier volume also decreasing;
- it is virtually certain that there will be more frequent hot and fewer cold temperature extremes over most land areas on daily and seasonal timescales, with heat waves occurring at a higher frequency and duration;
- global surface temperature change for the end of the 21st century is likely to exceed 1.5°C relative to 1850 to 1900 for all RCP scenarios except the mitigation scenario. It is likely to exceed 2°C for the highest forcing scenario and one stabilizing scenario, and more likely than not to exceed 2°C for the remaining stabilizing scenario. Warming will continue beyond 2100 under all RCP scenarios except the mitigation scenario;
- the global ocean will continue to warm during the 21st century, with heat penetrating from the surface to the deep ocean and affecting ocean circulation;

- further uptake of carbon by the ocean will increase ocean acidification;
- changes in the global water cycle in response to the warming over the 21st century will not be uniform. The contrast in precipitation between wet and dry regions and between wet and dry seasons will increase, although there may be regional exceptions; and
- most aspects of climate change will persist for many centuries even if GHG emissions cease entirely.

Physical conditions beyond average temperatures could be indirectly affected by the accumulation of GHG emissions. For example, changes in weather patterns resulting from increases in global average temperature are expected to result in a decreased volume of precipitation falling as snow in California and an overall reduction in snowpack in the Sierra Nevada. Based upon historical data and modeling, the California Department of Water Resources (DWR) projects that the Sierra snowpack will experience a 25 to 40 percent reduction from its historic average by 2050 (DWR 2008:4). An increase in precipitation falling as rain rather than snow also could lead to increased potential for floods because water that would normally be held in the Sierra Nevada until spring could flow into the Central Valley concurrently with winter storm events (California Natural Resources Agency [CNRA] 2012:5). This scenario would place more pressure on California's levee/flood control system.

Another outcome of global climate change is sea level rise. Sea level rose approximately seven inches during the last century and, assuming that sea-level changes along the California coast continue to track global trends, sea level along the state's coastline in 2050 could be 10-18 inches higher than in 2000, and 31 to 55 inches higher by the end of this century (CNRA 2012: 9).

As the existing climate throughout California changes over time, the ranges of various plant and wildlife species could shift or be reduced, depending on the favored temperature and moisture regimes of each species. In the worst cases, some species would become extinct or be extirpated from the state if suitable conditions are no longer available (CNRA 2012: 11, 12).

Changes in precipitation patterns and increased temperatures are expected to alter the distribution and character of natural vegetation and associated moisture content of plants and soils. An increase in frequency of extreme heat events and drought are also expected. These changes are expected to lead to increased frequency and intensity of large wildfires (CNRA 2012: 11).

To protect the state's public health and safety, resources, and economy, CNRA — in coordination with other state agencies — has updated the *2009 California Climate Adaptation Strategy* with the 2014 *Safeguarding California: Reducing Climate Risk* plan (CNRA 2014). Additionally, in March 2016, CNRA released *Safeguarding California: Implementation Action Plans*, a document that shows how California is acting to convert the recommendations contained in the 2014 *Safeguarding California* plan into action. The 2016 *Action Plans* document is divided by ten sectors (i.e., agriculture, biodiversity and habitat, emergency management, energy, forestry, land use and community development, oceans and coastal resources and ecosystems, public health, transportation, and water), and shows the path forward by presenting the risks posed by climate change, the adaptation efforts underway, and the actions that will be taken to safeguard residents, property, communities, and natural systems.

Substantial work has been done at the international and national level to evaluate climatic impacts, and climate change and its potential impacts have been studied extensively in California. Cal-Adapt is a climate change scenario planning tool developed by the California Energy Commission (CEC) and the University of California Berkeley Geospatial Innovation Facility. Cal-Adapt currently downscales global climate model data to local and regional resolution under two emissions scenarios; the A-2 scenario represents a business-as-usual (BAU) future emissions scenario, and the B-1 scenario represents a lower GHG emissions future. According to Cal-Adapt, annual average temperatures in Los Angeles County are projected to rise by 3.8-6.4°F by 2100, with the range based on low- and high-emissions scenarios (Cal-Adapt 2016).

2.1.2 Regulatory Setting

FEDERAL

Clean Air Act

In *Massachusetts v. Environmental Protection Agency* (2007) 549 U.S. 497, the U.S. Supreme Court held that the U.S. Environmental Protection Agency (EPA) has authority under the Clean Air Act (CAA) to regulate CO_2 emissions if those emissions pose an endangerment to the public health or welfare.

In 2009, EPA issued an "endangerment finding" under the CAA, concluding that GHGs threaten the public health and welfare of current and future generations and that motor vehicles contribute to GHG emissions. These findings provide the basis for adopting national regulations to mandate GHG emission reductions under the CAA.

To date, EPA has exercised its authority to regulate mobile sources that reduce GHG emissions via the control of vehicle manufacturers, as discussed immediately below (see "Federal Vehicle Standards"). The EPA also has adopted standards that set a national limit on GHG emissions produced from new, modified, and reconstructed power plants, and has issued the Clean Power Plan, which is targeted toward the reduction of carbon emissions from existing power plants. Under the Clean Power Plan, EPA set state-specific interim and final performance rates for two subcategories of fossil fuel-fired electric generation units: fossil fuel-fired electric steam generating units and natural gas-fueled combined cycle generating units. The Clean Power Plan requires states to develop and implement plans that ensure that the power plants in their state – either individually, together or in combination with other measures – achieve the interim performance rates over the period of 2022 to 2029 and the final performance rates, rate-based goals or mass-based goals by 2030. In February 2016, the U.S. Supreme Court stayed implementation of the Clean Power Plan pending judicial review.

Federal Plan to Reduce GHG Emissions by 2025

In 2015, the U.S. State Department submitted the nation's GHG emissions reduction target to the United Nations Framework Convention on Climate Change. The submission, referred to as an Intended Nationally Determined Contribution, is a formal statement of the U.S. target to reduce the nation's emissions by 26 to 28 percent below 2005 levels by 2025.

The target is the culmination of a process that examined opportunities under existing regulatory authorities to reduce GHG emissions in 2025 from all sources in every economic sector. Several U.S. laws, as well as existing and proposed regulations thereunder, are relevant to the implementation of the U.S. target, including the CAA (42 U.S.C. Section 7401 et seq.), the Energy Policy Act (42 U.S.C. Section 13201 et seq.), and the Energy Independence and Security Act (42 U.S.C. Section 17001 et seq.) (The White House 2015).

Federal Vehicle Standards

In response to the *Massachusetts v. Environmental Protection Agency* decision, in 2007, the Bush Administration issued EO 13432 directing EPA, the Department of Transportation (DOT), and the Department of Energy (DOE) to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. In 2009, the National Highway Traffic Safety Administration (NHTSA) issued a final rule regulating fuel efficiency for and GHG emissions from cars and light-duty trucks for model year 2011; and, in 2010, EPA and NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012–2016.

In 2010, President Obama issued a memorandum directing the same federal agencies to establish additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, EPA and NHTSA proposed stringent, coordinated federal GHG and fuel economy standards for model years 2017 to 2025 light-duty vehicles. The proposed standards are projected to achieve 163 grams/mile of CO_2 in model year 2025, on an average industry fleet-wide basis,

which is equivalent to 54.5 miles per gallon (mpg) if this level were achieved solely through fuel efficiency. The final rule was adopted in 2012 for model years 2017–2021, and NHTSA intends to set standards for model years 2022–2025 in a future rulemaking.

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011, EPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014 to 2018. The standards for CO_2 emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles.

In August 2016, EPA and NHTSA adopted the next phase (Phase 2) of the fuel economy and GHG standards for medium- and heavy-duty trucks, which apply to vehicles with model year 2018 and later (EPA 2016). In response to EPA's adoption of the Phase 2 standards, ARB staff plan to propose a Phase 2 program for California, most likely in late 2016 or 2017 (ARB 2016a).

Energy Independence and Security Act

The Energy Independence and Security Act of 2007 (EISA) facilitates the reduction of national GHG emissions by requiring the following:

- increasing the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) that requires fuel producers to use at least 36 billion gallons of biofuel in 2022;
- prescribing or revising standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances;
- requiring approximately 25 percent greater efficiency for light bulbs by phasing out incandescent light bulbs between 2012 and 2014; requiring approximately 200 percent greater efficiency for light bulbs, or similar energy savings, by 2020; and
- while superseded by EPA and NHTSA actions described above, (i) establishing mpg targets for cars and light trucks and (ii) directing NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for trucks.

Additional provisions of the EISA address energy savings in government and public institutions, promote research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green jobs."

STATE

Numerous laws, plans, and regulations that require GHG emissions reductions have been implemented or are under development in California. This comprehensive statewide framework is summarized below.

Executive Order S-3-05

In 2005, former Governor Arnold Schwarzenegger signed EO S-3-05, which established the following GHG emission reduction goals for California:

- By 2010, reduce GHG emissions to 2000 levels;
- By 2020, reduce GHG emissions to 1990 levels; and
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

In adopting Assembly Bill (AB) 32, the Global Warming Solutions Act of 2006, and Senate Bill (32), the Global Warming Solutions Act of 2006: emissions limit, discussed below, the Legislature did not adopt the 2050 horizon-year goal from EO S-3-05.

Assembly Bill 32, the California Global Warming Solutions Act of 2006

AB 32 (Nunez, 2006), the California Global Warming Solutions Act of 2006, was enacted after considerable study and expert testimony before the Legislature. The heart of AB 32 is the requirement that statewide GHG emissions be reduced to 1990 levels by 2020 (Health & Saf. Code, Section 38550). To achieve this reduction mandate, AB 32 requires ARB to adopt rules and regulations in an open public process that achieve the maximum technologically feasible and cost-effective GHG reductions.

AB 32 charges ARB to monitor and regulate sources of GHG emissions to reduce the state's emissions level. In December 2007, ARB approved 427 million MT CO_2e as the total statewide GHG 1990 emissions level and 2020 emissions limit. This limit is an aggregate statewide limit, rather than sector- or facility-specific, and is in accordance with Health & Safety Code Section 38550.

Per Health & Safety Code Section 38561(b), ARB also is required to prepare, approve, and amend a scoping plan that identifies and makes recommendations on "direct emission reduction measures, alternative compliance mechanisms, market-based compliance mechanisms, and potential monetary and nonmonetary incentives for sources and categories of sources that [ARB] finds are necessary or desirable to facilitate the achievement of the maximum feasible and cost-effective reductions of greenhouse gas emissions by 2020."

ARB Climate Change Scoping Plan

In 2008, ARB approved the *Climate Change Scoping Plan: A Framework for Change* (2008 Scoping Plan) in accordance with Health & Safety Code Section 38561. During the development of the 2008 Scoping Plan, ARB created a planning framework that is comprised of eight emissions sectors: (1) transportation; (2) electricity; (3) commercial and residential; (4) industry; (5) recycling and waste; (6) high GWP gases; (7) agriculture; and, (8) forest net emissions. It establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions from the eight emissions sectors to 1990 levels by 2020. In the Scoping Plan, ARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of approximately 28.5 percent from the otherwise projected 2020 emissions level; i.e., those emissions that would occur in 2020, absent GHG-reducing laws and regulations (BAU).

To achieve the necessary GHG reductions to meet AB 32's 2020 target, ARB developed a series of reduction measures in the Scoping Plan covering a range of sectors and activities. Broadly, the reduction measures can be separated into capped sectors (i.e., covered by the Cap-and-Trade Program) and uncapped sectors. Emissions from capped sectors, which include the transportation, electricity, industrial, commercial, and residential sectors of the economy, were fixed under the rules of the Cap-and-Trade Program, and the majority of policy proposals developed by ARB and other state agencies pursuing GHG emissions-reducing strategies are designed to secure reductions from these sectors.

In 2011, ARB introduced the *Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document (2011 Final Supplement)*, which contains the main strategies California will implement to achieve reduction from the state's projected 2020 emission level under a BAU scenario. ARB's revised 2020 projection takes into account the economic downturn that occurred in 2008, and includes reductions anticipated from the Renewable Portfolio Standard (RPS) and Advanced Clean Cars (ACC) (ARB 2015).

In May 2014, ARB released and has since adopted the *First Update to the Climate Change Scoping Plan* to identify the next steps in reaching AB 32 goals and evaluate the progress that has been made between 2000 and 2012 (ARB 2014a:4 and 5). According to the update, California is on track to meet the near-term 2020 GHG limit and is well positioned to maintain and continue reductions beyond 2020 (ARB 2014a:ES-2). The update also reports the trends in GHG emissions from various emission sectors.

Currently, ARB is preparing a 2030 Target Scoping Plan Update to address EO B-30-15 and SB 32, and specifically Governor Brown's statewide GHG emissions reduction target for 2030, as discussed below.

Senate Bill 375

SB 375 (Steinberg, 2008), the Sustainable Communities and Climate Protection Act, coordinates land use planning, regional transportation plans, and funding priorities to reduce GHG emissions from passenger

vehicles through better-integrated regional transportation, land use, and housing planning that provides easier access to jobs, services, public transit, and active transportation options. SB 375 specifically requires the Metropolitan Planning Organization (MPO) relevant to the project area (here, the Southern California Association of Governments [SCAG]) to include a Sustainable Communities Strategy (SCS) in its Regional Transportation Plan (RTP) that will achieve GHG emission reduction targets set by ARB by reducing vehicle miles traveled (VMT) from light-duty vehicles through the development of more compact, complete, and efficient communities.

Executive Order B-30-15

In April 2015, Governor Brown signed EO B-30-15, which established the following GHG emission reduction goal for California: by 2030, reduce GHG emissions to 40 percent below 1990 levels. This EO also directed all state agencies with jurisdiction over GHG-emitting sources to implement measures designed to achieve the new interim 2030 goal, as well as the pre-existing, long-term 2050 goal identified in EO S-3-05 (see discussion above). Additionally, the EO directed ARB to update its Scoping Plan (see discussion above) to address the 2030 goal. Therefore, in the coming months, ARB is expected to develop statewide inventory projection data for 2030, and identify reduction strategies capable of securing emission reductions that allow for achievement of the EO's new interim goal.

Senate Bill 32 and Assembly Bill 197, Statutes of 2016

In August 2016, Governor Brown signed SB 32 and AB 197, which are aimed at California's GHG reduction programs beyond 2020. SB 32 amended the Health and Safety Code to include Section 38566, which contains language to requiring ARB to ensure that a statewide GHG emissions are reduced to at least 40 percent below the AB 32 goal of 1990 levels no later than December 31, 2030. SB 32 codified the targets established by EO B-30-15 for 2030, which set the next interim step in the state's continuing efforts to pursue the long-term target expressed in EOs S-3-05 and B-30-15 of 80 percent below 1990 emissions levels by 2050.

AB 197 amended the existing Health and Safety Code sections and established new statutory directions, including the following provisions. Section 9147.10 establishes a six-member Joint Legislative Committee on Climate Change Policies to ascertain facts and make recommendations to the Legislature. ARB is required to appear before this committee annually to present information on GHG emissions, criteria pollutants, and toxic air contaminants from sectors covered by the Scoping Plan. Section 38562.5 requires that ARB consider social cost when adopting rules and regulations to achieve emissions reductions, and prioritize reductions at large stationary sources and from mobile sources. Section 38562.7 requires that each Scoping Plan update identify the range of projected GHG and air pollution reductions and the cost-effectiveness of each emissions reduction measure.

Advanced Clean Cars Program

In 2012, ARB adopted the ACC program, an emissions-control program for passenger vehicles and light-duty truck for model years 2017–2025, thereby continuing the regulatory framework established under the Pavley standards beyond model year 2016. The program combines the control of smog, soot, and GHG emissions with requirements for greater numbers of zero emission vehicles. By 2025, when the rules will be fully implemented, new automobiles will emit 34 percent fewer GHGs and 75 percent fewer smog-forming emissions.

Low Carbon Fuel Standard

EO S-1-07, as issued by former Governor Arnold Schwarzenegger, called for a 10 percent or greater reduction in the average fuel carbon intensity for transportation fuels in California regulated by ARB by 2020. Carbon intensity is a measure of the GHG emissions associated with the various production, distribution and use steps in the "lifecycle" of a transportation fuel. In response, ARB adopted the Low Carbon Fuel Standard (LCFS) regulations in 2009, which became fully effective in April 2010. Thereafter, a lawsuit was filed challenging ARB's adoption of the regulations; and, in 2013, a court order was issued compelling ARB to remedy substantive and procedural defects of the LCFS adoption process under CEQA (*POET, LLC v. ARB* (2013) 217 Cal.App.4th 1214). However, the court allowed implementation of the LCFS to

continue pending correction of the identified defects. In September 2015, ARB re-adopted the LCFS regulations.

Pavley Regulations

AB 1493 (Pavley, 2002) required ARB to adopt regulations to reduce GHG emissions from non-commercial passenger vehicles and light-duty trucks for model years 2009–2016. In September 2004, and pursuant to AB 1493, ARB approved regulations (which are often referred to as the "Pavley standards") to reduce GHG emissions from new motor vehicles beginning with the 2009 model year. In September 2009, ARB adopted amendments to the Pavley standards to reduce GHG emissions from new motor vehicles through the 2016 model year.

Zero Emissions Vehicles

Zero emission vehicles (ZEVs) include plug-in electric vehicles, such as battery electric vehicles and plug-in hybrid electric vehicles, and hydrogen fuel cell electric vehicles.

In 2012, Governor Brown issued EO B-16-2012, which calls for the increased penetration of ZEVs into California's vehicle fleet to help California achieve a reduction of GHG emissions from the transportation sector equaling 80 percent less than 1990 levels by 2050. In furtherance of that statewide target for the transportation sector, the EO also calls upon ARB, CEC, and the California Public Utilities Commission (CPUC) to establish benchmarks that will: (1) allow over 1.5 million ZEVs to be on California roadways by 2025, and (2) provide the state's residents with easy access to ZEV infrastructure.

In furtherance of those goals, in February 2013, the Governor's Interagency Working Group on ZEVs issued the *2013 ZEV Action Plan: A roadmap toward 1.5 million zero-emission vehicles on California roadways by 2025*. Additionally, in May 2014, the National Renewable Energy Laboratory issued the *California Statewide Plug-In Electric Vehicle Infrastructure Assessment* (Infrastructure Assessment report) prepared at the request of the CEC. In the Infrastructure Assessment report, CEC noted that "can't miss" ZEV charging locations are residential and workplace areas.

California is incentivizing the purchase of ZEVs through implementation of the Clean Vehicle Rebate Project, which is administered by a non-profit organization (The Center for Sustainable Energy) for ARB and currently subsidizes the purchase of passenger near-zero and ZEVs as follows:

- Hydrogen Fuel Cell Electric Vehicles: $5,000
- Battery Electric Vehicles: $2,500
- Plug-In Hybrid Electric Vehicles: $1,500
- Neighborhood Electric Vehicles and Zero Emission Motorcycles: $900

In its 2014 First Update to the Scoping Plan, ARB recognized that the light-duty vehicle fleet "will need to become largely electrified by 2050 to meet California's emission reduction goals" (ARB 2014a:48). Accordingly, ARB's ACC program – summarized above – requires about 15 percent of new cars sold in California in 2025 to be a plug-in hybrid, battery electric, or fuel cell vehicle (ARB 2014a:47).

Short-Lived Climate Pollutant Reduction Strategy

SB 605 (Lara, Chapter 523, Statutes of 2014) directed ARB to developed comprehensive short-lived climate pollutant (SLCP) strategy, in coordination with other state agencies and local air quality management and air pollution control districts. Governor Brown has identified reductions in SLCP emissions as one "pillar" to meet the goals of AB 32. ARB staff released a proposed SLCP Strategy in April 2016. Subsequently in September 2016, the Legislature passed and Governor Brown signed Senate Bill 1383 (Lara, Chapter 395, Statutes of 2016) mandating ARB to take certain specific actions with regard to the SLCP strategy. Specifically, it mandated that ARB, no later than January 1, 2018, approve and begin to implement the SLCP strategy developed under Health and Safety Code section 39730 to achieve specified targets identified for each of the pollutants and after carrying out certain procedures and analyses. In response to this new mandate, ARB is

revising the SLCP Strategy to reflect the requirements of the bill. SB 1383 identifies specific reduction targets for three SLCPs (i.e., black carbon, fluorinated gases, and methane), which the SLCP Strategy will address.

Senate Bill X1-2 (2011) and Senate Bill 350 (2015)

SB X1-2 of 2011 requires all California utilities to generate 33 percent of their electricity from renewables by 2020. SB X1-2 sets a three-stage compliance period requiring all California utilities, including independently owned utilities, energy service providers, and community choice aggregators, to generate 20 percent of their electricity from renewables by December 31, 2013; 25 percent by December 31, 2016; and 33 percent by December 31, 2020. SB X1-2 also requires the renewable electricity standard to be met increasingly with renewable energy that is supplied to the California grid from sources within, or directly proximate to, California. SB X1-2 mandates that renewables from these sources make up at least 50 percent of the total renewable energy for the 2011-2013 compliance period, at least 65 percent for the 2014-2016 compliance period, and at least 75 percent for 2016 and beyond.

Most recently, Governor Edmund G. Brown signed into legislation SB 350 in October 2015, which requires retail seller and publicly owned utilities to procure 50 percent of their electricity from eligible renewable energy resources by 2030, with interim goals of 40 percent by 2024, and 45 percent by 2027.

California Building Efficiency Standards (Title 24, Part 6)

Title 24, Part 6 of the California Code of Regulations (CCR) regulates the design of building shells and building components. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. CEC's 2016 Building Energy Efficiency Standards (2016 Building Standards), which become effective on January 1, 2017, are the most current version of these standards.

CPUC, CEC, and ARB also have a shared, established goal of achieving Zero Net Energy (ZNE) for new construction in California. The key policy timelines include: (1) all new residential construction in California will be ZNE by 2020, and (2) all new commercial construction in California will be ZNE by 2030.

The ZNE goal generally means that new buildings must use a combination of improved efficiency and renewable energy generation to meet 100 percent of their annual energy need, as specifically defined by the CEC:

> "A ZNE Code Building is one where the value of the energy produced by on-site renewable energy resources is equal to the value of the energy consumed annually by the building, at the level of a single 'project' seeking development entitlements and building code permits, measured using the [CEC]'s Time Dependent Valuation (TDV) metric. A ZNE Code Building meets an Energy Use Intensity value designated in the Building Energy Efficiency Standards by building type and climate zone that reflect best practices for highly efficient buildings" (CEC 2015:41).

In addition to CEC's efforts, in 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Part 11 of Title 24) are commonly referred to as CALGreen, and establish voluntary and mandatory standards pertaining to the planning and design of sustainable site development, energy efficiency, water conservation, material conservation, and interior air quality. CALGreen is periodically amended, and the 2016 CALGreen standards become effective on January 1, 2017.

The Building Energy Efficiency Standards are updated on approximately a three-year cycle. The 2019 standards will would achieve greater energy efficiency as compared to the 2016 standards. Residential and non-residential buildings built later than 2019 will be required to comply with the 2019 standards, as will other future residential and non-residential buildings constructed within the timeframe of future editions of the standards.

LOCAL

SCAG's Regional Transportation Plan/Sustainable Communities Strategy

As previously discussed, SB 375 requires SCAG to incorporate an SCS into its RTP that achieves the GHG emission reduction targets set by ARB. As required by SB 375, ARB adopted year 2020 and 2035 GHG reduction targets for each metropolitan region. The SB 375 targets for the Southern California region under SCAG's jurisdiction in 2020 and 2035 are reductions in per capita GHG emissions of 8 percent and 13 percent, respectively (ARB 2014b).

Pursuant to Government Code Section 65080(b)(2)(K), an SCS does not: (i) regulate the use of land; (ii) supersede the land use authority of cities and counties; or (iii) require that a city's or county's land use policies and regulations, including those in a general plan, be consistent with it.

2012 Sustainable Communities Strategy

In April 2012, SCAG adopted its first-ever SCS, which is included in the *2012–2035 Regional Transportation Plan/Sustainable Communities Strategy* (2012 RTP/SCS). The goals and policies of the SCS that reduce VMT (and result in corresponding GHG emission reductions) focus on transportation and land use planning that include building infill projects, locating residents closer to where they work and play, and designing communities so there is access to high quality transit service. SCAG's 2012 SCS is expected to reduce per capita transportation emissions by 9 percent in 2020 and by 16 percent in 2035. In 2012, ARB accepted SCAG's determination that the 2012 SCS would meet the region's GHG reduction targets (ARB 2012).

2016 Sustainable Communities Strategy

In April 2016, SCAG adopted the 2016-2040 RTP/SCS: A Plan for Mobility, Accessibility, Sustainability and a High Quality of Life (2016 RTP/SCS). SCAG's 2016 SCS is expected to reduce per capita transportation emissions by 8 percent in 2020, 18 percent in 2035, and 21 percent in 2040. In June 2016, ARB accepted SCAG's determination that the 2016 SCS would meet the region's GHG reduction targets for 2020 and 2035.

County of Los Angeles General Plan

The County Board of Supervisors adopted the Los Angeles County General Plan 2035 in October 2015. The General Plan directs future growth and development in the County's unincorporated areas and establishes goals, policies, and objectives that pertain to the entire County.

As part of the General Plan's Air Quality Element, the County adopted a Community Climate Action Plan (CCAP) to reduce GHG emissions associated with community (not municipal) activities in unincorporated Los Angeles County. The CCAP addresses emissions from building energy, land use and transportation, water consumption and waste generation, and sets forth the County's path to a sustainable future that achieves identified GHG reductions. More precisely, the CCAP includes 26 local actions that are grouped into five emissions reduction strategy areas: (1) green building and energy; (2) land use and transportation; (3) water conservation and wastewater; (4) waste reduction, reuse and recycling; and, (5) land conservation and tree planting.

County of Los Angeles Community Climate Action Plan

The County of Los Angeles CCAP provides that public agencies and private developers may use it to comply with project-level review requirements pursuant to CEQA, because it accords to the tiering requirements established by CEQA Guidelines Section 15183.5(b)(1). As such, the CCAP provides that project-specific environmental documents that incorporate applicable emissions reduction strategies can rely on the GHG analysis in the Environmental Impact Report (EIR) certified for the County's General Plan (including the CCAP) to meet project-level CEQA evaluation requirements for the time period covered by the CCAP. Projects that demonstrate consistency with applicable emissions reduction strategies can be determined to have a less-than-significant impact on GHG emissions and global climate change.

The CCAP focuses on compliance with AB 32 and includes GHG reduction strategies up to the year 2020 and provides a projected inventory for 2035. The actions included in the CCAP will help Los Angeles County achieve GHG reductions consistent with statewide goals by 2020. By 2021, the County will develop an

update to the CCAP for the years following 2020. Because the current CCAP does not apply to the full project buildout year (2030), for the purposes of this project, the CCAP and its associated environmental documents cannot be relied on for GHG significance determinations. The updated CCAP containing projections and reduction strategies up through the year 2035 would be intended to serve as a qualified plan that may be applied to future project implementation actions occurring after the adoption of the updated CCAP.

South Coast Air Quality Management District

The South Coast Air Quality Management District (SCAQMD) is principally responsible for comprehensive air pollution control in the South Coast Air Basin, which includes Los Angeles, Orange, and the urbanized portions of Riverside and San Bernardino counties. SCAQMD works directly with SCAG, County transportation commissions, and local governments, and cooperates actively with all federal and state government agencies to regulate air quality.

Adopted Threshold for Stationary Source Projects

In 2008, SCAQMD's Governing Board adopted an interim CEQA GHG significance threshold of 10,000 MT CO_2e per year for industrial stationary source projects for which SCAQMD is the CEQA lead agency. When adopting its threshold, the Governing Board authorized the use of offsets as mitigation (SCAQMD 2008).

Draft Threshold for All Other Project Types

For all other projects (i.e., non-stationary source projects), SCAQMD staff developed a draft, multi-tier framework to assist with the CEQA significance evaluation process. The draft framework recognized the relevance of locally adopted GHG reduction plans, and allowed for the use of such plans in the significance evaluation process. Additionally, the draft framework included the development of the following efficiency targets:

2020: 4.8 MT CO_2e per year per service population (defined to include residents plus workers)
2035: 3.0 MT CO_2e per year per service population (same as above)

If none of the prescribed performance standards are met, the draft framework recognized the use of off-site mitigation.

As of October 2016, SCAQMD's Governing Board has not adopted the draft staff proposal. Therefore, no GHG significance thresholds are approved for use in the South Coast Air Basin by the applicable regional air district (i.e., SCAQMD).

Santa Clarita Valley Area Plan: One Valley One Vision 2012

The Santa Clarita Valley Area Plan: One Valley One Vision 2012 (Area Plan) serves as a long-term guide for development in the Santa Clarita Valley (Valley) Planning Area over the next 20 years. The Area Plan ensures consistency between the General Plans of the County and the City of Santa Clarita (City) to achieve common goals. The primary GHG-related policy of the Area Plan is the requirement that the County create and adopt a Climate Action Plan; that effort is complete, as discussed above.

2.1.3 Environmental Impacts and Mitigation Measures

GREENHOUSE GAS PROVISIONS IN CEQA GUIDELINES

In 2007, SB 97 was enacted calling for the preparation and adoption of CEQA Guidelines to address environmental impacts of GHG emissions. CEQA Section 21083.05 was added by the statute and directed that guidelines be developed "for the mitigation of greenhouse gas emissions or the impacts of greenhouse gas emissions as required by this division, including, but not limited to, impacts associated with transportation or energy consumption." A series of CEQA Guidelines amendments were added in 2010 to fulfill the requirements of SB 97. Key provisions relevant to determining the significance of GHG emissions are summarized as follows.

Section 15064.4 was added as one of a set of amendments addressing GHG. The Guidelines state:

(a) "The determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency consistent with the provisions in Section 15064. A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project…"

(b) A lead agency should consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment:

(1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;

(2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project;

(3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible impacts of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

Additionally, under CEQA Guidelines Section 15126.4(c)(3)-(4), a project's GHG emissions can be reduced by "[o]ff-site measures, including offsets that are not otherwise required" and "[m]easures that sequester greenhouse gases." Therefore, the CEQA Guidelines allow projects to reduce GHG emissions by relying on voluntary market offsets that are not otherwise required as well as other offsite and sequestration measures that result in GHG reductions.

THRESHOLD OF SIGNIFICANCE FOR THE ADDITIONAL ENVIRONMENTAL ANALYSIS

Section 15064 of the CEQA Guidelines provides the foundational guidance for determinations of significant effect on the environment. As noted in subpart (b) of Section 15064, "(t)he determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data. An ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting."

Recognizing that GHG emissions contribute to the cumulative impact condition of global climate change, Section 15064(h)(1) is also pertinent. When assessing if a significant environmental effect may occur, Section 15064(h)(1) states that "the lead agency shall consider whether the cumulative impact is significant and whether the effects of the project are cumulatively considerable." A cumulative impact may be significant when the project's incremental effect, though individually limited, is cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of other past, current, and reasonably foreseeable probable future projects. As discussed in Section 2.1, Environmental Setting, climate change is the product of incremental contributions of GHGs on a global scale; therefore, a project's cumulatively considerable GHG emissions, even if relatively small in magnitude compared to world-wide emissions, could ultimately contribute to the progression of climate change.

To define the appropriate approach to the judgment of significance in the case of this project and the Additional Environmental Analysis (AEA) prepared in response to a Supreme Court decision, CDFW has been guided and informed by principles detailed in CEQA Guidelines Sections 15064 and 15064.4 and relevant portions of Guidelines Appendix G. CDFW also recognizes the guidelines' recommendations for a lead agency

to consider the project's consistency with relevant, adopted plans and the direction in CEQA Guidelines Section 15125(d) to discuss any inconsistencies with applicable regional plans, including plans for the reduction of GHG emissions. In Appendix G of the State CEQA Guidelines, two questions are provided to help assess if the project would result in a potentially significant impact on climate change. Would the project:

- generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or

- conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs?

In response to the Supreme Court's decision, the project applicant approached CDFW to propose extensive, tailored mitigation strategies to minimize GHG emissions from project land developments and then, for emissions that cannot be fully avoided, compensate through offsets, resulting in zero net GHG emissions compared to existing conditions (i.e., no net increase in GHG emissions). The project applicant has proposed the commitment to achieve zero net GHG emissions using feasible and reliable emission-reduction actions related to the land development project, the implementation of direct measures to reduce GHG emissions offsite, and the procurement of GHG offsets. The intended net outcome would be to eliminate any contribution of GHG emissions to the cumulative impact of global climate change.

In light of the project applicant's proposed commitment and modifications to the project, and in consideration of the direction from the CEQA Guidelines, the threshold of significance for the Newhall Ranch RMDP and SCP Project will be to feasibly and reliably attain the project applicant's commitment to achieve no net increase in GHG emissions. With such an outcome, the project would not increase GHG emissions, which is applicable to Section 15064.4(b)(1). Similarly for cumulative impacts, because of the commitment to achieve zero net GHG emissions, the project's incremental contribution to climate change would be eliminated, and therefore it would not be cumulatively considerable. With no increase in GHG emissions compared to existing conditions, any inconsistencies with relevant plans would be avoided. If, through the zero GHG emissions commitment, the project demonstrates that it may be implemented and operate without increasing emissions of GHGs beyond the existing conditions, the project-level and cumulative impact to global climate change would be less than significant.

In the evaluation of GHG-related impacts, CDFW has exercised its independent lead agency review and analysis, pursuant to Public Resources Code section 21082.1(c)(1). CDFW has applied its judgment and discretion, in consultation with ARB, in estimating the project's emissions, defining the zero net commitment detailed in the additional analysis, making the project-specific impact significance determination and cumulative considerable contribution determination, and including mitigation measures to achieve the project commitment.

The intent of this analysis is not to present the use of a zero GHG emissions commitment as a generally applied threshold of significance for GHG impacts. Its use herein is related directly to the facts surrounding the project and the project applicant's proposed commitment. Achieving zero net GHG emissions is the appropriate threshold for the proposed project in this case. CDFW recognizes there are multiple pathways available under CEQA for a lead agency to assess and analyze the significance of project-specific GHG emissions. Consistent with the CEQA Guidelines principles highlighted above, determining the significance of related effects is a matter of lead agency discretion, requiring careful judgment on a project-by-project basis. Achieving zero net emissions is just one way to reach a less-than-significant conclusion; it is not the only approach; and it may not be needed or appropriate for all projects.

ANALYSIS METHODS

Project-related operational emissions of GHGs were estimated for the following sources: area sources (e.g., landscaping-related fuel combustion sources), energy use associated with residential and non-residential buildings, water and wastewater treatment and distribution, solid waste, and mobile sources (e.g.,

passenger vehicles). In addition, the one-time increase in emissions associated with construction activities and vegetation changes was quantified. The typical types of GHG emissions resulting from mixed-use developments, such as the proposed project, are CO_2, CH_4, and N_2O. GHG emissions are measured in terms of MT CO_2e, which is calculated as the product of the mass emitted of a given GHG and its GWP.

The impact analysis in the AEA first estimates GHG emissions from the project construction and operation prior to consideration of mitigation measures. The project applicant has proposed mitigation measures to reduce and compensate for GHG emissions in response to the Supreme Court's decision on the previous 2010 Final EIR. The project applicant's proposal includes the commitment that the project would achieve zero net GHG emissions through the implementation of emission-reduction measures applied to project elements and activities, direct measures to reduce GHG emissions offsite, and the procurement of compensatory GHG offsets. CDFW has independently reviewed and analyzed, in consultation with ARB, the proposed mitigation measures. This section concludes by assessing the significance of the project's GHG emissions after consideration of the proposed mitigation measures.

Short-term construction-generated and long-term operational GHG emissions were calculated using the California Emissions Estimator Model (CalEEMod) Version 2013.2.2 computer program (SCAQMD 2013). CalEEMod uses widely accepted models for emission estimates combined with appropriate default data that can be used if site-specific information is not available. These models and default estimates use sources such as the EPA AP-42 emission factors, and ARB's on-road and off-road equipment emission models such as the EMission FACtor model (EMFAC) and the Emissions Inventory Program model (OFFROAD). EMFAC is an emission factor model used to calculate emissions rates from on-road vehicles (e.g., passenger vehicles). The emission factors used by CalEEMod are based on the ARB EMFAC2011 program. OFFROAD is an emission factor model used to calculate emission rates from off--road mobile sources (e.g., construction equipment, agricultural equipment). The off-road diesel emission factors used by CalEEMod are based on the ARB OFFROAD2011 program.

The 2013.2.2 version of CalEEMod does not incorporate the updated version of EMFAC (2014) which includes various updates, notably the incorporation of EPA and ARB regulations and standards. The updates were in response to regulations enacted through California's ACC Program and NHTSA Phase 1 standards. Therefore, EMFAC2014 information was incorporated into the analysis in lieu of CalEEMod's default use of EMFAC2011 information. Notably, EMFAC2014 (unlike EMFAC2011) excludes GHG emission reductions from LCFS.

In addition, CalEEMod contains default values and methodologies consistent with existing regulations for each region. Appropriate statewide default values can be used if regional default values are not defined. Default factors for Los Angeles County area (within the SCAQMD jurisdiction) were used for the GHG emission inventory, unless otherwise noted in the methodology descriptions below.

CalEEMod uses GWPs from the IPCC Second Assessment Report, which is 310 for N_2O and 21 for CH_4. Therefore, the GWPs in the IPCC Fourth Assessment Report of 298 for N_2O and 25 for CH_4 were manually incorporated to CalEEMod output as the Fourth Assessment Report to be consistent with current GWPs used by ARB in its current emission inventories.

Modeling assumptions are included in the Technical Report contained in Draft AEA Appendix 1. Where appropriate, directions to Technical Report sections, tables, and appendices within Draft AEA Appendix 1 that relate to specific modeling details are provided to support the GHG analysis.

Construction Emissions

Model assumptions for construction-related emissions were based on project-specific information (i.e., number and type of units, construction phasing based on site location, start date of construction, area to be graded, area to be paved, and year of operation); and default values in CalEEMod that are based on the project's location and land use types. The project's construction schedule consists of six stages, with construction-related activities commencing in March 2018 and concluding in December 2030. This schedule conservatively assumes that construction may continue to the end of 2030 when the project

reaches full operation. While some construction phases are conservatively identified to conclude in the second half of the 2030 calendar year, the project's absorption schedule anticipates that the project would be fully constructed and occupied during the 2030 calendar year.

For each of the stages, the major construction phases included are grading, trenching or improvements, paving, building construction, and architectural coating. GHG emissions from these construction phases are largely attributable to fuel use from construction equipment and worker commuting vehicles. Construction-related emissions were estimated using CalEEMod Version 2013.2.2. The construction schedule, off-road equipment lists and equipment specifications used in CalEEMod are project specific estimates, and consistent with the total level of construction equipment activity analyzed in the *Final Joint Environmental Impact Statement/EIR (EIS/EIR) for the RMDP and SCP Project* GHG analysis.

Adjustments were made to CalEEMod's default parameters for the number of worker and vendor trips. CalEEMod default assumptions result in an over-estimation of the number of vendor and worker trips during the building construction and architectural coating phases due to the model's assumption that all buildings are constructed simultaneously during every year of construction activity. The project proposes to phase development such that construction-related activities would occur on various portions of the total development area from year-to-year. Therefore, an adjustment factor was applied to correct CalEEMod's number of vendor and worker trips based on the estimated number of residential dwelling units and non-residential square footage being built and painted in each calendar year. Additional details on construction-related inputs to CalEEMod are shown in Technical Report Tables 2.3-1 through 2.3-5 and Technical Report Appendix B, contained in Draft AEA Appendix 1.

Area Sources

Area sources in CalEEMod are direct sources of GHG emissions. The area source GHG emissions included in this analysis result from landscaping-related fuel combustion sources, such as lawn mowers. GHG emissions due to natural gas combustion in buildings, including fireplaces, are excluded from this section as they are included in the emissions associated with building energy use. Additional details on area source inputs to CalEEMod are shown in Technical Report Table 2-11 and Technical Report Appendix B, contained in Draft AEA Appendix 1.

Energy Use

Natural gas combustion used for space heating, water heating, and cooking is a direct source of GHG emissions from the project. GHGs are also emitted during the generation of electricity from fossil fuels; these emissions are considered to be indirect emissions.

Residential building energy use data for the project was generated by ConSol using the CEC-approved CBECC-Res 2016 software (EnergyPro 6.8 and 7.1). The total residential energy use rates were input into CalEEMod. CalEEMod default values were used in combination with building energy use data prepared by ConSol using CEC-approved building energy modeling software (EnergyPro 6.8 and 7.1). The project, for purposes of estimating unmitigated emissions, was assumed to comply with the 2016 Title 24 efficiency standards; however, CalEEMod provides default values based on the 2008 Title 24 Standards. Therefore, the 2016 Title 24 energy efficiency improvement from 2008 Title 24 were applied to the relevant default energy intensity factors to estimate energy demand for the project. More detailed assumptions regarding residential building energy use is contained in Technical Report Tables 4-1a through 4-1d and Technical Report Appendix C, contained in Draft AEA Appendix 1.

The project's non-residential building energy use data was generated using default values in CalEEMod in combination with building energy use data prepared by ConSol using CEC-approved building energy modeling software (EnergyPro 6.8 and 7.1). Because CalEEMod is based on the 2008 Title 24 Standards, percentage reductions were applied to CalEEMod default energy intensity factors to estimate the energy savings resulting from implementation of the 2016 Title 24 Standards. Additional assumptions about non-residential building energy are shown in Technical Report Tables 4-2a through 4-2d and Technical Report Appendix C of Draft AEA Appendix 1.

The swimming pools at the project's private recreation centers were assumed to use electricity for filters and pumps, and natural gas for water heating. See Technical Report Table 2-14a of Draft AEA Appendix 1 for more detail.

Further, the CalEEMod default CO_2 intensity factor was modified to reflect compliance with 50 percent RPS for 2030 based on SCE Power/Utility Protocol (PUP) reports. CalEEMod intensity factors for CH_4 and N_2O were retained to provide a more conservative estimate for these emissions. Additional detail is contained in Technical Report Appendix B contained in Draft AEA Appendix 1.

Mobile Sources

Mobile Sources GHG emissions associated with on-road mobile sources are generated from residents, workers, customers, and delivery vehicles visiting the land uses developed as part of the project. Mobile-source emissions were estimated using CalEEMod, with adjustments based on EMFAC2014 emission factors, and estimates of project-generated vehicle trips from the traffic study conducted for the project by Stantec, which was derived using the Santa Clarita Valley Consolidated Traffic Model (SCVCTM).

SCVCTM takes into account five standardized trip types: home-based work trip, home-based shopping trips, home-based "other" (i.e., non-work, non-shopping) trips, other-based work trips, and other-based other trips. Trip generation numbers were adjusted to reflect the characteristics of a planned community (i.e., mixed-use development) which have higher internal trip capture rates than single-use developments. VMT data, which is generated by multiplying trip length with total number of daily trips, was adjusted by applying an internalization factor appropriate to each trip purpose to more appropriately reflect the anticipated vehicle travel patterns in the proposed project. Detailed assumptions regarding SCVCTM are located in Technical Report Section 2.3.5, Mobile Sources, and Technical Report Appendix D contained in Draft AEA Appendix 1.

CalEEMod, in combination with VMT estimates provided by SCVCTM, was used to calculate mobile source GHG emissions. CalEEMod provides the option to assign different trip lengths for different trip types; however, to calculate a more conservative estimate and ensure that the total annual VMT was consistent with estimates from SCVCTM, a consistent trip length was applied for all trip types. Further, CalEEMod's default approach is to specify a certain percentage of vehicle trips as pass-by or diverted trips, and assigns shorter trip length to these trips. To provide a more accurate and conservative VMT estimate, this default was overridden by designating all trips as primary trips rather than diverted or pass-by trips.

Additionally, to more accurately demonstrate the benefits from adopted regulatory programs such as Pavley and ACC, as discussed in Section 2.2, Regulatory Setting, EMFAC 2014, recently released by ARB, was incorporated into the analysis. Further, EMFAC 2014, unlike EMFAC 2011, excludes GHG emissions reductions from LCFS and results in more conservative estimates of mobile source GHG emissions. EPA/NHTSA's Phase 1 and Phase 2 advanced fuel economy and GHG standards for medium- and heavy-duty trucks were also incorporated. Additional details on the project's VMT calculations, internal trip capture adjustments, and mobile source emission factors are provided in Technical Report Tables 2-17a through 2-18b and Technical Report Appendix D, all contained in Draft AEA Appendix 1.

Water Consumption

Indirect GHG emissions also result from the production of electricity to convey, treat, and distribute the project's water and wastewater. GHG emissions from water consumption and wastewater treatment were estimated based on the volume of water that would be required by the project. The project's demand, recycled water usage, and wastewater generation values were based on Alternative D2 of the *Final Joint EIS/EIR for the RMDP and SCP Project*, and scaled by the change in land use square footage and number of dwelling units between the project and Alternative D2. The scaling factors and subsequent water use quantities are shown in Technical Report Tables 2-15a through 2-15e in Draft AEA Appendix 1.

The project's estimated water usage reflects a demand reduction for indoor potable water that is based on compliance with applicable regulatory water conservation and recycled water requirements. Specifically, the project would comply with the CALGreen Standards, which require a 20 percent reduction in indoor potable

water use through the use of water saving fixtures and/or flow restrictors. Because the CALGreen Standards were adopted in 2010, after the development of the water usage estimates presented in the *Final Joint EIS/EIR for the RMDP and SCP Project*, the indoor water usage was reduced to reflect project compliance with the CALGreen Standards.

The project's estimated water usage also reflects that recycled water would be used to satisfy a portion of its demand for the outdoor, irrigation-related water demand, consistent with the mandate by the State Water Resources Control Board's (SWRCB's) recycled water policy (SWRCB 2013).

The CALGreen Standards, as well as the County of Los Angeles's Green Building Standards Code (Municipal Code Title 31) and previously adopted Newhall Ranch Specific Plan (NRSP) mitigation measures, and the local water purveyor (Valencia Water Company), would also require the incorporation of features to reduce the project's outdoor water demand. The analysis conservatively does not reduce the project's outdoor water usage to reflect these requirements.

For indirect emissions associated with the supply, treatment, and distribution of the project's water, CalEEMod default assumptions were used for the project's Valencia Commerce Center and Entrada planning areas, which would rely upon a blend of locally-sourced and State Water Project water. The default assumptions represent the average embodied energy for the supply, treatment, and distribution of water for Southern California, which are determined by a study commissioned by the CEC (CEC 2006). Because the NRSP area would exclusively use locally-sourced groundwater, different factors were used to account for the energy embodied in the NRSP's water use. Detailed water use estimates are provided in Technical Report Appendix B contained in Draft AEA Appendix 1.

The CalEEMod default assumptions conservatively estimate the GHG emissions associated with the distribution of the wastewater generated by the project's NRSP area. The Newhall Ranch Water Reclamation Plant (WRP) would be located within the NRSP area, and not outside the project as assumed by the default electricity intensity factor for wastewater treatment.

The direct and indirect emissions associated with the Newhall Ranch WRP's wastewater treatment processes are captured through the wastewater emissions estimates in CalEEMod for each of the project land uses in the NRSP that would send wastewater to the WRP; because the WRP is designed with the capacity to treat 6.8 million gallons per day (mgd) of wastewater, emissions were estimated based on the maximum capacity to provide a conservative estimate. See Technical Report Tables 2-15a through 2-15d in Draft AEA Appendix 1 for more detailed assumptions.

Solid Waste

Indirect GHG emissions associated with solid waste generated by the proposed land uses were estimated using the applicable module in CalEEMod and solid waste generation rate based on the City of Santa Clarita 2012 actual disposal rates. The analysis assumes that additional waste would be diverted from landfills by a variety of means, such as reducing the amount of waste generated, and increasing the amount of waste recycled, and/or composted to meet the statewide goal of 75 percent waste diversion (AB 341, Chapter 476, Statutes of 2011). Various plans and regulations applicable to the project support achieving the statewide diversion goal, including: (1) SW- 1: Waste Diversion Goal of the County's Community Climate Action Plan, which calls for compliance with all state mandates associated with diverting at least 75 percent of waste from landfill disposal by 2020; (2) the County's Green Building Standards Code (Municipal Code Title 31), which includes a number of sustainability requirements that apply to waste diversion; and, (3) AB 1826, which requires applicable commercial businesses to separate food scraps and yard trimmings, and arrange for recycling services for that organic waste. Various design elements of the project, such as the provision and location of recycling receptacles would also further the achievement of AB 341 goals. Additional detail regarding solid waste-related GHGs are shown in Technical Report Table 2-16 contained in Draft AEA Appendix 1.

Vegetation Change

The loss in sequestered carbon was also estimated in CalEEMod using the vegetation module. Permanent vegetation changes occur as a result of land use development constitute a one-time change in the carbon sequestration capacity of a project site. Thus, total one-time GHG emissions from the loss in carbon sequestration were estimated and then amortized over the operational life of the project (assumed to be 30 years for this analysis). This approach is consistent with SCAQMD's recommendations on the use of the vegetation module in CalEEMod (SCAQMD 2013). Land use change was based on CDFW's Draft Joint EIS/EIR for the RMDP and SCP Project (April 2009; SCH No. 2000011025), Volume XVI – Appendix 8.0 [ENVIRON International Corporation, Climate Change Technical Report (February 2009)]. Accounting for the loss in sequestered carbon in this way allows for the evaluation of whether ongoing operation of the proposed land uses would be efficient enough to "recoup" these one-time emissions. See Technical Report Section 2.2.2 and Technical Report Tables 2-10a and 2-10b in Draft AEA Appendix 1 for more detailed assumptions.

IMPACT ANALYSIS

While the section numbering has been revised to align with the organization of the Final AEA (i.e., Chapter 2 in the Draft AEA becomes Section 2.1 in the Final AEA), the impact conclusion and mitigation measure numbering remains identical to the Draft AEA to facilitate cross comparison.

Impact 2-1: Project-Generated GHG Emissions

The project is estimated to generate annualized construction emissions of 6,437 MT CO_2e amortized over 30 years (193,119 MT CO_2e total), net annualized vegetation change emissions of 1,335 MT CO_2e amortized over 30 years (40,059 MT CO_2e total based on net change in carbon sequestration/land use changes), and 518,330 MT CO_2e operations-related emissions at project buildout in 2030. Before consideration of mitigation measures proposed by the project applicant, total project emissions would be 526,103 MT CO_2e/year in 2030. This level of GHG emissions has the potential to result in a considerable contribution to cumulative emissions related to global climate change, and would be **potentially significant without the implementation of further mitigation**. The project applicant has proposed as mitigation the commitment for the project to achieve zero net GHG emissions (i.e., no net increase above existing conditions) through a combination of feasible and reliable emission-reduction actions, direct measures to reduce GHG emissions offsite, and the procurement of compensatory GHG offsets. With the implementation of the proposed mitigation measures and resulting achievement of zero net GHG emissions, the project would not make any contribution to cumulative GHG emissions, so the **GHG impact would be less than significant with mitigation**.

Construction-related activities that would generate GHGs include worker commute trips, haul trucks carrying supplies and materials to and from the project area, and off-road construction equipment (e.g., dozers, loaders, excavators) operating onsite. Construction of the land uses proposed under the project would occur over six stages with mass grading and utilities construction to begin in 2018. The construction emissions that would occur within each stage is summarized in Table 2.3-1.

Table 2.3-1 Summary of Greenhouse Gas Emissions by Construction Stage[1]

Stage	Year	Emissions (MT CO_2e/year)		
		Off-Road[2]	On-Road[3]	Total
1	2018	3,487	1,045	4,532
	2019	4,465	801	5,266
	2020	4,320	692	5,013
	2021	2,827	1,089	3,916
	2022	272	699	970
	2023	272	690	961
	2024	272	686	958

Table 2.3-1 Summary of Greenhouse Gas Emissions by Construction Stage[1]

Stage	Year	Emissions (MT CO_2e/year)		
		Off-Road[2]	On-Road[3]	Total
	2025	272	680	952
	2026	272	674	946
	2027	272	669	941
	2028	284	694	978
	Total	**17,014**	**8,418**	**25,432**
2	2018	2,909	311	3,220
	2019	4,564	670	5234
	2020	396	249	645
	2021	285	382	667
	2022	285	377	662
	2023	285	372	657
	2024	286	372	659
	Total	**9,010**	**2,735**	**11,745**
3	2020	10,233	796	11,029
	2021	8,812	949	9,761
	2022	2,751	1,593	4,345
	2023	3,290	1,600	4,890
	2024	5,268	1,924	7,192
	2025	7,722	2,116	9,837
	2026	737	1,455	2,192
	2027	737	1,444	2,181
	2028	734	1,429	2,163
	2029	737	1,426	2,163
	2030	816	1,419	2,235
	Total	**41,835**	**16,152**	**57,987**
4	2023	15,236	907	16,143
	2024	17,162	1,494	18,656
	2025	17,004	1,480	18,484
	2026	2,200	2,448	4,648
	2027	1,234	2,382	3,616
	2028	1,145	2,355	3,500
	2029	1,149	2,351	3,501
	2030	1,279	2,341	3,620
	Total	**56,410**	**15,757**	**72,166**
5	2018	3,587	676	4,263
	2019	2,101	276	2,378
	2020	656	266	922
	2021	473	422	894
	2022	384	411	795
	2023	384	406	789
	2024	387	407	793
	2025	385	401	786
	2026	385	398	783
	Total	**8,741**	**3,662**	**12,403**

Table 2.3-1 Summary of Greenhouse Gas Emissions by Construction Stage[1]

Stage	Year	Emissions (MT CO_2e/year)		
		Off-Road[2]	On-Road[3]	Total
6	2020	4,763	727	5,491
	2021	1,535	596	2,131
	2022	252	394	646
	2023	252	390	642
	2024	252	388	640
	2025	252	385	637
	2026	252	382	634
	2027	252	380	632
	2028	252	378	630
	2029	252	376	628
	2030	289	385	674
	Total	**8,604**	**4,782**	**13,386**
Grand Total				**193,119**[4]
30-Year Amortized				**6,437**

Notes: MT CO_2e/year=metric tons of carbon dioxide equivalent per year; EPA=Environmental Protection Agency~~0~~

[1] Sources of GHG emissions occur during construction activities such as grading, trenching, paving, building construction, and application of architectural coatings.

[2] This analysis assumes that the off-road, diesel-powered construction equipment greater than 50 horsepower used to grade the project site shall meet the EPA's Tier 3 standards at a minimum; construction equipment shall achieve the Tier 4 standards, where feasible.

[3] Emissions associated with worker and vendor trips for building construction and architectural coating were scaled by the adjustment factor to adjust for double-counting associated with analyzing phased construction in CalEEMod.

[4] Summarized emissions by year are rounded to the nearest whole number; however, total emissions reflect the sum of exact emissions levels.

Source: Modeling conducted by Ramboll Environ in 2016. See Technical Report Tables 2-3 through 2-9 and Technical Report Appendix B, contained in Draft AEA Appendix 1 for detailed calculations.

The project would generate a total of 193,119 MT CO_2e over the duration of construction activities (2018-2030). Total construction emissions were amortized over the project's 30-year life, consistent with guidance from SCAQMD. Amortized construction emissions are also shown in Table ~~2.3.3~~2.3-3.

The project would also include changes in vegetation types, which, as discussed under the heading, Analysis Methods, alters the carbon sequestration potential of a project site. Acres of vegetation change and type by area, as well as the corresponding emissions of CO_2 are provided in Table 2.3-2 below.

Table 2.3-2 Vegetation Change Evaluation

Area	Type of Vegetation Change	Land Use Change[1]		
		Existing (acres)	Final (acres)	Emissions[2] (MT CO_2e/year)
ES	Cropland	44.0	0	273
	Grassland	5.8	0	25
	Trees	1.7	0	189
	Scrub	149.3	0	2,135
	Total Vegetation Change	**200.8**	**0**	**2,621**

Table 2.3-2 Vegetation Change Evaluation

Area	Type of Vegetation Change	Land Use Change[1]		
		Existing (acres)	Final (acres)	Emissions[2] (MT CO_2e/year)
NRSP	Cropland	2,036.3	138	11,769
	Wetlands	8.8	0	0
	Trees[3]	107.0	0	11,877
	Grassland	950.5	0	4,097
	Trees	82.6	0	9,169
	Scrub	1,903.4	0	27,219
	Total Vegetation Change	**5,088.6**	**138**	**64,130**
VCC	Cropland	86.0	0	533
	Grassland	63.3	0	273
	Trees	18.5	0	2,054
	Scrub	37.6	0	538
	Wetland	0.6	0	0
	Total Vegetation Change	**206.0**	**0**	**3,397**
Total		**5,495.4**	**138**	**70,149[5]**
CO_2e Sequestered from Net New Trees[4]				**-30,090**
Total CO_2e Emissions Released				**40,059**
30-Year Amortized				**1,335**

Notes: MT CO_2e/year=metric tons of carbon dioxide equivalent per year; CDFW=California Department of Fish and Wildlife; EIS/EIR=Environmental Impact Statement/Environmental Impact Report; RMDP=Resource Management Development Plan; SCP=Spineflower Conservation Plan; ES=Entrada South; NRSP=Newhall Ranch Specific Plan; VCC=Valencia Commerce Center

[1] Land use change was based on the CDFW Draft Joint EIS/EIR for the RMDP and SCP Project, Table 4-2-B.

[2] Emissions were calculated using CalEEMod 2013.2.2 values.

[3] Two sets of tree land use changes were modeled based on the land designation of "Broad Leaf Upland" and "Riparian and Bottomland" in the table cited above (Table 4-2-B).

[4] Total CO_2e sequestered over 20-year active growth period of new trees is reported as recommended by the Intergovernmental Panel on Climate Change. The negative value indicates CO_2 emissions sequestered, as opposed to emissions released. Total number of new trees is 42,500.

[5] Summarized emissions by area are rounded to the nearest whole number; however, total emissions reflect the sum of exact emissions levels.

Source: Modeling conducted by Ramboll Environ in 2016. See Technical Report Tables 2-10a and 2-10b in Draft AEA Appendix 1 for detailed calculations.

The project would result in a total of 40,059 MT CO_2e from vegetation change associated with project implementation. These emissions reflect emissions of CO_2e from loss in vegetation type combined with sequestration of CO_2e from the planting of new trees. Total emissions are amortized over the project's 30-year life, consistent with guidance from SCAQMD. Amortized vegetation change emissions are also shown in Table 2.3-3.

Operation of the project would result in GHG emissions associated with motor vehicle trips to and from the project area; combustion of natural gas for space and water heating; consumption of electricity and water; conveyance, treatment, and discharge of wastewater; transport and disposal of solid waste; and use of equipment for landscaping. The removal of trees and vegetation would also result in the loss of sequestered carbon. Table 2.3-3 summarizes all the direct and indirect sources of GHG emissions associated with the project upon full buildout in 2030, along with existing emissions from the project site. The emissions

estimates are based on the application of existing regulations pertaining to vehicle emissions, building standards, and electricity generation. See heading, Analysis Methods, above for further information.

As shown in Table 2.3-3, upon full buildout, GHG emissions associated with construction and operation of the proposed project would be 526,103 MT CO_2e/per year in 2030. This level of GHG emissions has the potential to result in a considerable contribution to cumulative emissions related to global climate change, and would be potentially significant without the implementation of further mitigation.

Table 2.3-3 Summary of Annual Greenhouse Gas Emissions Comparing Existing Emissions with Unmitigated Project Emissions at Full Buildout (2030)

Emissions Activity	Emissions (MT CO_2e/year)	
	Existing[1]	Unmitigated
Mobile Sources	152	403,814
Electricity	–	39,393
Natural Gas	–	43,386
Area Sources[1]	7,883	367
Water Consumption and Wastewater Treatment	2,987	8,190
Solid Waste Generation	–	23,179
Vegetation Removal	–	1,335
Construction	–	6,437
Total Annual Emissions	**11,021**	**526,103**[2]

Notes: MT CO_2e/year=metric tons of carbon dioxide equivalent per year; N_2O=nitrous oxide

[1] Existing emissions are categorized as follows:
Area Sources: methane emission associated with oil wells, energy use associated with oil wells, N_2O emissions associated with fertilizer use.
Water Consumption: energy use associated with water.
Mobile Sources: emissions associated with diesel fuel usage.

[2] Summarized emissions per sector are rounded to the nearest whole number; however, total emissions reflect the sum of exact emissions levels.

Source: Modeling conducted by Ramboll Environ in 2016. See Draft AEA Appendix 1 for detailed calculations.

The project applicant has proposed a commitment to CDFW to reach zero net emissions, in response to the California Supreme Court ruling in November 2015. Without incorporation of emission-reduction measures, the project would not be able to meet this commitment. Because the project's emissions would be a potentially considerable contribution to cumulative emissions influencing global climate change and in light of the project applicant's zero net GHG emissions commitment, the project applicant has proposed mitigation measures that would result in no net increase in GHG emissions above existing conditions. The mitigation measures presented below have been independently reviewed and analyzed by CDFW, in consultation with ARB, and modified, where needed, from the project applicant's original proposal. With the implementation of the following 13 mitigation measures, the project would feasibly and reliably achieve the zero net emissions commitment.

Consistent with SCAQMD recommendations, the mitigation considered the following geographic priorities: (1) project design feature/on-site reduction measures; (2) off-site within neighborhood; (3) off-site within district; (4) off-site within state; and (5) off-site out of state (SCAQMD 2008).

Mitigation Measure 2-1: Residential Zero Net Energy

Prior to the issuance of residential building permits for the project or a portion of the project, the project applicant or its designee shall submit one or more ~~a~~ Zero Net Energy Confirmation (ZNE) Reports (ZNE Report) prepared by a qualified building energy efficiency and design consultant to Los Angeles County for review and

~~approval~~ confirmation that the residential development covered by the ZNE Report achieves the ZNE standard specified in this mitigation measure. Specifically, a ~~The~~ ZNE Report shall demonstrate that the residential development within the RMDP/SCP project site subject to application of Title 24, Part 6, of the California Code of Regulations has been designed and shall be constructed to achieve ZNE, as defined by CEC in its 2015 Integrated Energy Policy Report, which requires the value of the net energy produced by project renewable energy resources to equal the value of the energy consumed annually by the project using the CEC's Time Dependent Valuation metric ~~or otherwise achieve an equivalent level of energy efficiency, renewable energy generation or greenhouse gas emissions savings~~.

A ZNE Report shall provide, at a minimum, the following information ~~may, but is not required to~~:

- Confirmation that the residential development shall comply with Title 24, Part 6 building standards that are operative at the time of building permit application.

- Identification of additional measures or building performance standards that shall be relied upon to achieve the ZNE standard (as defined above), assuming ZNE is not already achieved by meeting the operative Title 24, Part 6 building standards.

In demonstrating that the residential development achieves the ZNE standard, the ZNE Report may:

- Evaluate multiple buildings and/or land use types. For example, a ZNE Report may cover all of the residential and ~~commercial~~ non-residential buildings within a neighborhood/community, or a subset thereof, including an individual building.

- Rely upon aggregated or community-based strategies to support its determination that the subject buildings are designed to achieve ZNE. For example, shortfalls in renewable energy generation for one or more buildings may be offset with excess renewable generation from one or more other buildings~~, or off-site renewable energy generation~~. As such, a ZNE Report could determine a building is designed to achieve ZNE based on aggregated or community-based strategies even if the building on its own may not be designed to achieve ZNE.

- Make reasonable assumptions about the estimated electricity and natural gas loads and energy efficiencies of the subject buildings.

- If interconnection of the project's renewable generation is not sufficient to allow compliance with the ZNE standard for the project, or a portion of the project, then Los Angeles County shall allow the project applicant or its designee to achieve an equivalent level of GHG emissions reductions to mitigate such shortfall by providing 5.1 MT CO_2e of GHG reductions for every megawatt-hour of renewable energy generation that would have been needed to achieve the ZNE standard for the project, or a portion of the project, as demonstrated in the ZNE Report.

Discussion

Project-related emissions of GHGs from the residential energy sector (i.e., electricity and natural gas) would be substantially reduced through implementation of Mitigation Measure 2-1. Through the incorporation of zero-energy technology into new residential development, as prescribed by a qualified energy efficiency and design consultant, fossil fuel-related sources of GHGs associated with energy use would be reduced ~~not occur from project-related activities~~.

Mitigation Measure 2-1 is considered feasible and enforceable mitigation because the project applicant or its designee shall be required to comply with the standards and components of the measure before construction begins. Los Angeles County shall hold the project applicant or its designee accountable for meeting the criteria of Mitigation Measure 2-1 prior to approving or issuing residential building permits. Issuance of residential buildings permits shall be contingent upon the project applicant or its designee providing adequate evidence as to implementation of Mitigation Measure 2-1 as specified.

As shown below in Table 2.3-4, implementation of Mitigation Measure 2-1 would reduce operations-related GHG emissions by ~~30,659~~ 30,656 MT CO_2e/year from residential electricity and natural gas use. Details on this measure, including estimated reductions, supporting data and implementation mechanisms are provided in Technical Report Tables ES-3 and 4-1a through 4-1d and Technical Report Appendix C, all contained in Draft AEA Appendix 1.

Mitigation Measure 2-2: Non-Residential Zero Net Energy

Prior to the issuance of building permits for commercial development and private recreation centers, and prior to the commencement of construction for the public facilities, respectively, for the project or a portion of the project the project applicant or its designee shall submit one or more ~~a~~ Zero Net Energy Confirmation Reports (ZNE Report) prepared by a qualified building energy efficiency and design consultant to Los Angeles County for review and confirmation that the commercial development, private recreation centers, and/or public facilities covered by the ZNE Report achieve the ZNE standard specified in this mitigation measure ~~approval~~. Specifically, a ~~The~~ ZNE Report shall demonstrate that the commercial development, private recreation centers, and public facilities within the RMDP/SCP project site subject to application of Title 24, Part 6, of the California Code of Regulations have been designed and shall be constructed to achieve ZNE, as defined by CEC in its 2015 Integrated Energy Policy Report, which requires the value of the net energy produced by project renewable energy resources to equal the value of the energy consumed annually by the project using the CEC's Time Dependent Valuation metric ~~or otherwise achieve an equivalent level of energy efficiency, renewable energy generation or GHG gas emissions savings~~.

("Commercial development" includes retail, light industrial, office, hotel, and mixed-use buildings. "Public facilities" are fire stations, libraries, and elementary, middle/junior high and high schools.)

A ZNE Report shall provide, at a minimum, the following information ~~may, but is not required to~~:

- Confirmation that the commercial development, private recreation centers, and/or public facilities shall comply with Title 24, Part 6 building standards that are operative at the time of building permit application.

- Identification of additional measures or building performance standards that shall be relied upon to achieve the ZNE standard (as defined above), assuming ZNE is not already achieved by meeting the operative Title 24, Part 6 building standards.

In demonstrating that the commercial development, private recreation centers, and/or public facilities achieves the ZNE standard, the ZNE Report may:

- Evaluate multiple buildings and/or land use types. For example, a ZNE Report may cover all of the residential and non-residential buildings within a neighborhood/community, or a subset thereof, including an individual building.

- Rely upon aggregated or community-based strategies to support its determination that the subject buildings are designed to achieve ZNE. For example, short falls in renewable energy generation for one or more buildings may be offset with excess renewable generation from one or more other buildings~~, or off-site renewable energy generation~~. As such, a ZNE Report could determine a building is designed to achieve ZNE based on aggregated or community-based strategies even if the building on its own may not be designed to achieve ZNE.

- Make reasonable assumptions about the estimated electricity and natural gas loads and energy efficiencies of the subject buildings.

- If interconnection of the project's renewable generation is not sufficient to allow compliance with the ZNE standard for the project, or a portion of the project, then Los Angeles County shall allow the project applicant or its designee to achieve an equivalent level of GHG emissions reductions to mitigate such shortfall by providing 5.1 MT CO_2e of GHG reductions for every megawatt-hour of renewable energy

generation that would have been needed to achieve the ZNE standard for the project, or a portion of the project, as demonstrated in the ZNE Report.

Discussion

Project-related emissions of GHGs from the non-residential energy sector (i.e., electricity and natural gas) would be substantially reduced through implementation of Mitigation Measure 2-2. Through incorporation of zero-energy technology into all non-residential development associated with the project, as prescribed by a qualified energy efficiency and design consultant, fossil fuel-related sources of GHGs associated with energy use would be reduced ~~not occur from project-related activities~~.

Mitigation Measure 2-2 is considered feasible and enforceable mitigation because the project applicant or its designee shall be required to comply with the standards and components of the measure before construction begins. Los Angeles County shall hold the project applicant or its designee accountable for meeting the criteria of Mitigation Measure 2-2 prior to approving or issuing non-residential building permits and prior to commencement of construction for public facilities. Issuance of non-residential building permits and/or commencement of construction shall be contingent upon the project applicant or its designee providing adequate evidence that Mitigation Measure 2-2 has been implemented as specified.

As shown below in Table 2.3-4, implementation of Mitigation Measure 2-2 would reduce operations-related GHG emissions by ~~24,512~~ 24,456 MT CO_2e/year from non-residential electricity and natural gas use. Details on this measure, including estimated reductions, supporting data and implementation mechanisms are provided in Technical Report Tables ES-3 and 4-2a through 4-2d and Technical Report Appendix C, all contained in Draft AEA Appendix 1.

Mitigation Measure 2-3: Swimming Pool Heating

Prior to the issuance of private recreation center building permits, the project applicant or its designee shall submit swimming pool heating design plans to Los Angeles County for review and approval. The design plans shall demonstrate that all swimming pools located at private recreation centers on the RMDP/SCP project site have been designed and shall be constructed to use solar water heating or other technology with an equivalent level of energy efficiency.

Discussion

Project-related emissions of GHGs from the energy sector (specifically natural gas) associated with heating swimming pools would be eliminated through incorporation of low-emission heating design for pools constructed as a result of project implementation. Swimming pools shall be designed and constructed to use solar water heating or other technology with an equivalent level of energy efficiency; therefore, no combustion of natural gas would occur during heating and operation of the swimming pools.

Mitigation Measure 2-3 is considered feasible and enforceable mitigation because the project applicant or its designee shall be required to comply with the standards and components of the measure before construction begins. Los Angeles County shall hold the project applicant or its designee accountable for meeting the criteria of Mitigation Measure 2-3 prior to approving or issuing private recreation center building permits. Issuance of private recreation center building permits will contingent upon the project applicant or its designee providing adequate evidence that Mitigation Measure 2-3 has been implemented as specified.

As shown below in Table 2.3-4, implementation of Mitigation Measure 2-3 would reduce operations-related GHG emissions by 22,356 MT CO_2e/year from natural gas use. Detailed calculations showing the estimated reduction are provided in Technical Report Tables ES-3 and 2-14a, contained in Draft AEA Appendix 1.

Mitigation Measure 2-4: Residential Electric Vehicle Chargers and Vehicle Subsidy

Prior to the issuance of residential building permits, the project applicant or its designee shall submit building design plans, to Los Angeles County for review and approval, which demonstrate that each residence within the

RMDP/SCP project site subject to application of Title 24, Part 6, of the California Code of Regulations shall be equipped with a minimum of one single-port electric vehicle (EV) charging station. Each charging station shall achieve a similar or better functionality as a Level 2 charging station.

Additionally, prior to the issuance of the first building permit for the RMDP/SCP project site, the project applicant or its designee shall establish and fund a dedicated account for the provision of subsidies for the purchase of ZEVs, as defined by ARB. The project applicant or its designee shall provide proof of the account's establishment and funding to Los Angeles County.

The dedicated account shall be incrementally funded, for each village-level project, in an amount that equals the provision of a $1,000 subsidy per residence – on a first-come, first-served basis – for 65 ~~50~~ percent of the village's total residences subject to application of Title 24, Part 6, of the California Code of Regulations.

Discussion

Project-related emissions of GHGs from the transportation sector would be substantially reduced through incorporation of EV charging stations. Use of ZEVs results in a reduction of GHG emissions from fossil fuel-combusting engines. Further, the electricity supplied to EV charging stations may originate from renewable resources provided by public utilities, as specified through RPS, or on-site sources of renewable energy. As discussed above in Section 2.2, Regulatory Setting, deployment of SB 350 would require public utilities to achieve a 50 percent renewable portfolio by 2030, the year of project buildout.

Mitigation Measure 2-4 is considered feasible and enforceable mitigation because the project applicant or its designee shall be required to comply with the standards and components of the measure before construction begins. Los Angeles County shall hold the project applicant or its designee accountable for meeting the criteria of Mitigation Measure 2-4 prior to approving or issuing residential building permits. Issuance of residential buildings permits shall be contingent upon the project applicant or its designee providing adequate evidence as to implementation of Mitigation Measure 2-4 as specified.

As shown ~~in~~ below in Table 2.3-4, implementation of Mitigation Measure 2-4 would reduce operations-related GHG emissions by ~~53,735~~ 53,724 MT CO_2e/year from the transportation sector. Detailed calculations showing the estimated reduction are provided in Technical Report Tables ES-3 and 4-3, contained in Draft AEA Appendix 1.

Mitigation Measure 2-5: Commercial Development Area Electric Vehicle Chargers

Prior to the issuance of commercial building permits, the project applicant or its designee shall submit building design plans, to Los Angeles County, which demonstrate that the parking areas for commercial buildings on the RMDP/SCP project site shall be equipped with EV charging stations that provide charging opportunities to 7.5 percent of the total number of required parking spaces. ("Commercial buildings" include retail, light industrial, office, hotel, and mixed-use buildings.)

The EV charging stations shall achieve a similar or better functionality as a Level 2 charging station. In the event that the installed charging stations use ~~more superior~~ functionality/technology other than Level 2 charging stations, the parameters of the mitigation obligation (i.e., number of parking spaces served by EV charging stations) shall reflect the comparative equivalency of Level 2 charging stations to the installed charging stations on the basis of average charge rate per hour. For purposes of this equivalency demonstration, Level 2 charging stations shall be assumed to provide charging capabilities of 25 range-miles per hour.

Discussion

Project-related emissions of GHGs from the transportation sector would be substantially reduced through incorporation of EV charging stations. Use of ZEVs results in a reduction of GHG emissions from fossil fuel-combusting engines. Further, the electricity supplied to EV charging stations may originate from renewable

resources provided by public utilities, as specified through RPS, or on-site sources of renewable energy. As discussed ~~above~~ in Section 2.2, Regulatory Setting, deployment of SB 350 would require public utilities to achieve a 50 percent renewable portfolio by 2030, the year of project buildout.

Mitigation Measure 2-5 is considered feasible and enforceable mitigation because the project applicant or its designee shall be required to comply with the standards and components of the measure before construction begins. Los Angeles County shall hold the project applicant or its designee accountable for meeting the criteria of Mitigation Measure 2-5 prior to approving or issuing commercial building permits. Issuance of commercial buildings permits shall be contingent upon the project applicant or its designee providing adequate evidence as to implementation of Mitigation Measure 2-5 as specified.

As shown ~~in~~ below in Table 2.3-4, implementation of Mitigation Measure 2-5 would reduce operations-related GHG emissions by 39,109 MT CO_2e/year from the transportation sector. Detailed calculations showing the estimated reduction are provided in Technical Report Tables ES-3 and 4-4, contained in Draft AEA Appendix 1.

Mitigation Measure 2-6: Transportation Demand Management Plan

The project applicant-submitted Newhall Ranch Transportation Demand Management Plan (TDM Plan), located in ~~Technical Report~~ Final AEA Appendix 7~~contained in AEA Appendix 1~~, shall be implemented to reduce VMT resulting from project build out with oversight from Los Angeles County. The TDM Plan is designed to influence the transportation choices of residents, students, employees, and visitors, and serves to enhance the use of alternative transportation modes both on and off the project site through the provision of incentives and subsidies, expanded transit opportunities, bikeshare and carshare programs, technology-based programs, and other innovative means. Village-level implementation ~~Implementation~~ of relevant elements of the TDM Plan ~~will be included as a condition of approval~~ shall proceed in accordance with village-level applicability supplements prepared by a qualified transportation engineer that are reviewed and considered by Los Angeles County when approving tentative subdivision maps for land developments that are part of the project.

Accordingly, the TDM Plan identifies key implementation actions that are critical to the effectiveness of the VMT-reducing strategies, as well as timeline and phasing requirements, monitoring standards, and performance metrics and targets tailored to each of the strategies.

In accordance with the TDM Plan, a non-profit Transportation Management Organization (TMO) or equivalent management entity shall be established to provide the services required, as applicable.

Discussion

Implementation of the TDM plan would reduce project-related emissions of GHGs from the transportation sector through incorporation of measures and strategies designed to influence behavior and increase the efficiency of transportation modes. Implementation of the TDM strategy will result in increased rates of alternative modes of transportation, such as walking, bicycling, and public transit use, with a subsequent decrease in single-occupancy vehicle dependency through vanpooling, car-sharing, and ride-matching programs, which will reduce transportation-related GHG emissions on a community-wide scale. Incorporation of measures to improve the efficiency of transportation systems will lower rates of emissions associated with idling and braking. Pursuant to SB 375, TDM strategies have been developed by Metropolitan Planning Organizations (MPOs) and incorporated into RTP/SCSs. These plans are reviewed by ARB, which has concluded that TDM produces a notable reduction in GHG emissions from automobiles (ARB 2016b).

As shown ~~in~~ below in Table 2.3-4, implementation of Mitigation Measure 2-6 would reduce operations-related GHG emissions by ~~60,179~~ 60,168 MT CO_2e/year from the transportation sector. Details on this measure, including estimated reductions, supporting data and implementation mechanisms, along with components of the project applicant-submitted TDM plan are provided in Technical Report Tables ES-3 and 4-5 ~~and Technical Report Appendix E, all contained~~ in Draft AEA Appendix 1.

Mitigation Measure 2-7: Traffic Signal Synchronization

Prior to the issuance of traffic signal permits, the project applicant or its designee shall work with Los Angeles County and the California Department of Transportation (Caltrans), as applicable, to facilitate traffic signal coordination along:

- State Route 126 from the Los Angeles County line to the Interstate 5 north-bound ramps;
- Chiquito Canyon Road, Long Canyon Road, and Valencia Boulevard within the RMDP/SCP project site;
- Magic Mountain Parkway from Long Canyon Road to the Interstate 5 north-bound ramps; and
- Commerce Center Drive from Franklin Parkway to Magic Mountain Parkway.

To effectuate the signal synchronization and specifically the operational and timing adjustments needed at affected traffic signals, the project applicant or its designee shall submit traffic signal plans for review and approval, and/or pay needed fees as determined by Los Angeles County or Caltrans, as applicable.

A majority of the signals that will be synchronized will be new signals constructed/installed by the project. Thus, for these signals, the project will provide the necessary equipment at the signal controller cabinet, as well as within the new roadways themselves, to enable and facilitate synchronization. The project is responsible for paying 100 percent of the applicable fee amount for the signal synchronization work, with assurance that the necessary funding will be available to fully implement this measure.

Discussion

The improved synchronization of the aforementioned intersections will improve vehicle efficiency, thus decreasing transportation-related emissions of GHGs associated with project implementation. Emissions from inefficient travel (e.g., idling) shall be mitigated through signal synchronization and improved vehicle movement.

Mitigation Measure 2-7 is considered feasible and enforceable mitigation because the project applicant or its designee shall be required to comply with the standards and components of the measure prior to issuance of traffic signal permits. Los Angeles County and Caltrans shall hold the project applicant or its designee accountable for meeting the criteria of Mitigation Measure 2-7 prior to issuing traffic signal permits. Issuance of traffic signal permits shall be contingent upon the project applicant or its designee providing adequate evidence as to implementation of Mitigation Measure 2-7 as specified.

As shown ~~in~~ below in Table 2.3-4, implementation of Mitigation Measure 2-7 would reduce operations-related GHG emissions by ~~8,214~~ 8,212 MT CO_2e/year from the transportation sector. Detailed calculations showing the estimated reduction are provided in Technical Report Tables ES-3 and 4-6 and Technical Report Appendix I, all contained in Draft AEA Appendix 1.

Mitigation Measure 2-8: Zero-Emission ~~Electric~~ School Bus Program

Consistent with the parameters of the Newhall Ranch TDM Plan, the project applicant or its designee shall provide Los Angeles County with proof that funding has been provided for the purchase, operation and maintenance of ~~electric~~ zero-emission school buses in furtherance of the school bus program identified in the project's TDM Plan. The proof of funding shall be demonstrated incrementally as the school bus program is paced to village-level occupancy and student enrollment levels.

Discussion

Use of ~~electric~~ zero-emission school buses would mitigate transportation-related emissions of GHGs by reducing the use of GHG-emitting fossil fuels during operation of school buses. Proof of funding shall be demonstrated incrementally as the school bus program is paced to village-level occupancy and student enrollment levels.

As shown ~~in~~ below in Table 2.3-4, implementation of Mitigation Measure 2-8 would reduce operations-related GHG emissions by 157 MT CO_2e/year from the transportation sector. Detailed calculations showing the estimated reduction are provided in Technical Report Tables ES-3 and 4-7 in Draft AEA Appendix 1.

Mitigation Measure 2-9: Zero-Emission ~~Electric~~ Transit Bus Program

Prior to the issuance of the first 2,000th residential building permit within the RMDP/SCP project site and every 2,000th residential building permit thereafter, the project applicant or its designee shall provide Los Angeles County with proof that it has provided a subsidy of $100,000 per bus for the replacement of up to 10 diesel or compressed natural gas transit buses with ~~electric~~ zero-emission buses to the identified transit provider(s).

Discussion

Use of ~~electric~~ zero-emission transit buses would mitigate transportation-related emissions of GHGs by reducing the use of GHG-emitting fossil fuels (i.e., diesel fuel and natural gas) during operation of transit buses.

Mitigation Measure 2-9 is considered feasible and enforceable mitigation because the project applicant or its designee shall be required to comply with the standards and components of the measure before an incremental number of residential building permits are issued. Los Angeles County shall hold the project applicant or its designee accountable for meeting the criteria of Mitigation Measure 2-9 prior to issuing building permits. Issuance of buildings permits shall be contingent upon the project applicant or its designee providing adequate evidence as to implementation of Mitigation Measure 2-9 as specified.

As shown ~~in~~ below in Table 2.3-4, implementation of Mitigation Measure 2-9 would reduce operations-related GHG emissions by 619 MT CO_2e/year from the transportation sector. Detailed calculations showing the estimated reduction are provided in Technical Report Tables ES-3 and 4-8 in Draft AEA Appendix 1.

Mitigation Measure 2-10: Offsetting Construction and Vegetation Change Emissions

Prior to issuing grading permits for village-level development within the RMDP/SCP project site, Los Angeles County shall confirm that the project applicant or its designee shall fully mitigate the ~~related~~ construction and vegetation change GHG emissions associated with each such grading permit (the "Incremental Construction GHG Emissions") by relying upon one of the following compliance options, or a combination thereof, in accordance with the project applicant-submitted Newhall Ranch GHG Reduction Plan (GHG Reduction Plan; see ~~Technical Report~~ Final AEA Appendix 6 ~~F contained in AEA Appendix 1~~):

- Directly undertake or fund activities that reduce or sequester GHG emissions ("Direct Reduction Activities") and retire the associated "GHG Mitigation ~~reduction~~ Credits ~~credits~~ in a quantity equal to the Incremental Construction GHG Emissions~~;~~. A "GHG Mitigation Credit" shall mean an instrument issued by an Approved Registry that satisfies the performance standards set forth in the GHG Reduction Plan and shall represent the estimated reduction or sequestration of one metric tonne of carbon dioxide equivalent that will be achieved by a Direct Reduction Activity that is not otherwise required (CEQA Guidelines Section 15126.4(c)(3)). An "Approved Registry" is an accredited carbon registry as defined by the GHG Reduction Plan; or

- Obtain and retire "Carbon Offsets" ~~carbon credits that have been issued by a recognized and reputable carbon registry, as described in the GHG Reduction Plan,~~ in a quantity equal to the Incremental Construction GHG Emissions. "Carbon Offset" shall mean an instrument issued by an Approved Registry that satisfies the performance standards set forth in the GHG Reduction Plan and shall represent the past reduction or sequestration of one metric tonne of carbon dioxide equivalent achieved by a Direct Reduction Activity or any other GHG emission reduction project or activity that is not otherwise required (CEQA Guidelines Section 15126.4(c)(3)).

Discussion

Involvement in at least one of the actions listed above would be sufficient to offset the project's GHG emissions associated with construction- and vegetation change-related activities ~~to project implementation~~. The sum of ~~purchased~~ GHG Mitigation Credits ~~reduction credits~~ and/or Carbon Offsets ~~carbon credits~~ retired by the project applicant or its designee shall equal the total emissions generated during construction activities and vegetation removal associated with each such grading permit ~~as amortized over the life of the project (i.e., 30 years)~~. GHG Mitigation Credits and Carbon Offsets ~~credits~~ shall be of sufficient criteria to meet the standards of an Approved Registry ~~adequate carbon credit through a reputable carbon registry~~. Carbon Offsets ~~credits~~ purchased to offset construction and vegetation emissions shall be real, additional, quantifiable, enforceable, validated, and permanent. All GHG Mitigation Credits and Carbon Offsets must meet the performance standards identified in the GHG Reduction Plan. ~~The year of full buildout (2030), the project applicant shall engage in a one time purchase of carbon offsets that can demonstrate GHG reductions shall continue over the life of the project on a yearly basis.~~

Mitigation Measure 2-10 is considered feasible and enforceable mitigation because the project applicant or its designee shall be required to comply with the standards and components of the measure prior to issuance of grading permits. Los Angeles County shall hold the project applicant or its designee accountable for meeting the criteria of Mitigation Measure 2-10 prior to issuing grading permits. Issuance of grading permits shall be contingent upon the project applicant or its designee providing adequate evidence as to implementation of Mitigation Measure 2-10 as specified.

As shown ~~in~~ below in Table 2.3-4, implementation of Mitigation Measure 2-10 would reduce construction- and vegetation change-related GHG emissions by ~~7,808~~ 7,773 MT CO_2e/year. Details on this measure, including estimated reductions, supporting data and implementation mechanisms are provided in Technical Report Tables ES-2 and ES-3 and Technical Report Appendices F and K, all contained in Draft AEA Appendix 1.

Mitigation Measure 2-11: Building Retrofit Program

Prior to the issuance of building permits for ~~every 100 residential units or 100,000 square feet of commercial development for each village-level project~~ development within the RMDP/SCP project site, the project applicant or its designee shall ~~provide proof of funding of~~ undertake or fund Direct Reduction Activities pursuant to the Building Retrofit Program ("Retrofit Program"), as included in Final AEA Appendix 13, to improve the energy efficiency of existing buildings located primarily in disadvantaged communities (as defined in the Retrofit Program). The project applicant or its designee shall retire GHG Mitigation Credits or Carbon Offsets issued by an Approved Registry based on such Direct Reduction Activities in a quantity equal to the ~~proportional percentage~~ sum of the ~~Building Retrofit Program (Retrofit Program),~~ following (together, the "Retrofit Reduction Requirement") as included in ~~Technical Report~~ Final AEA Appendix 13 ~~G contained in AEA Appendix 1, to Los Angeles County~~.

- For the residential portion of a building permit application, the product of the planned number of residential units for the village-level project multiplied by 0.0377 $MTCO_2e$;
- For the commercial portion of a building permit application, the product of the planned commercial development per thousand commercial square feet multiplied by 0.0215 MTCO2e. ~~(~~"Commercial development" includes retail, light industrial, office, hotel and mixed-use buildings.~~)~~

Building retrofits covered by the Retrofit Program can include, but are not limited to: cool roofs, solar panels, solar water heaters, smart meters, energy efficient lighting (including, but not limited to, light bulb replacement), energy efficient appliances, energy efficient windows, pool covers, insulation, and water conservation measures.

The Retrofit Program shall be implemented within the geographic area defined to include Los Angeles County and primarily within disadvantaged communities, as defined by the Retrofit Program, or in other areas accepted by the Los Angeles County Planning Director.

~~Funding shall be applied to implement retrofits strategies identified in the Retrofit Program or other comparable strategies accepted by the Los Angeles County Planning Director.~~

Discussion

The Retrofit Program would reduce emissions through the replacement of existing and less efficient technologies and addition of low-emission infrastructure. Cool roofs and improved insulation keep the internal temperatures of buildings low, thus reducing dependency on heating, ventilation and air conditioning systems and the indirect GHG emissions produced from their energy use. Solar panels and solar water heaters employ the sun's energy to heat and power buildings to meet energy demands while reducing GHG emissions from electricity and natural gas. Use of energy efficient lighting, meters, appliances, and windows lower the overall energy demand of a building or structure requiring less energy; therefore, lowering the rate of energy-related fossil fuel combustion. Implementation of water conservation strategies further reduce GHG emissions associated with water and wastewater treatment and conveyance.

Mitigation Measure 2-11 is considered feasible and enforceable mitigation because the project applicant or its designee shall be required to comply with the standards and components of the measure prior to issuance of building permits for a proportional number of residential units or square feet of commercial space. Los Angeles County shall hold the project applicant or its designee accountable for meeting the criteria of Mitigation Measure 2-11 prior to issuing building permits. Issuance of buildings permits shall be contingent upon the project applicant or its designee providing adequate evidence as to implementation of Mitigation Measure 2-11 as specified.

As shown ~~in~~ below in Table 2.3-4, implementation of Mitigation Measure 2-11 would reduce operations-related GHG emissions by 1,000 MT CO_2e/year from the energy sector. Detailed calculations showing the estimated reduction, along with supporting data, are shown in Technical Report Tables ES-3 and 4-9 and Technical Report Appendix G, all contained in Draft AEA Appendix 1.

Mitigation Measure 2-12: Off-Site Electric Vehicle Chargers

Prior to the issuance of the first building permit for the RMDP/SCP project site, the project applicant or its designee shall provide Los Angeles County with proof of installation of EV charging stations capable of serving 20 off-site parking spaces. Thereafter, the project applicant or its designee shall provide Los Angeles County proof of installation of EV charging stations prior to the issuance of residential and commercial building permits per the following ratios: one (1) off-site parking space shall be served by an electric vehicle charging station for every 30 dwelling units, and one (1) off-site parking space shall be served by an electric vehicle charging station for every 7,000 square feet of commercial development. ("Commercial development" includes retail, light industrial, office, hotel and mixed-use buildings.) Off-site EV charging stations capable of servicing 2,036 parking spaces would be required if the maximum allowable development facilitated by the RMDP/SCP project occurs; fewer EV charging stations would be required if maximum build-out under the RMDP/SCP project does not occur.

The EV charging stations shall achieve a similar or better functionality as a Level 2 charging station and may service one or more parking spaces. In the event that the installed charging stations use ~~more superior~~ functionality/technology other than Level 2 charging stations, the parameters of the mitigation obligation (i.e., number of parking spaces served by EV charging stations) shall reflect the comparative equivalency of Level 2 charging stations to the installed charging stations on the basis of average charge rate per hour. For purposes of this equivalency demonstration, Level 2 charging stations shall be assumed to provide charging capabilities of 25 range-miles per hour.

The EV charging stations shall be located within the geographic area defined to include Los Angeles County~~,~~ ~~and~~ The EV charging stations shall be in areas that are generally accessible to the public~~. For example, the charging stations may be located in~~ such as areas that include, but are not limited to, retail centers, employment centers and office complexes, recreational facilities, schools, and other categories of public facilities.

Discussion

The project would contribute to reductions from the transportation sector through incorporation of off-site EV charging stations. Use of ZEVs results in a reduction of GHG emissions from fossil fuel-combusting engines. Further, the electricity supplied to EV charging stations may originate from renewable resources provided by public utilities, as specified through RPS, or on-site sources of renewable energy. As discussed above in Section 2.2, Regulatory Setting, deployment of SB 350 would require public utilities to achieve a 50 percent renewable portfolio by 2030, the year of project buildout.

Mitigation Measure 2-12 is considered feasible and enforceable mitigation because the project applicant or its designee shall be required to comply with the standards and components of the measure prior to issuance of an incremental number of building permits for residential and commercial uses. Los Angeles County shall hold the project applicant or its designee accountable for meeting the criteria of Mitigation Measure 2-12 prior to issuing building permits. Issuance of buildings permits shall be contingent upon the project applicant or its designee providing adequate evidence as to implementation of Mitigation Measure 2-11 as specified.

As shown ~~in~~ below in Table 2.3-4, implementation of Mitigation Measure 2-12 would reduce operations-related GHG emissions by 39,813 MT CO_2e/year from the transportation sector. Detailed calculations showing the estimated reduction are provided in Technical Report Tables ES-3 and 4-4 in Draft AEA Appendix 1.

Mitigation Measure 2-13: Implement a GHG Reduction Plan

In addition to Mitigation Measures 2-1 through 2-12, the project applicant or its designee shall offset GHG emissions to zero by funding or undertaking Direct Reduction Activities ~~activities that directly reduce or sequester GHG emissions~~ or, if necessary, obtaining Carbon Offsets ~~carbon credits~~ through the Newhall Ranch GHG Reduction Plan. The project applicant-submitted Newhall Ranch GHG Reduction Plan focuses on achieving GHG reductions or sequestration through the Direct Reduction Activities ~~direct investment in specific programs or projects~~ in coordination with an Approved Registry ~~accredited carbon registry~~, such as the Climate Action Reserve. If these Direct Reduction Activities ~~direct investment efforts~~ do not achieve the necessary ~~an adequate~~ amount of GHG reductions, the project applicant or its designee can obtain Carbon Offsets issued by an Approved Registry ~~carbon credits from accredited carbon registries~~.

~~SCAQMD recommends that mitigation be considered in the following prioritized manner: (1) project design feature/on site reduction measures; (2) off site within neighborhood; (3) off site within district; (4) off site within state; and (5) off-site out of state (SCAQMD 2008).~~ Prior to issuing building permits for development within the RMDP/SCP project site, Los Angeles County shall confirm that the project applicant or its designee shall fully offset the project's remaining (i.e., post implementation of Mitigation Measures 2-1 through 2-12) operational GHG emissions over the 30-year project life associated with each such building permit ~~permits~~ (the "Incremental Operational GHG Emissions) by relying upon one of the following compliance options, or a combination thereof, in accordance with the Newhall Ranch GHG Reduction Plan:

- Undertake or fund Direct Reduction Activities ~~Demonstrate that the project applicant has directly undertaken or funded activities that reduce or sequester GHG emissions ("Direct Reduction Activities")~~ that are estimated to result in GHG Mitigation Credits ~~reduction credits~~, as described in the GHG Reduction Plan, and retire such GHG Mitigation Credits ~~reduction credits~~ in a quantity equal to the Incremental Operational GHG Emissions ~~emissions~~;

- ~~Provide a guarantee that it shall retire carbon credits issued in connection with Direct Reduction Activities in a quantity equal to the Incremental Operational GHG emissions;~~

- Undertake or fund Direct Reduction Activities and retire the associated Carbon Offsets ~~carbon credits~~ in a quantity equal to the Incremental Operational GHG Emissions; or

- If necessary, as determined by the Los Angeles County Planning Director in accordance with the GHG Reduction Plan, ~~it is impracticable~~ to fully offset Incremental Operational GHG Emissions ~~through the Direct~~

~~Reduction Activities~~, the project applicant or its designee may purchase and retire Carbon Offsets ~~carbon credits~~ that have been issued by an Approved Registry ~~a recognized and reputable, accredited carbon registry~~ in a quantity equal to the Incremental Operational GHG Emissions.

Compliance with MM 2-13 shall be demonstrated incrementally prior to obtaining building permits~~, and shall in the context of the project overall follow the preferred geographic hierarchy recommended by SCAQMD, discussed above~~.

The Incremental Operational GHG Emissions ~~emissions~~ shall be equal to the sum of (1) the number of proposed residential units covered by the applicable building permit multiplied by a "GHG Residential Ratio" ~~108.89 MT CO_2e~~ and (2) every thousand square feet of proposed commercial development covered by the applicable building permit multiplied by "a "GHG Commercial Ratio." ("Commercial development" includes retail, light industrial, office, hotel, and mixed-use buildings.) GHG Residential Ratio and GHG Commercial Ratio shall mean the emissions ratios in $MTCO_2e$ set forth in the applicable CEQA analysis completed by the County of Los Angeles for a specific village-level project to ensure that the related GHG emissions are reduced to zero ~~506.86 MT CO_2e~~.

Discussion

See Technical Report Appendix K, contained in Draft AEA Appendix 1 for detailed information regarding the derivation of the GHG Residential Ratio and GHG Commercial Ratio for the project. For example, the GHG Residential Ratio would be 108.89 $MTCO_2e$ per residential unit and the GHG Commercial Ratio would be 506.86 $MTCO_2e$ per thousand square feet of commercial development if the maximum allowable development facilitated by the RMDP/SCP project occurs. However, as noted above, the applicable GHG Residential Ratio and GHG Commercial Ratio for each village-specific project will be set forth in the applicable CEQA documentation for such village-level project ~~these estimates for the project~~.

Implementation of Mitigation Measure 2-13 shall be adequate to fully mitigate the Incremental Operational GHG Emissions through Direct Reduction Activities that result in GHG Mitigation Credits ~~direct investment in GHG reduction activities~~ and/or the efficacy of Carbon Offsets ~~carbon credits~~ and the reductions they produce. The parameters of the compliance options provided above ensure that the GHG Mitigation Credits and/or Carbon Offsets ~~carbon offsets~~ purchased by the project applicant or its designee meet the criteria of a successful and effective GHG reduction offset. To be accredited by an Approved Registry ~~a recognized carbon registry~~, Carbon Offsets ~~carbon offsets~~ must be ~~demonstrate that they are~~ real, additional, quantifiable, enforceable, validated, and permanent. Carbon Offsets ~~offsets~~ purchased to implement Mitigation Measure 2-13 ~~following project implementation~~ shall meet these standards, and the GHG Mitigation Credits and/or Carbon Offsets obtained by the project applicant or its designee shall produce levels of GHG reductions ~~carbon offsetting on a yearly basis~~ to mitigate the Incremental Operational ~~Operation~~ GHG Emissions during project implementation. All GHG Mitigation Credits and Carbon Offsets must meet the performance standards identified in the GHG Reduction Plan.

The Carbon Offsets ~~carbon offsets~~ associated with the aforementioned compliance options ~~responses~~ are considered appropriate and applicable mitigation for the Incremental Operational GHG Emissions produced by the project following deployment of Mitigation Measures 2-1 through 2-12. Accredited projects and programs participating in local, regional, and global carbon markets shall be subject to the standards enforced by Approved Registries ~~carbon registries~~. If it is found that a Carbon Offset project or program loses its ability to meet the criteria of being real, additional, quantifiable, enforceable, validated, and permanent, the Carbon Offset ~~it~~ loses its accreditation as an active carbon reducing or sequestrating action. The Carbon Offsets ~~carbon credits~~ purchased as a result of Mitigation Measure 2-13 shall be subject to the same standards. Therefore, in ~~In~~ the event that a Carbon Offset project or program providing Carbon Offsets ~~offsets~~ to the project applicant or its designee loses its accreditation, the project applicant or its designee shall comply with the rules and procedures of retiring Carbon Offsets ~~offsets~~ specific to the registry involved and will undertake additional direct investments or purchase an equivalent number of credits to recoup the loss.

Project Emissions with Implementation of Mitigation Measures 2-1 through 2-13

GHG reductions associated with each mitigation measure were quantified and are reported in Draft AEA Appendix 1, along with underlying assumptions and supporting data. Mitigation Measures 2-1 through 2-12 reduce the project's GHG emissions by 289,043 MT CO_2e/year. The project would need additional reductions pursuant to Mitigation Measure 2-13 to meet its zero net emissions commitment. Implementation of Mitigation Measure 2-13 further reduces project-related GHG emissions to zero net emissions. Table 2.3-4 shows estimated reductions associated with each mitigation measure and how the project will meet its commitment to achieve zero net emissions of GHGs. References to corresponding tables in Draft AEA Appendix 1 are included to provide additional details on reduction quantification.

Table 2.3-4 Summary of Greenhouse Gas Emissions Reductions Associated with Mitigation Measures at Full Buildout (2030)

Mitigation Measure	Emissions Reduction (MT CO_2e/year)	Source (Draft AEA Appendix 1)
Mobile Sources		
MM 2-4: Residential EV Chargers and Vehicle Subsidy	53,724	Tables ES-3 and 4-3 Appendix H
MM 2-5: Commercial Development Area EV Chargers	39,109	Tables ES-3 and 4-4
MM 2-6: Transportation Demand Management Plan	60,168	Tables ES-3 and 4-5 Appendix E
MM 2-7: Traffic Signal Synchronization	8,212	Tables ES-3 and 4-6 Appendix I
MM 2-8: Zero-Emission ~~Electric~~ School Bus Program	157	Tables ES-3 and 4-7
MM 2-9: Zero-Emission ~~Electric~~ Transit Bus Subsidy	619	Tables ES-3 and 4-8
MM 2-12: Off-Site EV Chargers	39,813	Tables ES-3 and 4-4
Electricity[1]		
MM 2-1: Residential Zero Net Energy	18,930	Tables ES-3, 4-1a, 4-1b, 4-1c, and 4-1d Appendix C
MM 2-2: Commercial Zero Net Energy	24,843	Tables ES-3, 4-2a, 4-2b, 4-2c, and 4-2d Appendix C
MM 2-11: Building Retrofit Program	500	Tables ES-3 and 4-9 Appendices G and J
Natural Gas[1]		
MM 2-1: Residential Zero Net Energy	11,726	Tables ES-3, 4-1a, 4-1b, 4-1c, and 4-1d Appendix C
MM 2-2: Commercial Zero Net Energy	612	Tables ES-3, 4-2a, 4-2b, 4-2c, and 4-2d Appendix C
MM 2-3: Swimming Pool Heating	22,356	Tables ES-3 and 2-14a
MM 2-11: Building Retrofit Program	500	Tables ES-3 and 4-9 Appendices G and J
Vegetation Removal		
MM 2-10: Offsetting Construction and Vegetation Change Emissions	1,335	Tables ES-2 and ES-3 Appendices F and K

Table 2.3-4 Summary of Greenhouse Gas Emissions Reductions Associated with Mitigation Measures at Full Buildout (2030)

Mitigation Measure	Emissions Reduction (MT CO_2e/year)	Source (Draft AEA Appendix 1)
Construction		
MM 2-10: Offsetting Construction and Vegetation Change Emissions	6,437	Tables ES-2 and ES-3 Appendices F and K
Subtotal GHG Reductions by Measures 1 – 12 (Mitigation)	289,043	Table ES-3
Offset of Remaining Emissions (GHG Reduction Plan)		
MM 2-13: Zero GHG Plan (Mobile)	202,011	Table ES-2
MM 2-13: Zero GHG Plan (electricity) [1]	-4,880[2]	Table ES-2
MM 2-13: Zero GHG Plan (Natural Gas) [1]	8,192	Table ES-2
MM 2-13: Zero GHG Plan (Area Sources)	367	Table ES-2
MM 2-13: Zero GHG Plan (Water Consumption and Wastewater Treatment)	8,190	Table ES-2
MM 2-13: Zero GHG Plan (Solid Waste Generation)	23,179	Table ES-2
Subtotal GHG Reductions by Measure 13 (GHG Reduction Plan)	237,059	Table ES-2
Total Reductions	**526,103**[3]	

Notes: MT CO_2e/year=metric tons of carbon dioxide equivalent per year; MM=mitigation measure; EV=electric vehicle; TDV=Time Dependent Valuation; CEC=California Energy Commission; ZNE=Zero Net Energy

[1] The zero net energy mitigation measures (MM 2-1 and MM 2-2) are applied by assuming 80% of the mitigation applies to electricity and 20% of the mitigation applies to natural gas consumption associated with the respective land use type (residential and non-residential)

[2] Emissions reductions from direct and indirect energy consumption appear as a negative to represent TDV energy savings from use of photovoltaics combined with variations in natural gas pricing consistent with CEC's TDV model to achieve ZNE.

[3] Summarized emissions by mitigation measure are rounded to the nearest whole number; however, total emissions reflect the sum of exact emissions levels.

Source: Modeling conducted by Ramboll Environ in 2016. See Draft AEA Appendix 1 for detailed calculations.

GHG emissions are anticipated to decrease into the future based on ongoing improvements in technology and implementation of regulations to reduce GHGs (i.e., the reductions of energy-related emissions due to 50 percent RPS based on SB 350 and the reductions in mobile source-related emissions due to fleet turnover and fuel efficiency improvements due to Pavley and ACC). Based on modeling performed for the project and incorporation of the above-mentioned mitigation measures, carbon offsets totaling 237,059 MT CO_2e/year would be required over the 30-year project life to meet the zero net commitment. This translates to ~~7,026,846~~ 7,026,845 MT CO_2e in total carbon offsets required. Technical Report Appendix K contained in Draft AEA Appendix 1 includes detailed calculations of the remaining net operational emissions over the project's operational life of 30 years, and the relationship to the proposed residential and commercial land uses and the offset ratios identified in MM 2-13. This estimate of offsets is conservative in that it likely overstates the amount of GHG emissions that would need to be offset because additional regulatory programs and technology will likely be developed in the future under new state mandates, which will reduce the actual GHG emissions associated with the project at buildout.

Table 2.3-5 shows project emissions for each source after implementation of Mitigation Measures. The Sub-Total emissions value remaining after implementation of Mitigation Measures 2-1 through 2-12 represents the amount that would need to be offset through implementation of Mitigation Measure 2-13 to meet the zero net emissions commitment for the project.

Table 2.3-5 Summary of Annual Greenhouse Gas Emissions at Full Buildout

Emissions Activity	Emissions (MT CO_2e/year)		
	Existing	Unmitigated	Post Mitigation
Mobile Sources	152	403,814	202,011
Electricity[1]	–	39,393	-4,880[2]
Natural Gas[1]	–	43,386	8,192
Area Sources	7,883	367	367
Water Consumption and Wastewater Treatment	2,987	8,190	8,190
Solid Waste Generation	–	23,179	23,179
Vegetation Removal	–	1,335	0
Construction	–	6,437	0
Sub-Total Annual Emissions	11,021	526,103	237,059
MM 2-13 GHG Reductions			-237,059
Total Annual Emissions[2]			0[3]

Notes: MT CO_2e/year=metric tons of carbon dioxide equivalent per year; MM=mitigation measure; TDV = Time Dependent Valuation; CEC=California Energy Commission; ZNE = zero net energy

[1] Unmitigated electricity and natural gas emissions are split based on the CalEEMod output and the swimming pool calculation. The ZNE mitigation measures are split by assuming 78% of the mitigation offsets electricity and 22% offsets natural gas, consistent with actual emissions reductions. The off-site building retrofits are split assuming 50% electricity and 50 % natural gas. Refer to Technical Report Section 2.3.2 and Tables 2-13a through 2-14b of Draft AEA Appendix 1 for more detailed assumptions.

[2] Emissions reductions from direct and indirect energy consumption appear as a negative to represent TDV energy savings from use of photovoltaics combined with variations in natural gas pricing consistent with CEC's TDV model to achieve ZNE. Refer to Technical Report Tables 4-1a through 4-2d and Appendix J of Draft AEA Appendix 1 for more detail.

[3] Summarized emissions by sector are rounded to the nearest whole number; however, total emissions reflect the sum of exact emissions levels.

Source: Modeling conducted by Ramboll Environ in 2016. See Draft AEA Appendix 1 for detailed calculations.

Significance after Mitigation

Adoption and implementation of Mitigation Measure 2-1 through 2-13 would reduce mobile source-, electricity-, natural gas-, vegetation removal-, and construction-related emissions by 526,103 MT CO_2e/year (see Tables 2.3-2, 2.3-3, and 2.3-4). These measures reduce the projected unmitigated GHG emissions levels of the project (unmitigated emissions of 526,103 MT CO_2e/year above existing conditions) that would otherwise occur on the project site, leading to no net contributions of GHG emissions from the project, or zero net emissions. Because the project would result in no net increase of GHG emissions after implementation of mitigation measures, there would be no contribution of GHG emissions to cumulative GHG emissions influencing global climate change.

In addition, because the project would result in no net increase of GHG emissions, it would not conflict with any plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. The state, and by extension regional and local climate policy is rooted in achieving emissions level below the reference year of 1990 and is based on levels established by scientific evidence to avoid the most adverse impacts of climate change. Therefore, relevant plans, such as ARB's Scoping Plan, SCAG's RTP/SCS, and Los Angeles County's CCAP, all establish non-zero targets (i.e., some level of positive net emissions above existing conditions for land developments to accommodate planned growth) to achieve future GHG emissions targets. By achieving the project applicant's commitment to reach zero net emissions, the feasibility and reliability of which has been demonstrated in the analysis above, the project would lead to no net increase in GHG emissions and would not, therefore, result in any adverse change that could conflict with any relevant plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

In response to public comments, the following supplemental commitment is proposed by the project applicant:

Project Applicant-Proposed Supplemental Commitment

In addition to the installation of EV charging stations required by Mitigation Measures 2-5 and 2-12, and although not required for the project to achieve net zero GHG emissions, the project applicant or its designee shall provide Los Angeles County with proof of installation of EV charging stations prior to the issuance of residential and commercial building permits per the following ratios: one (1) parking space shall be served by an electric vehicle charging station for every 50 dwelling units, and one (1) parking space shall be served by an electric vehicle charging station for every 15,900 square feet of commercial development. ("Commercial development" includes retail, light industrial, office, hotel and mixed-use buildings.) EV charging stations capable of servicing 1,010 parking spaces would be required if the maximum allowable development facilitated by the RMDP/SCP project occurs; fewer EV charging stations would be required if maximum build-out under the RMDP/SCP project does not occur.

The EV charging stations shall achieve a similar or better functionality as a Level 2 charging station and may service one or more parking spaces. In the event that the installed charging stations use functionality/technology other than Level 2 charging stations, the parameters of the mitigation obligation (i.e., number of parking spaces served by EV charging stations) shall reflect the comparative equivalency of Level 2 charging stations to the installed charging stations on the basis of average charge rate per hour. For purposes of this equivalency demonstration, Level 2 charging stations shall be assumed to provide charging capabilities of 25 range-miles per hour.

The EV charging stations shall be located either on the project site or within the jurisdictional area of the Southern California Association of Governments. The EV charging stations shall be in areas that are generally accessible to the public, such as areas that include, but are not limited to, retail centers, employment centers and office complexes, recreational facilities, schools, and other categories of public facilities.

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2.2 UNARMORED THREESPINE STICKLEBACK

Section 2.2, Unarmored Threespine Stickleback, was originally published as Chapter 3 of the Draft AEA. It is presented in its entirety in this section of the Final AEA with all updates and changes occurring since the publication of the Draft AEA. Section numbering and subheading levels have been adjusted herein to align with the organization of the Final AEA; however, table and figure numbers, impact conclusion numbers, and mitigation measure numbers remains the same as published in the Draft AEA to keep them identical for ease of cross comparisons.

In response to the California Supreme Court (Court) decision, modifications have been proposed by the project applicant to the Newhall Ranch Resource Management and Development Plan (RMDP)/Spineflower Conservation Plan (SCP), which together constitute the project addressed in this Additional Environmental Analysis (AEA). The modifications were proposed to avoid impacts to unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*). This section analyzes the impacts to the unarmored threespine stickleback that may result from the proposed modified design and construction methods for the project's bridges and bank stabilization features. Specifically, this analysis considers (1) whether previously identified significant adverse impacts would be avoided, precluding the need for mitigation measures that the Court found to be unlawful, and (2) whether new significant environmental impacts or a substantial increase in the severity of previously identified significant impacts to unarmored threespine stickleback would occur. Impacts of other project components and impacts to all other biological resources were evaluated in the environmental impact report (EIR) for the RMDP/SCP, which was certified by the California Department of Fish and Wildlife (CDFW) in 2010 (2010 Final EIR; State Clearing House [SCH] No. 2000011025; USACE 2010) and conclusions were upheld by the court decision; therefore, they are not reevaluated in this section.

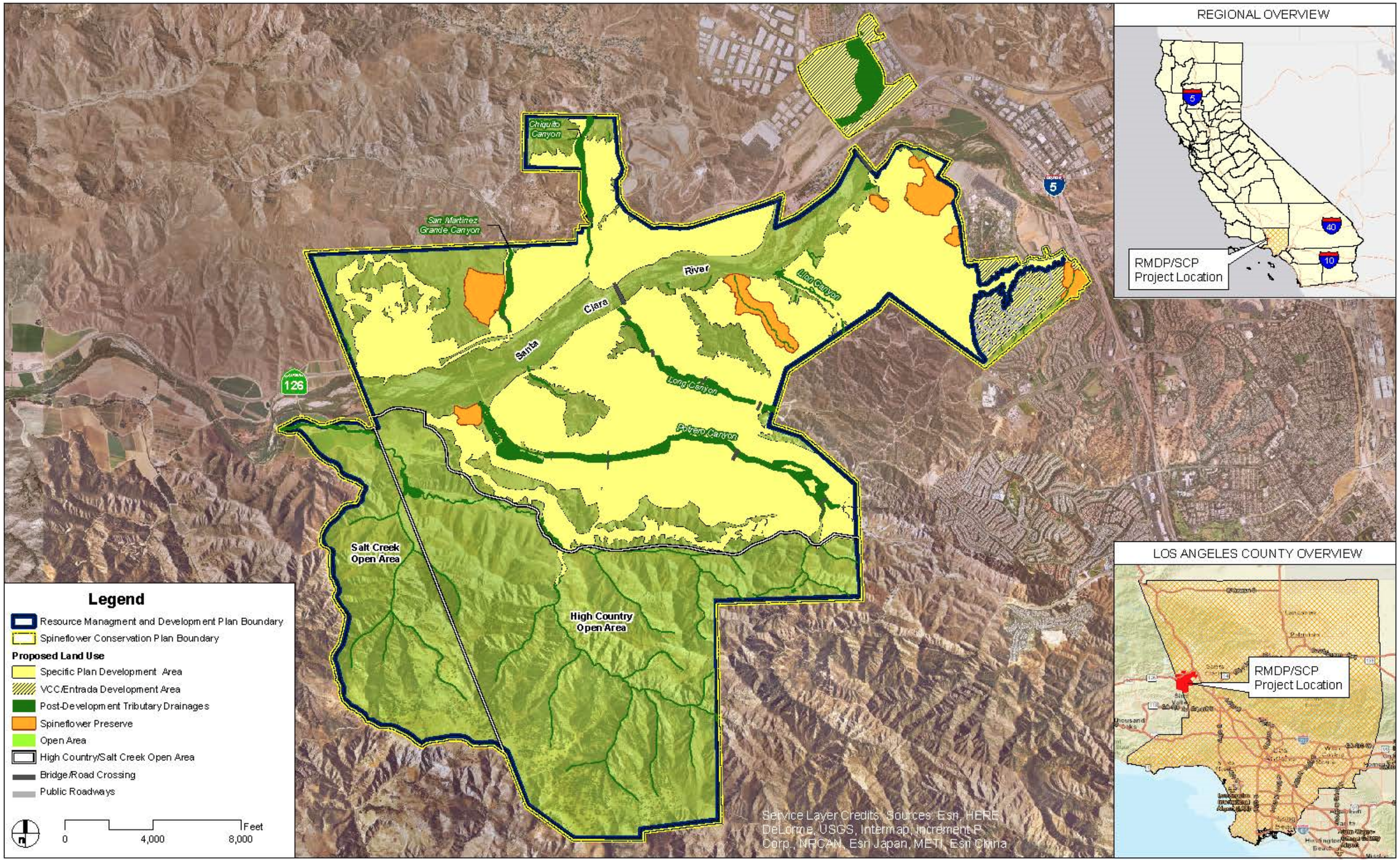
Importantly, with the project applicant's proposed modifications to the previously approved project, CDFW has considered whether the modifications might cause new significant or more severe significant environmental effects generally, as compared to the effects analyzed and disclosed in the 2010 Final EIR. No such effects would occur, however, but for the potential effects to unarmored threespine stickleback, other fish and wildlife, and their habitats discussed below. No new significant or more severe significant effects to other resources would occur, because of the limited nature of the modifications to the project that eliminate the need for the two mitigation measures (BIO-44 and BIO-46) that were the focus of the California Supreme Court decision. The proposed project modifications at issue are described below in Section 3.3.2, Description of Project Modifications Since the 2010 Final EIR.

2.2.1 Environmental Setting Relevant to Unarmored Threespine Stickleback

PROJECT ENVIRONMENTAL SETTING

The project is a conservation, mitigation, and permitting plan for the long-term management of special-status biological resources within the 11,999-acre Newhall Ranch Specific Plan (Specific Plan) area. The project would consist of development-related infrastructure needed to implement the approved Specific Plan. The project infrastructure is composed of flood control features, bridges, stream bank stabilization, drainage facilities, roads, building pads, utility corridors, pipeline and utility river crossings, nature trails, the discharge outfall for the previously approved Newhall Ranch Water Reclamation Plant (WRP), and drainage facility maintenance activities.

The 13,651-acre project area is located in the Santa Clara River Valley in unincorporated northwestern Los Angeles County and northeastern Ventura County (Figure 3.1-1). The boundary of the RMDP/SCP (i.e., the project area) includes the previously approved Newhall Ranch Specific Plan area, plus the land occupied by Specific Plan-related traffic/utility infrastructure and the related Salt Creek conservation corridor in Ventura



Source: Hunsaker 2010/PACE 2010

Figure 3.1-1 Newhall Ranch RMDP/SCP and Boundaries

County, adjacent to the Specific Plan. The project area lies west of Interstate 5 (I-5) and largely southwest of the junction of I-5 and State Route 126 (SR-126), with portions of the project area located in the San Martinez Grande and Chiquito canyons north of SR-126. Elevations range from 825 feet above mean sea level (AMSL) in the Santa Clara River bottom at the Los Angeles County/Ventura County line to approximately 3,200 feet AMSL on the ridgeline of the Santa Susana Mountains along the southern boundary.

In a regional context, the City of Santa Clarita is located to the east of the project area, and the Los Angeles County/Ventura County jurisdictional boundary line is to the west. This region and much of the proposed RMDP project area is located in a broad ecological and biogeographic transition zone for the coastal and mountain ecoregions. This alluvial valley also provides access via the Santa Clara River to the edges of the Mojave Desert and the foothills of the San Gabriel Mountains. While much of the region has been subject to urbanization, agricultural cultivation and oil development, large areas of open space, and natural lands border the region. The Los Padres National Forest is located to the north of the project area and the Angeles National Forest lies to the north and east. The Santa Susana Mountains, a region of gently rolling hills and sharp, steep walled canyons, border the project area to the south.

The biological resources that occur in the project area are adapted to a Mediterranean climate characterized by cool, wet winters and hot, dry summers. Rainfall occurs primarily between October and March, with the heaviest rainfall occurring in mountainous regions in the Angeles and Los Padres National Forests. According to the Piru-2 ESE weather station in Los Angeles County, the mean annual rainfall for the region is 17.98 inches of rain per year (Western Regional Climate Center 2016); however, some sections of the planning area remain in the rain shadow of the Santa Susana Mountains and receive considerably less rainfall than areas north of the Santa Clara River.

On a more local scale, the Santa Clara River corridor is considered an important habitat linkage, and the area supports numerous state and federally listed species, including least Bell's vireo (*Vireo bellii pusillus*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), southwestern willow flycatcher (*Empidonax traillii extimus*), and unarmored threespine stickleback. Maintenance of habitat quality and wetland functions and services of the Santa Clara River corridor is considered important for species in the region.

HYDROLOGICAL CONDITIONS IN THE SANTA CLARA RIVER

The Santa Clara River originates near Acton in Soledad Canyon in the San Gabriel Mountains and empties into the Pacific Ocean near Ventura, about 84 miles from its origin. Ninety percent of the watershed consists of mountainous terrain with steep, rocky ridges, and deep canyons. Only 10 percent of the watershed consists of narrow alluvial valleys. The project area is within a gently sloping alluvial valley that extends downstream from Castaic Creek to the Los Angeles County/Ventura County line.

The Santa Clara River flows through the northern portion of the project area, and is perennial within the river reach in the project area ("project reach"). Tributaries in the project area are ephemeral or intermittent. An ephemeral stream is a stream that flows in direct response to and only during and shortly after precipitation events. Ephemeral streams may or may not have a well-defined channel. Their beds are always above the elevation of the water table, and stormwater runoff is their primary source of water. An intermittent stream is a stream that flows only at certain times of the year when it receives water from springs, groundwater, or rainfall, or from surface sources such as melting snow. The exceptions are (i) a small portion of Salt Creek Canyon, (ii) the lower portion of Potrero Canyon, and (iii) Ayres Canyon, which are perennial. Aquatic habitat in the tributaries is not adequate to support unarmored threespine stickleback and, as a result, no unarmored threespine stickleback reside in these drainages (ENTRIX 2007, 2010). Stream flow in the project area is often debris laden during storm events because of intense rainfall patterns, relatively impervious soil types in the upper watershed, sparse vegetation in the upper watershed, possible denudation by fires, and steep gradients.

The mean annual precipitation for the Santa Clara River watershed ranges from 16 inches in the valley areas to approximately 36 inches in the mountains. Three types of storms produce precipitation in the watershed: winter storms, infrequent summer storms, and local isolated storms. Winter storms occur generally from December through March and contribute the greatest amount of rainfall. They originate over the Pacific

Ocean due to interaction between polar Pacific and tropical Pacific air masses that move eastward across California. These storms may last several days and respond greatly to changes in topography.

Summer storms are infrequent and usually associated with late-summer cyclones, producing very little precipitation. Local storms can occur at any time of the year. These storms often are accompanied by lightning and thunder. They affect only small areas, but can result in significant precipitation.

Natural Streamflow

During most of the year, the Santa Clara River experiences only negligible increases in streamflow due to natural precipitation, except during or immediately after relatively moderate to heavy storms. Streamflow increases rapidly in response to effective rainfall. Effective rainfall is the component of the storm hyetograph (depicts precipitation over time) and hydrograph (describe peak runoff over time), which is neither retained on the land surface nor which infiltrates into the soil. The effective rainfall produces overland flow that results in run off into the river. Streamflow abruptly drops after storm events due to percolation losses in the alluvial channels. Extreme runoff events are generally produced by intense rainfall over a relatively short period of time. Melting snow in the upper watershed has very little influence on streamflow.

Flows in the Santa Clara River also can be affected by groundwater dewatering operations or by stream diversions. Throughout the Santa Clara River channel, complex surface water/groundwater interactions cause some reaches of the river to move underground only to resurface at another location. In particular, downstream of the Los Angeles County/Ventura County line, the Santa Clara River flows into the Piru groundwater basin, which forms a natural “dry gap” where dry-season streamflow is lost to groundwater.

As with most southern California streams, flows in the Santa Clara River are highly episodic. For the gauged period between 1953 and 1996, annual flow at the Los Angeles County/Ventura County line gauge ranged between 253,000 acre-feet (1969) and 561 acre-feet (1961). Data after 1996 is not available because the gauging station at this location was discontinued. Annual peak flow rates at the County line between 1953 and 1996 ranged from 68,800 cubic feet per second (cfs) (1969) to 109 cfs (1960). The second highest annual peak flow rate, 32,000 cfs in 1966, was less than half of the highest peak (68,800 cfs in 1969).

Artificial Streamflow

Artificial surface water input and interrupted streamflow in the project area is derived from three sources: (i) runoff from irrigated agricultural fields (croplands) and upstream urban areas; (ii) discharges of tertiary-treated effluent from two existing upstream water reclamation plants; and (iii) releases from Castaic Lake.

Irrigated agricultural land occurs north of the Santa Clara River upstream of the project area near Six Flags Magic Mountain (amusement park) and on the north and south side of the Santa Clara River within the project area. The amount and seasonality of cropland runoff are variable. As cropland is converted to urban uses, discharges from agricultural irrigation operations will decrease.

Two existing regional water reclamation plants occur upstream of the project area and are operated by the County Sanitation Districts of Los Angeles County (Districts). These plants discharge tertiary-treated wastewater to the Santa Clara River, and are interconnected to provide operational flexibility. The Saugus WRP outfall for treated effluent is located near Bouquet Canyon Road Bridge on the Santa Clara River. The Saugus WRP produces on average 5 million gallons per day (mgd) of effluent that is discharged to the river. It contributes to perennial flows from the outfall to approximately I-5. The current plant capacity is 6.5 mgd. The Valencia WRP outfall is located immediately downstream of the I-5 bridge. The Valencia WRP produces on average 13-15 mgd of treated effluent and has a capacity of 21.6 mgd. The plant discharge also creates perennial flow that extends from the outfall to the confluence of the Santa Clara River with Castaic Creek and downstream.

Castaic Lake is a terminal dam/reservoir of the State Water Project (SWP) and is operated by the California Department of Water Resources (DWR). Local storms that generate surface flows captured by Castaic dam/reservoir are released to Castaic Creek in accordance with agreements between DWR and downstream

water users. By agreement, DWR releases water from the reservoir to Castaic Creek at a discharge rate up to a maximum of 100 cfs.

During the dry season (defined for this project as June 1 through September 30), Santa Clara River flows through the project reach at an approximate maximum of 500 cfs (Geosyntec 2016.) During the early portion of the dry season (June-July), releases from Castaic Dam may cause slightly higher flows while during the later dry season (August-September), rain events account for the heavier flow range.

Wetted Channel

The wetted channel is the portion of a stream channel that is covered in water at any given time. The width of the wetted channel fluctuates with hydrologic changes (i.e., season to season). The bankfull flow is a discharge that fills the active channel to a stage above which any further increase in depth results in a rapid increase in width as flow spreads across the channel. The Santa Clara River has a broad, alluvial channel and floodplain. During the dry season, when the river experiences low flows, the wetted channel is restricted to a relatively narrow course along the lowest profile alignment within the bankfull channel.

The highest estimated, dry-season flow is approximately 500 cfs. For this hydrologic condition, the width of the wetted channel in the location of the two permanent bridges proposed in the project area varies from approximately 90 feet to 125 feet (PACE 2016a). Because 500 cfs represents the highest expected flow during the dry season, this condition is used as a design criterion to describe “wetted channel” for determining the placement of bridge piers. Based on the geometry and gradient of the Santa Clara River in these locations, the approximate 500 cfs peak flow would result in an inundated area less than 165 feet in width at the location of the proposed bridge crossings (PACE 2016a, p. 1.). This is important because the proposed modified bridge design and construction methods contemplate bridge piers placed at a minimum of 165 feet apart, which would span the wetted channel at these locations during this highest dry-season flow condition.

UNARMORED THREESPINE STICKLEBACK IN THE PROJECT AREA

Life History

Although historically widespread throughout the Los Angeles basin, the unarmored threespine stickleback is currently found in few locations, all of which are located outside of the Los Angeles River basin (Swift et al. 1993). The predominant location is the upper Santa Clara River above the “dry gap” in the river (CDFG 2005; USFWS 2009). The unarmored threespine stickleback does not occur in any tributary drainages affected by the project, including the tributary drainages of the Santa Clara River, because: (i) survey results indicate limited amounts of aquatic habitat were present in 10 of the 23 tributary drainages within the Newhall Ranch RMDP area; and (ii) the remaining tributaries consist of dry, ephemeral drainages with no observable aquatic habitat or potential aquatic habitat (ENTRIX 2007; ICF International 2016a). The unarmored threespine stickleback is known to periodically occupy the project reach of the river (Figure 3.1-2).

The project reach includes the mainstem of the Santa Clara River from Salt Canyon to Potrero Canyon (Reach A), Potrero Canyon to Chiquito Canyon (Reach B), Chiquito Canyon to Middle Canyon (Reach C), Middle Canyon to the Valencia WRP (Reach D), and the Valencia WRP to Old Road Bridge (Reach E), and associated tributary drainages. This reach represents the downstream demarcation of the unarmored threespine stickleback (USFWS 2009). Habitat conditions in these reaches are described in the following section.

The unarmored threespine stickleback is a small territorial fish, approximately 2 inches in length. Unarmored threespine stickleback prefers slow-moving and standing water, usually shaded by dense and abundant vegetation. In more open reaches, algal mats or instream structures such as boulders or large woody debris provide refuge for the species. Similar to other threespine stickleback species, male unarmored threespine sticklebacks build a nest in slow-moving water, by gluing together bits of vegetation, such as grass and sticks, using a kidney-secreted protein, and will vigorously defend the established nest territory. Unarmored threespine stickleback may breed throughout the year, with less breeding occurring from October to January (USFWS 2009). Typically, unarmored threespine stickleback breed in spring to early summer and they are

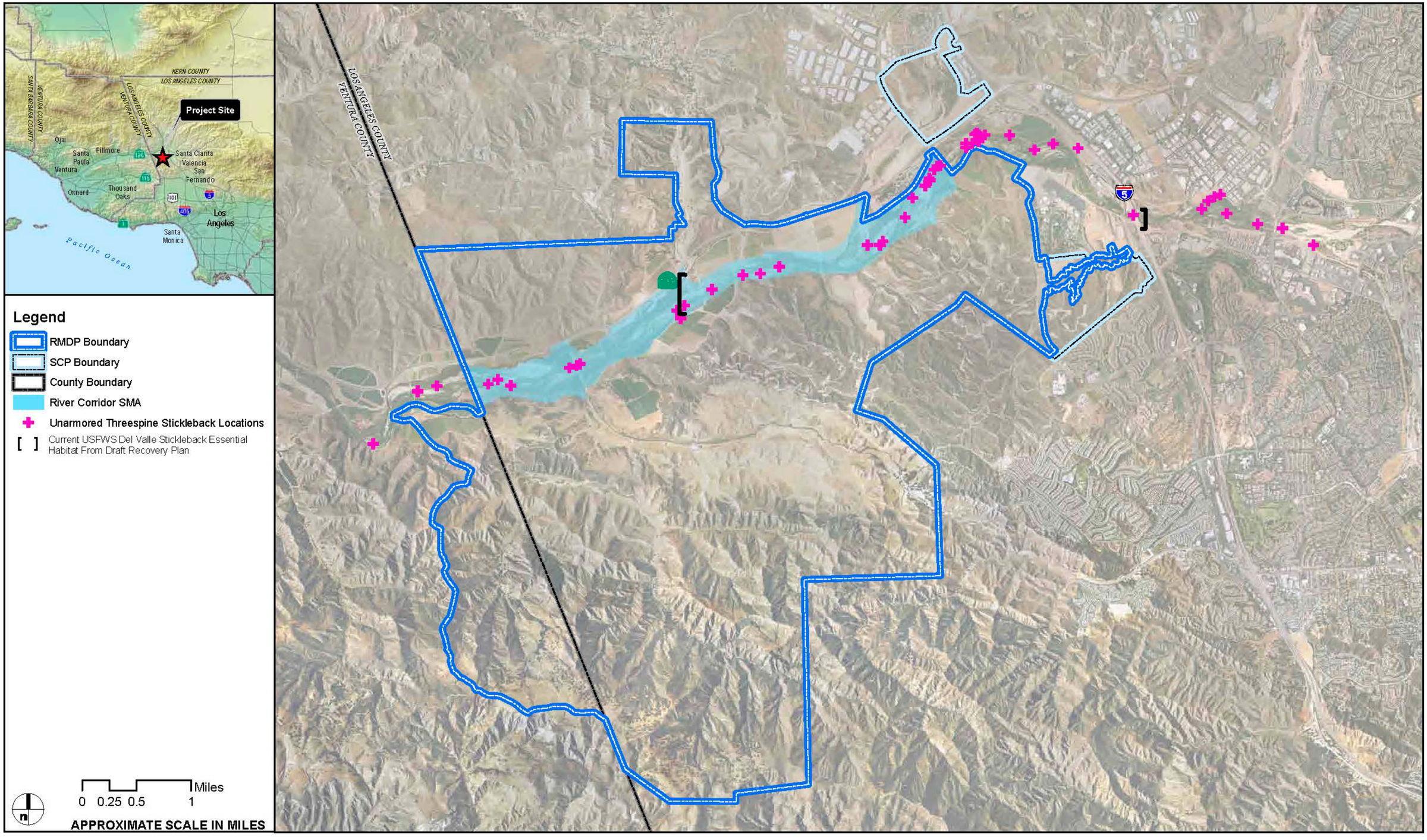
not likely to have eggs in August and September (Tim Hovey, pers. comm., 2016). Unarmored threespine stickleback are not distributed uniformly throughout the rivers in which they occur and breeding habitat is patchily distributed (USFWS 2009). The amount of suitable breeding habitat may be a limiting factor in the population of the unarmored threespine stickleback (USFWS 2009). The unarmored threespine stickleback lives for about one year, and few if any survive to breed again (USFWS 1985, 2009).

A study in a laboratory setting indicated that threespine stickleback can withstand flow velocities of less than or equal to 60 centimeters per second (cm/s), which equates to 2 feet per second (fps), provided a coarse substrate is present (Whoriskey and Wooton 1987, cited in ENTRIX 2010). When flow velocities exceed these parameters, or if no coarse substrate or instream structure is present, unarmored threespine stickleback will likely be washed downstream (ENTRIX 2010). Based on this study, the unarmored threespine stickleback in the Santa Clara River require flood refugia velocities of 2 fps or less in order to avoid being washed downstream in flood events. During flood events, areas maintaining velocities of less than or equal 2 fps would function as the preferred refuge during storm events. Such refugia are important given most of the Santa Clara River and its adjacent floodplain contain flows greater than 2 fps during flood events.

Habitat Conditions and Survey Results

ENTRIX (2010) conducted surveys for the unarmored threespine stickleback in 2004 and 2005 within the project reach and upstream reaches of the Santa Clara River to determine (i) presence/absence of habitat suitable for unarmored threespine stickleback, and (ii) presence/absence of unarmored threespine stickleback individuals. The surveys targeted habitat attributes between Salt Creek Canyon and the Old Road Bridge, and recorded habitat type, length and mean width, mean and maximum depth, substrate composition, water and air temperature, and percent edgewater vegetation. Edgewater generally consists of shallow, low velocity areas found along the margins of the Santa Clara River. The vegetation in the edgewater is an important habitat feature utilized by unarmored threespine stickleback for cover, feeding, spawning, and velocity refuge (ENTRIX 2010). Based on the surveys, ENTRIX (2010) made the following findings:

> **Reach A** of the Santa Clara River, between Salt Canyon and Potrero Canyon, consists of a broad, flat sandy floodplain with minimal riparian vegetation. The general mesohabitat structure primarily was composed of riffles and runs with no pools. According to surveys conducted in September 2005, unarmored threespine stickleback habitat was minimally present in this reach due to a lack of pools, backwater habitats, and the presence of high velocity flows over newly deposited substrate. Edgewater vegetation, preferred by unarmored threespine stickleback, exists throughout this reach and will become increasingly lush over time notwithstanding episodic flood and scour events. No unarmored threespine stickleback were observed in this reach during the September 2005 surveys, but a number of individuals were observed during surveys conducted in June 2002.
>
> **Reach B** of the Santa Clara River, between Potrero Canyon and Chiquito Canyon, is similar to Reach A in its physical channel structure and habitat composition. Minimal unarmored threespine stickleback habitat exists in this reach because of a lack of pools, backwater habitats, and the presence of high velocity flows over newly deposited substrate. Edgewater vegetation, preferred by stickleback, was present throughout the reach and will become increasingly lush over time notwithstanding episodic flood and scour events. No unarmored threespine stickleback were observed in this reach during September 2005 surveys, but a number of individuals were observed during surveys conducted in June 2002.
>
> **Reach C** of the Santa Clara River, which runs from Chiquito Canyon to Middle Canyon, is similar to Reaches A and B in terms of physical channel structure and habitat composition. Edgewater vegetation, preferred by stickleback, was present throughout the reach and will become increasingly lush over time notwithstanding episodic flood and scour events. No unarmored threespine stickleback were observed in this reach during September 2005 surveys, but a number of individuals were observed during surveys conducted in June 2002.



Aerial Source: DigitalGlobe 2007

Figure 3.1-2 Habitat for Unarmored Threespine Stickleback in the Project Area

Reach D of the Santa Clara River, between Middle Canyon and the Valencia Water Treatment Plant, includes areas upstream and outside of the RMDP project area but has been surveyed to determine the presence/absence of unarmored threespine stickleback. Reach D differs from the other three reaches in terms of habitat and substrate composition. This reach retained some vegetation as well as associated pool habitats following the flood events in 2004 and 2005. Although sand is the dominant substrate type, gravel and cobble substrate are prominent as well. Surveys conducted in September 2005 noted that the channel bed had been destabilized by recent sediment depositions, resulting in large sandy runs, although a few pools and riffles were still evident. Flow velocities are fast in the riffle and run habitats, which are not preferred by unarmored threespine stickleback. Edgewater vegetation exists throughout this reach but there is a lack of backwater habitat preferred by unarmored threespine stickleback. Edgewater vegetation, preferred by unarmored threespine stickleback, was present throughout the reach and will become increasingly lush over time notwithstanding episodic flood and scour events. No unarmored threespine stickleback were observed in this reach during September 2005 surveys, but a number of individuals were observed during surveys conducted in May 2000 and June 2002.

Near Reach D is a spring-fed channel commonly referred to as "the refuge." This area was surveyed in 2005 as well. During the surveys, a number of young unarmored threespine stickleback were observed. This observation was consistent with other records showing that this spring-fed wetland has historically provided unarmored threespine stickleback refugia from high flow events. Like Reach D, "the refuge" is upstream of the Commerce Center Drive bridge and outside the project area.

Reach E of the Santa Clara River, between the Valencia WRP and the Old Road Bridge, is upstream of and outside the project area. Flow in this reach is considerably less than the downstream reaches due to its location upstream of the Valencia WRP effluent. Surveys conducted in September 2005 indicated that riparian vegetation in this reach had been largely carried away by the 2004-2005 flood events. The general habitat structure in this reach consist of riffles and runs, with no pools. Aquatic habitat for unarmored threespine stickleback is fair due to the presence of low velocity flow and some edgewater vegetation. Nevertheless, a lack of pool and backwater habitats limit the reach's value to unarmored threespine stickleback, which likely explains why no unarmored threespine stickleback were observed in this area during the September 2005 surveys. Note, however, that surveys conducted in 2000 did record the presence of unarmored threespine stickleback in this reach.

Conclusions from 2010

ENTRIX 2010 showed that the presence of unarmored threespine stickleback is variable (ranging from rare or absent in certain reaches of the river, to locally abundant in any given year) in the project reach. These survey results are consistent with those from other surveys conducted between 1988 and 2002, all of which reported observations of unarmored threespine stickleback in different reaches of the Santa Clara River (Haglund 1989; San Marino Environmental Associates 1995; Aquatic Consulting Services 2002a, 2002b, 2002c, 2002d; Impact Sciences 2003a, 2003b, 2003c). For this reason, the 2010 Final EIR assumed unarmored threespine stickleback was present at all pertinent locations (i.e., where project-related impacts might occur) within the project reach of the Santa Clara River.

Additional Surveys and Conclusions in 2014 and 2015

Biologists have continued to survey the Santa Clara River for aquatic species, including unarmored threespine stickleback. Surveys specifically for unarmored threespine stickleback were conducted on the Santa Clara River on August 19, September 4, and September 5, 2014 and other aquatic surveys were conducted on multiple dates from June 27 to September 1, 2015 (ICF International 2016a).

The survey area for focused unarmored threespine stickleback surveys included the mainstem Santa Clara River from near Salt Canyon to near Castaic Junction, approximately 1.5 miles downstream of the Valencia WRP. The survey area covered a total distance of approximately six river miles. River reaches within the survey area were delineated based on those identified in the previous fish and habitat surveys conducted by ENTRIX in 2005 (ENTRIX 2010).

Within each reach, the biologist conducted pedestrian surveys of the wetted channel from downstream to upstream to assess habitat availability and quality for fish. Each survey included a general, qualitative habitat characterization of each reach, including estimated stream gradient, water depths, riparian canopy cover and composition, and habitat unit types present.

Detailed habitat characteristics (habitat type, habitat length, and substrate composition) were recorded for a subset of the habitat units encountered at fairly regular intervals, and also for areas containing special-status species or other notable points of interest (e.g., suitable habitat for unarmored threespine stickleback, areas with large concentrations of exotic species). Habitat units typically consisted of one habitat type and were delineated by transitions between habitat types (i.e., from riffle to pool). At each of the subsampled habitat units, biologists snorkeled to visually identify and enumerate fish and aquatic vertebrate species. Photographs were taken of each subsampled habitat unit and of additional notable habitat or species locations. Water and air temperatures were recorded at the start and end of each survey using a handheld thermometer.

In addition, in August 2015, CDFW surveyed for unarmored threespine stickleback habitat at a reconnaissance level in the Santa Clara River, from the Old Road downstream to just below the Valencia WRP discharge. This survey was upstream of the project area.

During the 2014 and 2015 surveys, no unarmored threespine stickleback or other species native to the Santa Clara River were observed in the project area. During the habitat surveys, CDFW observed unarmored threespine stickleback between the Old Road Bridge and the Valencia WRP discharge, upstream of the project area in August 2015. Unarmored threespine stickleback were numerous in this reach and were represented by all size classes (Tim Hovey, pers. comm., 2015). Santa Ana sucker and arroyo chub were also observed.

For this analysis, unarmored threespine stickleback is expected to be present throughout the project reach of the Santa Clara River, because it has been observed in other nearby reaches.

2.2.2 Regulatory Setting

The unarmored threespine stickleback is listed as an endangered species under the federal Endangered Species Act (ESA) and California Endangered Species Act (CESA).

The unarmored threespine stickleback is also designated as fully protected under Fish and Game Code section 5515(b)(9).

Although the federal ESA and CESA provide for the “incidental take” of endangered species (see ESA Section 10 and Fish and Game Code section 2081), Fish and Game Code section 5515(a) prohibits the take and possession of fully protected species, except in limited circumstances not relevant here. “Take” as defined by state law means hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill (Fish and Game Code section 86). Under the state definition “harm” and “harass” are not take as they are under the federal ESA. Exceptions under state law to the take and possession prohibition for fully protected species are quite limited, specifically including necessary scientific research, under the Natural Community Conservation Planning Act (Fish and Game Code section 2800 et seq.), and in other circumstances unrelated to the project at hand. (See generally Fish and Game Code sections 5515(a), 2835.) Importantly absent an exception under all of the fully protected provisions in the Fish and Game Code, no other section of the code or any other law shall be construed to authorize the issuance of a permit or license to take a fully protected species and no previously issued permit or license shall be construed to that effect (Fish and Game Code section 5515(a)(1)).

2.2.3 Approach to Impact Analysis

SUMMARY OF IMPACTS IDENTIFIED IN 2010 FINAL EIR

The 2010 Final EIR disclosed, analyzed, and addressed Newhall Ranch RMDP infrastructure impacts to unarmored threespine stickleback and its habitat, including those resulting from installation and use of the two permanent bridges, temporary haul route bridges, and bank stabilization. Specifically, the 2010 Final EIR found that the project would result in three types of significant impacts to unarmored threespine stickleback absent mitigation: (i) impacts to individuals, (ii) temporary loss of suitable habitat, and (iii) secondary impacts to individuals and suitable habitat (2010 Final EIR, pp. 4.5-681-4.5-693).

For impacts to *individuals*, the 2010 Final EIR found that mitigation required by the Newhall Ranch Specific Plan Program EIR (County of Los Angeles 1996, 2003) and the additional mitigation measures in the 2010 Final EIR combined would reduce impacts to unarmored threespine stickleback individuals to less-than-significant levels. This mitigation contemplated temporary stream diversion channels, and USFWS collection and relocation of stranded stickleback, as described in mitigation measures BIO-44 and BIO-46.

For impacts to *habitat*, the 2010 Final EIR found that stickleback habitat would be temporarily affected by the construction of RMDP bridge piers and footings. These bridge elements were to be installed in the wetted channel of the Santa Clara River. To gain access to the riverbed, however, the river was to be diverted away from the construction zone. Because such stream diversion could result in the stranding of fish, including unarmored threespine stickleback, CDFW also adopted mitigation measures BIO-44 and BIO-46, whereby USFWS or its authorized agent could collect and relocate, if necessary, any stranded unarmored threespine stickleback.

As to *secondary impacts*, the 2010 Final EIR found that both the Specific Plan Program EIR mitigation (County of Los Angeles 1996, 2003) and the additional mitigation measures in the 2010 Final EIR would reduce to less than significant the identified secondary impacts on the unarmored threespine stickleback and its habitat. Secondary impacts from the RMDP infrastructure include short-term impacts resulting from changes to hydrology or water quality. Long-term secondary impacts include potential physical changes in the Santa Clara River, such as altered base and flood flows, biochemical changes, substrate and temperature alterations, vegetative changes (e.g., invasive plant species), increased human activity, and impacts from fecal material from pet, stray, and feral cats and dogs. These secondary impacts were considered significant absent mitigation. The 2010 Final EIR included mitigation measures that reduced the secondary impacts to a less than significant level and did not rely on mitigation measures BIO-44 or BIO-46 to reach this significance finding.

Mitigation measures BIO-44 and BIO-46 were found by the California Supreme Court to violate Fish and Game Code Section 5515. In response, the project applicant has modified the project designs and construction methods to eliminate the need for the two mitigation measures addressed by the Supreme Court, and to avoid and further reduce the potential for project-related impacts to unarmored threespine stickleback.

DESCRIPTION OF PROJECT MODIFICATIONS SINCE THE 2010 FINAL EIR

In response to the Supreme Court's decision, the project applicant proposes to avoid all construction-related contact with the wetted portion of Santa Clara River channel (defined in Section 3.1.2), to obviate the need for the previously adopted mitigation measures BIO-44 and BIO-46. To accomplish this, the construction methods for the bridges, temporary haul route bridges, and bank stabilization would be modified to avoid construction work in the wetted channel, and thereby eliminate the need for stream diversion, collection and relocation of unarmored threespine stickleback, and mitigation measures BIO-44 and BIO-46. Similarly, for the reasons stated above, the elements of BIO-45 and BIO-47 that specifically require temporary stream diversions or creation of slow-moving water habitats are no longer needed to avoid, minimize, and mitigate construction impacts to unarmored threespine stickleback or other special status species. Such

modifications would include placing limits on the seasonal timing of construction activities, so that work nearest the wetted channel would occur during the driest periods of the year. Project construction schedules would be based upon the potential for inundation due to proximity to the wetted channel. Those construction activities adjacent to the wetted channel, such as installation of a bridge pier, would have a shorter construction window than project facilities that are constructed farther away, such as the bank stabilization.

The proposed modified construction methods do not change the location, size, or proposed use of the two permanent bridges, the temporary haul route bridges, or the bank stabilization features. Rather, the modified design relocates the bridge piers farther from the lower flow channel and changes the construction methods to adjust the timing and construction techniques, so that no work takes place in the wetted channel of the Santa Clara River where unarmored threespine stickleback might be affected.

Modifications to Construction of Bridges and Bank Stabilization

Permanent Bridges at Commerce Center Drive and Long Canyon Road

Based on an evaluation of the modified bridge design and construction processes, it would be feasible for the construction associated with the proposed permanent bridges at Commerce Center Drive and Long Canyon Road to avoid contact with the wetted channel of the Santa Clara River for the highest estimated dry-season flow (500 cfs). The proposed modifications are summarized below. See Draft AEA Appendix 2 for detailed information about the construction methods.

To avoid contact with the wetted channel of the Santa Clara River during construction, the span between bridge piers would increase from the 100 feet distance analyzed in the 2010 Final EIR to a minimum of 165 feet over the wetted channel. Bridge piers are made up of the architectural support columns and below-grade piles that support the bridge deck. Bridge piers consist of a set of four columns with underlying piles placed in a row and interconnected, perpendicular to the bridge deck alignment (see Figures 3.2-1 and 3.2-2). The physical locations of bridge piers would be adjusted to confirm avoidance of the wetted channel conditions, as they would exist at the time of bridge construction (i.e., June 1 - September 30 dry-season period). Therefore, the bridge piers would be placed outside the wetted channel at the location of the proposed crossings and the bridge segment between the columns and piles would span across the entirety of the wetted channel, which would avoid water contact during construction. The length of each span would conform to the California Department of Transportation (Caltrans) Bridge Design Standards, the County of Los Angeles Department of Public Works geotechnical review requirements, and applicable seismic stability and operational safety standards. The minimum 165-foot span also would reduce the number of piers needed in the permanent bridge design from nine for each bridge, as described in the 2010 Final EIR, to seven for the Commerce Center Drive Bridge and six for the Long Canyon Road Bridge. A total of five bridge piers previously proposed for the two bridges would be eliminated. Because each bridge pier consists of four columns and below-grade piles placed in a row, elimination of five bridge piers would eliminate 20 columns and below-grade piles. Figures 3.2-1 and 3.2-2 show the modified bridge pier locations for the Commerce Center Drive Bridge and Long Canyon Road Bridge, respectively.

The work zone for the modified bridge designs would be the same as described in the 2010 Final EIR (100 feet upstream and 100 feet downstream of the bridge crossing location). It would require vegetation cutting and removal to facilitate bridge construction within the same areal extent as presented in the 2010 Final EIR. Clearing activities would be performed in a manner that equipment and all work would avoid the wetted channel. To facilitate access and provide level and safe work zones, minor surface disturbance to the dry riverbed would be required — primarily to create ramps between the terraces of the dry riverbed and existing farm areas, with some minor surface contouring, as necessary, to create safe, level work areas at bridge pier or false work locations. Figure 3.2-3 shows a representation of the bridge pier work area. All of these impacts, however, were part of the original bridge design contemplated and analyzed in the 2010 Final EIR. No new or more severe significant impacts caused by the proposed modified bridge construction methods would occur.

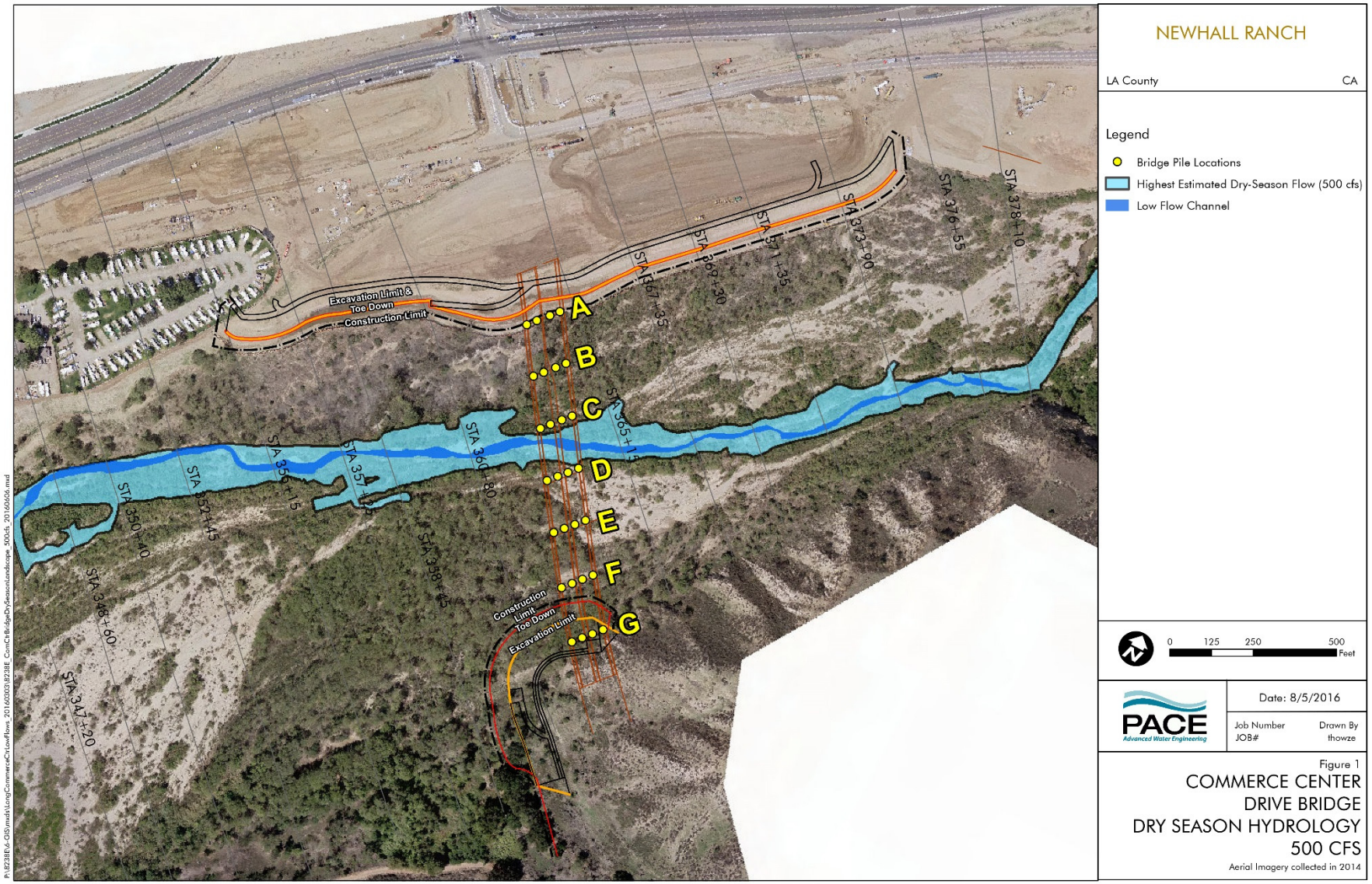


Figure 3.2-1 **Commerce Center Drive Bridge with Highest Dry-Season Flow (500 cfs)**

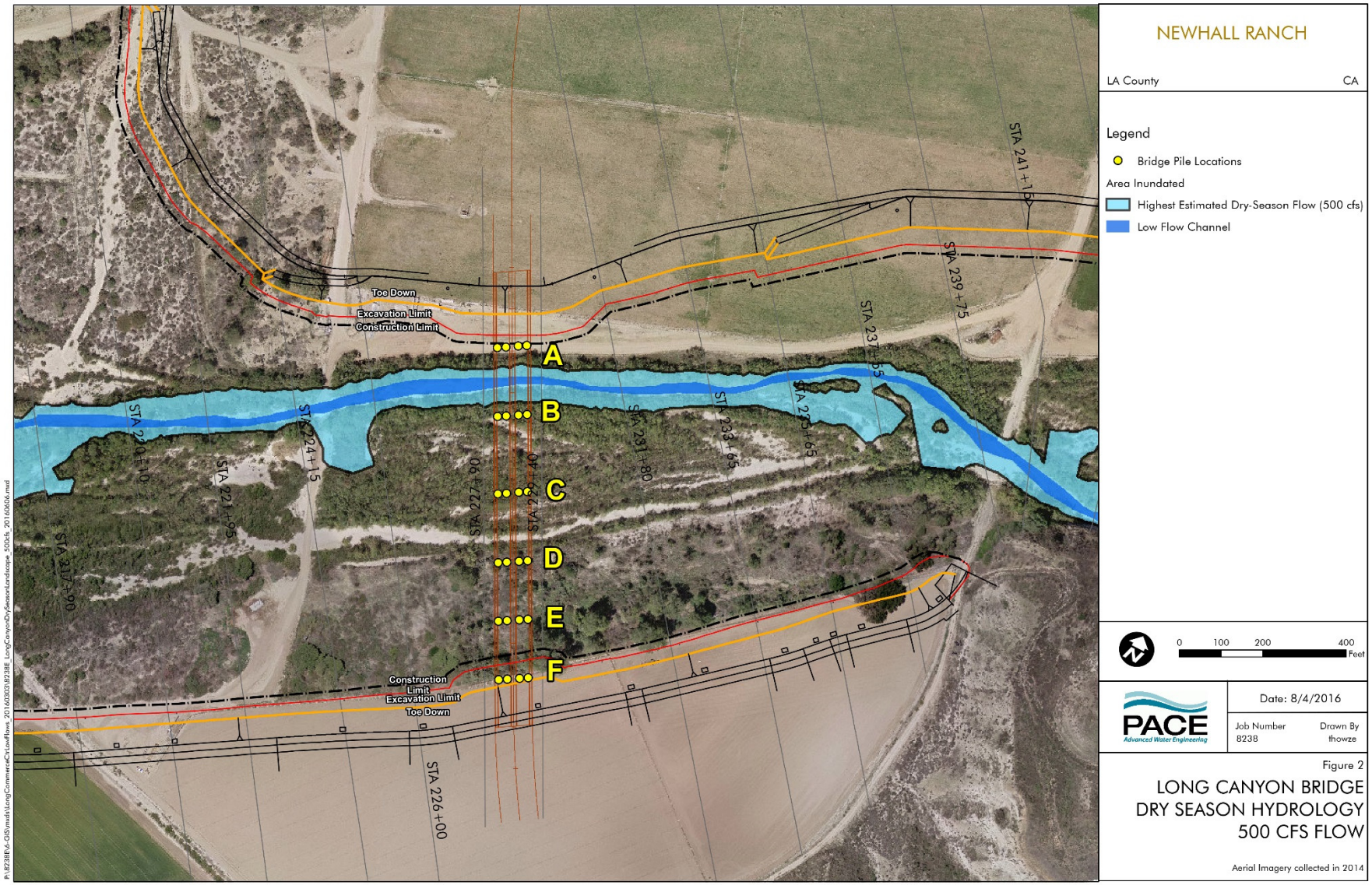


Figure 3.2-2 **Long Canyon Road Bridge with Highest Dry-Season Flow (500 cfs)**

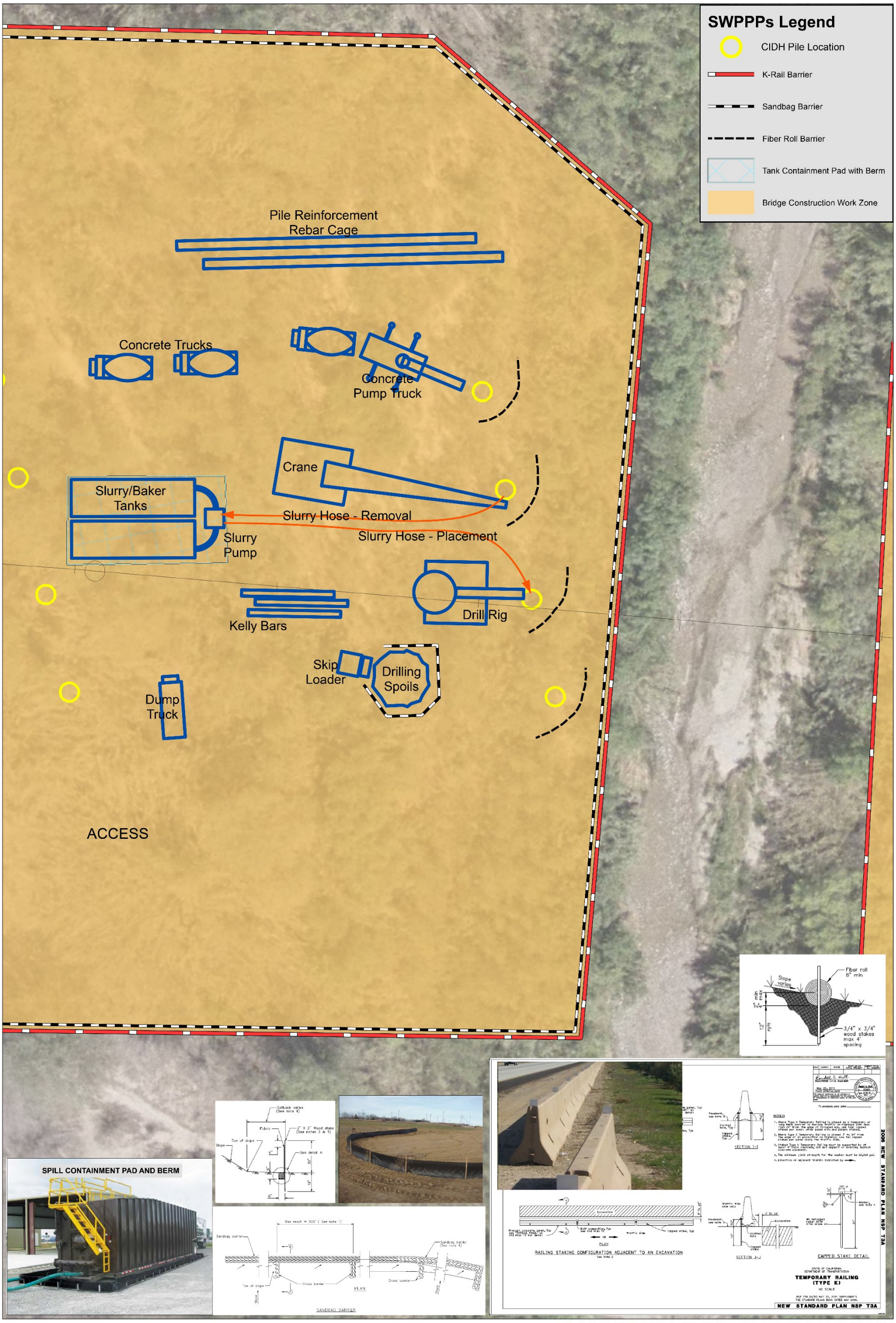


Figure 3.2-3 **CIDH Equipment Layout and Stormwater Pollution Prevention Plans Containment**

Moffatt & Nichol (2016a) describe modified construction methods where the Cast-in-Drilled-Hole (CIDH) pile supports and bridge columns (four of each collectively referred to as bridge piers) can be performed without contact with any portion of the wetted channel of the Santa Clara River (Draft AEA Appendix 2). The construction work area and equipment access would be located outside of the wetted channel such that no work in the wetted channel would be required. By also requiring that construction work take place only in the dry season, column and pile installation areas would not be inundated with river flows. This means no column and pile construction work would take place in locations, or during a time period, where fish could be present or become stranded in the construction work zone.

The CIDH piles support the bridge columns, girders, and deck. CIDH piles would begin with a boring or shaft augured to a depth necessary to ensure a competent foundation for the bridge super-structure. This shaft would then be fitted with a rebar cage and filled with concrete to form the CIDH support pile, upon which a column would be built using prefabricated forms. Further, protective barriers and spill containment devices would be deployed during CIDH construction to collect and retain any debris, spoils and drilling fluids, and to ensure construction equipment stays within the defined work zone and out of the wetted channel (PACE 2016a; Geosyntec 2016; Moffatt & Nichols 2016a; see Draft AEA Appendix 2).

The CIDH piles would be constructed using full-depth steel casing to address potentially unstable soil conditions from anticipated excavations in loose soils below the groundwater table. A steel casing would be installed to the full depth of the pile using an oscillator/rotator technique. The steel casing would be used to stabilize the drilled shaft during construction and to minimize the possibility of soil caving and geometric irregularities during concrete placement. After drilling is completed using the full-depth steel casing, a rebar cage is lowered into the boring and a pipe is lowered to the bottom of the hole. Concrete is then pumped to the bottom of the hole. As concrete fills the bore hole, the steel casing is raised, allowing the concrete to become in contact with the soil walls of the boring. Water displaced during the concrete filling of the boring would be collected from the steel casing and then directed to temporary storage tanks for proper handling or subsequent upland disposal. The extraction of the steel casing will continue until the steel casing is still 20 feet below the ground surface, at which point, the steel casing would get left in place as a permanent steel casing with a minimum 5 feet of additional permanent steel casing remaining above the ground surface. The permanent casing will be accommodated in the bridge pile foundation design.

Each pile hole would be drilled in fewer than five days. During this period, the extension of the steel casing five feet above the ground surface would provide additional protection from any potential inundation of the open hole. Each casing would be capped except when actual construction work requires access to the hole (e.g., when pouring cement or actively drilling). A clear weather forecast, defined for this project as a 40 percent or less chance of a 0.1 inch or greater precipitation event within the next 48 hours, would be required for the initiation of any new pile shaft operation. In Los Angeles County, 0.1 inch of precipitation is considered measurable and a 40 percent chance of precipitation may produce some change in surface water. The National Oceanic and Atmospheric Administration's (NOAA) weather forecast would be used to determine if clear weather is predicted. If drilling is in progress and a rain event is forecast in the coming 48 hour period, drilling would be suspended, equipment demobilized, and the only authorized work would be to activate the site Best Management Practices (BMPs) and containment systems.

Upon completion of the construction shaft and boring work, a rebar cage would be lowered into the hole and concrete would be pumped into the hole to create the pile. Groundwater would be displaced during the concrete pour and contained within portable tanks located in the work zone for disposal at a legal disposal site in an upland area. No continuous dewatering or drawdown within the shaft would be required. Casing water, if any, would be extracted and disposed at a legal disposal site in an upland location. As previously stated, concrete pours would only be scheduled and proceed with a clear weather forecast and be suspended in the event of a precipitation event. In addition to standard BMPs used in construction (silt fence, waddles, sand bags, etc.), a "K-rail" barrier system also would be deployed around the perimeter of the pile work zone. A typical layout of the work zone is shown in Figure 3.2-3. As illustrated, the K-rail barrier acts as both a containment berm for the construction area and a barrier to prevent construction equipment from inadvertently entering the wetted channel of the Santa Clara River. Access to the dry portion of the ground surface for the CIDH work would be restricted to the dry season. At the completion of each CIDH pile, a vertical column would be constructed above the pile using conventional false work or prefabricated forms.

Following bridge pier installation (i.e., construction of four above-grade columns and four below-grade piles placed in a row), construction of bridge girders and the bridge decks would use methods that do not require access into, or through, the wetted portion of the Santa Clara River channel. The bridge superstructure would be constructed using conventional engineering and construction techniques within the dry portion of the riverbed (Moffatt & Nichol 2016a). Where access to the wetted channel is to be avoided, the use of pre-cast girders is specified. These girders are placed using over-head cranes (gantry or truck mounted) onto cast-in-place receiving supports at column and pile locations located on either side of the river. No access to the wetted channel is required for this work to be completed.

To prevent the inadvertent discharge of concrete, debris, or other construction materials into the wetted channel of the Santa Clara River, an underslung tarp, netting, or equivalent catchment or deflecting barrier would be deployed beneath the bridge deck. This catchment system would be maintained in place until completion of the bridge. Equipment and personnel access to the dry portion of the riverbed would be restricted to the dry season.

Pipelines and utilities crossing the river at the bridge location would be integrated into the superstructure of the bridge, suspended between or beneath the girders. Pipe sleeves and conduits, mounting brackets, and pipe hangers, as appropriate, would be placed prior to construction of the bridge deck. Depending on the location of the utilities in relation to the finished bridge deck, construction equipment access to the dry riverbed may be required during this phase of construction and access would be restricted to the dry season.

All of the work described above would be completed during the dry season defined for the project, and may require multiple construction seasons.

The bridge deck would be constructed by pouring concrete into the prepared wood and steel deck frames that are supported on the completed girders and bridge piers. Each deck frame would be poured and then allowed to set for a period of time prior to stripping of the frames. Deck work, including barriers, curbs, rails and other final features of the bridge would be completed entirely from the top of the bridge. As previously stated, concrete pours would only proceed with a clear weather forecast and would be suspended in the event of a precipitation event. All construction of the bridge decks and subsequent deck work would occur from the top of the superstructure and no access to the wetted portion of the Santa Clara River channel would be required for this work to be completed.

Temporary Haul Route Bridges

To support grading equipment access between soil borrow sites south of the Santa Clara River and fill sites north of the Santa Clara River, temporary haul routes, with temporary haul route bridges spanning the wetted channel of the Santa Clara River, would be used. The temporary haul routes would be located along historic agricultural roads. The temporary haul route bridges are independent of the permanent bridges at Commerce Center Drive and Long Canyon Road, and would be used during initial grading and land development of Landmark Village, one of the developments identified in the Newhall Ranch Specific Plan approved by Los Angeles County in 2003.

As with the permanent bridges, the temporary haul route bridges would be constructed in a manner that does not require installation of bridge support piers in the wetted channel of the Santa Clara River and when there is a clear weather forecast, as predicted using NOAA data. As described above, a clear weather forecast is defined for this project as a 40 percent or less chance of a 0.1 inch or greater precipitation event within the next 48 hours. The spans of the temporary haul route bridges would be wide enough to allow for installation of the support columns and piles in dry portions of the riverbed. Prior to installation, the locations for temporary haul route bridges would be surveyed for the edge of the wetted channel to identify and demarcate a sufficient margin between the wetted channel and column and pile installation zones. Orange construction fencing, silt fence, or other BMPs would be deployed between the pile location and the top of bank of the wetted channel with piles located a minimum of 10 feet away from the edge of the wetted channel. No construction activities would be allowed near the edge of the wetted channel that would have potential to destabilize low flow channel bank (CDFW 2016a). See Figure 1 in Draft AEA Appendix 4-1, which shows a horizontal set-back from the edge of the top of back that is twice the bank height.

A prefabricated steel pile would be placed in a predetermined location within the dry riverbed and mechanically vibrated, while pressure is applied from the top. This combination of forces pushes the pile down through the soil to the appointed depth, at which point it can serve as the foundation for the temporary haul route bridge deck. The piles can be vibrated into place in a few hours and the set-up/take-down time is very short. Installation and removal of the support piles would remain safely outside the areas where unarmored threespine stickleback and other fish might be affected. Vibration of piles within a sandy substrate has a very limited expression beyond the immediate area of the pile and are not likely to visibly disturb the ground from 1 to 3 feet from the pile (Moffatt & Nichol 2016a). Each pier row would consist of two to four piles (depending on bridge deck width), and pile rows would be spaced from 40 to 60 feet along the length of the temporary haul route bridge. Upon installation of the support piles, pile caps would be welded to the top of each pile row, creating a receiving platform for the modular bridge decks. The pile installation would only occur in the dry portion of the riverbed based upon timing, sequencing of work, and indexing of the pile spacing. The piles and pile cap portion of the temporary haul route bridge structure would remain in-place until the haul route is no longer needed for construction of Landmark Village. It is expected that the piles would remain in place and be subjected to two or more winter storm seasons.

Modular bridge decks would then be lowered onto the prepared pile caps using over-head cranes. A soil travel surface, edge curbing, fencing and other bridge edge protections would be installed above and along the edges of the modular bridge decks to allow the structure to adequately support the earth moving equipment and prevent any debris from leaving the travel surface. All installation would occur from the dry portion of the riverbed. The modular deck installation would only occur during the non-storm flow season. For this project, the non-storm flow season is the period from May 1 to November 30 and based on NOAA weather data. The temporary haul route bridges would be in operation only during this same period to eliminate the potential for river flows to overtop the bridge deck during a high flow storm event. The removal of the temporary haul route bridge soil covering, curbing, and fencing would be conducted using equipment similar to that used in the installation, and be accomplished from the bridge deck or using cranes located in the dry portion of the riverbed. The temporary haul route bridges would be stripped down to the pile and pile caps during the winter season. When use of the haul routes resumes in subsequent years, the modular bridge decks, travel surface, and bridge edge protections would be re-installed and re-deployed. Again, this work would be restricted to occurring either in the dry riverbed or from the surface of the bridge itself.

Once the temporary haul route bridges are no longer required for grading operations, the pile caps would be removed and piles would be extracted using equipment similar to that used for installation. However, instead of applying pressure to push the pile into the ground, the equipment would pull up to extract the pile. Extraction of each pile can be done in a matter of hours, and the same clear weather forecast as predicted by NOAA and work location restrictions described for installation would also be enforced to protect the wetted channel of the Santa Clara River during extraction of the piles. Extraction of piles would only occur with equipment accessing the dry riverbed (Moffatt & Nichol 2016b).

Bank Stabilization

The bank stabilization component of the project consists of flood control infrastructure — known as buried bank stabilization — that is proximate to, but setback from the wetted channel of the Santa Clara River. Most locations where construction of bank stabilization would occur are currently farmed agricultural lands. Bank stabilization can be installed without construction equipment or material contacting the wetted channel of the Santa Clara River. The modification to bank stabilization includes construction during the dry season (i.e., establishing three different work windows based on location and risk of inundation) and elimination of water diversions. In addition, monitoring would be conducted to confirm that water quality would not be affected and that drawdown of the wetted channel would not occur.

Bank stabilization construction at the San Jose Flats area of Mission Village would be restricted to the dry season, as defined for this project as between June 1 and September 30. Bank stabilization in this area would have a more restricted work window because it is closer to the Santa Clara River wetted channel and is susceptible to seasonal flood flows in addition to winter flood flows (Figure 3.2-4). Bank stabilization installation in locations susceptible only to winter flood flows would have a longer work window of May 1 through November 30, when winter flood flows typically do not occur on the Santa Clara River. Other bank stabilization areas not at risk of winter flood flows would be constructed year-round.

Bank stabilization may require excavation to depths below the local ground water level, necessitating dewatering, or suppression of the groundwater table, to a depth lower than the excavation. Where this is necessary, vertical extraction wells would be installed along the limit of the work zone and fitted with pumps. The wells would be operated to temporarily drawdown groundwater from the extraction point. The influence is greatest at the upper level of the water table and nearly zero at the bottom of the well. Dewatering wells for bank stabilization would be operated in a manner that can be monitored and demonstrated to not affect the surface flow of the wetted channel of the Santa Clara River. Where the wetted channel is within 1,000 feet of dewatering activities, daily monitoring for water quality would occur at least one week prior to and during pump operations and then continue for at least one week subsequent to completion of such operations, so no drawdown of the wetted channel would occur. Pumping would cease immediately if changes to the water level or area of the wetted channel are observed. Any groundwater discharges would be directed to an appropriate and legal disposal site in an upland location.

Proposed Project Design Features and Regulatory Measures

The following Project Design Features (PDFs) and regulatory measures have been incorporated by the project applicant into the project's bridge and bank stabilization designs, and will be included in CDFW's Errata to the Mitigation Monitoring and Reporting Plan (MMRP) to require implementation. The PDFs are included to avoid risk of take of unarmored threespine stickleback:

- **PDF-3-1:** To avoid impacts on the unarmored threespine stickleback, as well as other sensitive fish in the Santa Clara River, no construction activities shall take place in the wetted channel of the Santa Clara River.

- **PDF-3-2:** The construction methods for the two permanent bridges at Commerce Center Drive and Long Canyon Road shall be modified to: (i) reduce the number of bridge piers and include a span between columns supported by piles that accommodates the maximum dry season flow within the Santa Clara River; and (ii) relocate bridge piers to span the bridge deck across the entirety of the wetted portion of the Santa Clara River channel to allow for a "no water contact construction zone" within the wetted channel and avoid the need for stream diversion or dewatering during construction.

- **PDF-3-3:** To avoid contact with the wetted channels of the Santa Clara River during construction, the span between permanent bridge piers shall increase from the 100-foot span analyzed in the 2010 Final EIR to a minimum of a 165-foot span over the wetted channel.

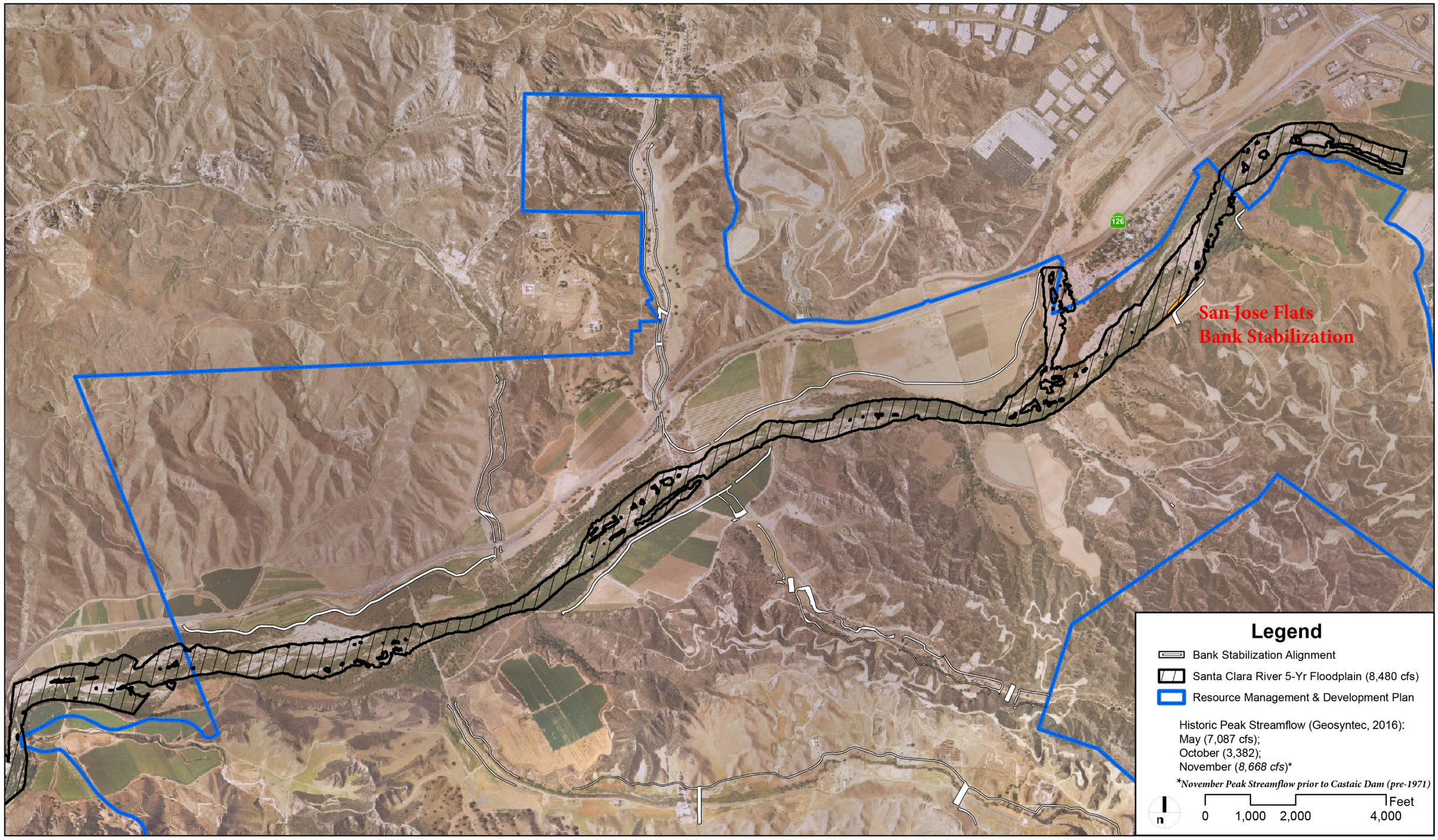
- **PDF-3-4:** The 165-foot span over the wetted channel shall conform to Caltrans Bridge Design Standards, the County of Los Angeles Department of Public Works geotechnical review requirements, and applicable seismic stability and operational safety standards.

- **PDF-3-5:** The project shall use the full-depth casing method for constructing CIDH shafts for the permanent bridges.

- **PDF-3-6:** All permanent bridge <u>pier and structure construction within the riverbed</u> ~~and bank stabilization construction work~~ shall be completed during the dry season (defined as June 1 through September 30), and may require multiple construction seasons.

- **PDF-3-7:** All construction of the permanent bridge decks and subsequent deck work shall occur from the top of the superstructure and no access to the wetted channel of the Santa Clara River shall be allowed for this work to be completed.

- **PDF-3-8:** With respect to the temporary haul route bridges, all steel pile supports shall be installed and removed when the column and pile locations are outside of the wetted portion of the Santa Clara River and when there is a clear weather window as predicted by NOAA weather data. A clear weather forecast is defined for this project as a 40 percent or less chance of a 0.1 inch or greater precipitation event within the next 48 hours. Modular bridge decks, and all travel surface materials above the deck, shall be removed from the river prior to November 30 and shall not be installed until after May 1 of each year they are in use, consistent with NOAA weather data.



Source: Hunsaker 2010/PACE 2010/Newhall 2016

Figure 3.2-4 Santa Clara River Floodplain Bank Stabilization Alignment

- **PDF-3-9:** Bank stabilization construction at the San Jose Flats area of Mission Village is restricted to June 1 through September 30, because this area is closer to the Santa Clara River wetted channel and to preclude the construction work zone from being inundated by seasonal flood flows. Bank stabilization in locations susceptible to winter flood flows shall be conducted from May 1 through November 30, when winter flood flows typically do not occur on the Santa Clara River. Other bank stabilization areas not at-risk of winter flood flows may be constructed year-round.

- **PDF-3-10:** During the concrete pour of the permanent bridge piles, displaced groundwater shall be contained within portable tanks located in the work zone for disposal at a legal disposal site in an upland area. No continuous dewatering or drawdown within the shaft shall occur. Casing water, if any, shall be extracted and disposed at a legal disposal site in an upland location. No other construction dewatering associated with installation of the bridges, including temporary haul route bridges, shall occur within the project site.

- **PDF-3-11:** All construction dewatering of seepage water, associated with bank stabilization shall be conducted in a manner that does not create a risk of fish stranding, either through draw down (zone of influence) or by flow discharge creating temporary habitat suitable for unarmored threespine stickleback.

- **PDF-3-12:** All long-term maintenance of project facilities on the Santa Clara River shall adhere to timing and work zone restrictions, specifically: (1) maintenance activities shall not take place in the wetted channel of the Santa Clara River; (2) maintenance, repair or replacement of bridge structures requiring access to the riverbed shall be restricted to the period from June 1 to September 30; (3) any dewatering necessary during any maintenance activities shall not create a risk of fish stranding, either through draw down (zone of influence) or by flow discharge creating temporary habitat suitable for unarmored threespine stickleback, nor shall it involve direct removal of surface water from, or discharge to, the wetted channel of the Santa Clara River.

2.2.4 Environmental Impacts and Mitigation Measures

To evaluate the significance of the proposed modified design and construction methods, which include "no water contact" construction methods for the project bridges and bank stabilization, this section assesses (i) whether the modified construction method can be executed consistent with Fish and Game Code section 5515, and (ii) whether the "no water contact" construction methods would result in any new significant or more severe significant impacts to unarmored threespine stickleback than those addressed in the 2010 Final EIR. While the section numbering has been revised to align with the organization of the Final AEA (i.e., Chapter 3 in the Draft AEA becomes Section 2.2 in the Final AEA), the impact conclusion and mitigation measure numbering remains identical to the Draft AEA to facilitate cross comparison.

Impact 3-1: Impacts from Bridge Construction, Maintenance, and Operation

As originally designed, construction of the permanent bridges at Commerce Center Drive and Long Canyon Road would have resulted in installation of bridge support piers within the Santa Clara River channel, which provides habitat for the unarmored threespine stickleback. After the bridge piers are installed outside of the wetted channel during the dry season, these locations could become inundated following storm events during the rainy season. Based on hydraulic modelling and analysis of expected fish behavior, scour depressions around and behind the bridge piers that could result after medium to heavy river flows would not result in stranding of unarmored threespine stickleback. This impact is less than significant and, therefore, no mitigation is prescribed.

Construction and long-term maintenance activities within the wetted channel (as defined by the estimated high-flow condition during the dry-season when the activities would occur), increased pH in the water (which may affect water quality due to contact with uncured concrete), and falling construction debris from bridge decks into the water could lead to direct mortality or injury to unarmored threespine stickleback. These construction and long-term maintenance activities ~~This~~ would ~~be~~ have a **potentially significant impact**

without mitigation. In response to the California Supreme Court decision, the project applicant has proposed to modify the bridge design, construction methods, and long-term maintenance activities as mitigation to avoid take of unarmored threespine stickleback. Impacts to unarmored threespine stickleback from bridge construction, maintenance, and operation would be **less than significant with these mitigation measures**.

The permanent bridges at Commerce Center Drive and Long Canyon Road would be constructed in a manner that would avoid entry into or contact with the wetted channel of the Santa Clara River, with work done either in the dry riverbed (i.e., the column and pile installations) or in the air above the wetted channel of the river (i.e., using overhead cranes to lower bridge deck sections into place).

As described previously, the CIDH pile and column (four of which interconnected together in a row constitute a bridge pier) installation work for the permanent bridges at Commerce Center Drive and Long Canyon Road would be scheduled during the dry season (as defined for this project as June 1 through September 30) when the Santa Clara River is at its lowest level and not subject to storm-generated surface flows in excess of 500 cfs (Geosyntec 2016). These lower surface flows allow for bridge pier construction outside of the aquatic habitat where unarmored threespine stickleback could be present.

At each pile shaft, a steel surface casing would be inserted via ~~vibratory pile driving~~ oscillator methods. The steel casing would be secure and contain any fluids within the boring. The steel casing would extend 5 feet above the ground surface, allowing the pile holes to be capped when not in use. Consequently, there would be no exposure of an open hole that could be inundated during a high flow event at any time.

Because the permanent bridge pier installation areas would be outside of the wetted channel of the Santa Clara River, noise and vibration from the permanent bridge construction would not be expected to adversely affect unarmored threespine stickleback. K-rail barriers would separate the column supported by piles installation zones from the wetted channel of the Santa Clara River and keep construction equipment and containment BMPs within the work zone. This would prevent any fluids resulting from the CIDH drilling and concrete pouring operations from entering the river.

The bridge superstructures (consisting of cast-in-place girders) would be located above the dry riverbed. The bridge girders would not present a risk to the wetted channel because they would be constructed outside of the wetted channel of the Santa Clara River during the dry season. Where the bridge girders cross the wetted channel, they would be constructed using pre-cast elements and installed without need for construction equipment or falsework in the riverbed. The overlying bridge deck would then be poured in to temporary deck frames that are supported on the girders. If not contained, concrete materials could be released to the riverbed or the wetted channel, impacting the water quality of the river. As described above in the description of project modifications, however, an underslung containment system would be deployed during this phase of bridge construction to capture any pollutant materials and prevent contamination.

The proposed bridges would not contact the wetted channel of the Santa Clara River during construction, and, therefore, Mitigation Measures BIO-44 and BIO-46 would no longer be necessary.

Despite the modified bridge construction methods, there are three potential scenarios that may lead to potentially significant construction-related impacts to unarmored threespine stickleback. The first involves the potential for construction-related equipment, personnel, or activities to accidently enter or make contact with the wetted channel of the Santa Clara River, which could result in death or injury to unarmored threespine stickleback. The second involves the potential for uncured concrete used in the bridge to be spilled or otherwise released into the wetted channel of the river, which could alter the water chemistry and quality and lead to deleterious conditions for unarmored threespine stickleback. The third involves the potential for construction debris to fall from the bridge deck into the wetted channel of the river where it may degrade water quality and/or strike unarmored threespine stickleback, which could lead to death or injury.

In addition, long-term maintenance and repair of the permanent bridges could result in similar types of impacts to unarmored threespine stickleback could occur during original construction, although they would

be less severe. Maintenance activities include repaving the bridge deck, repairing bridge railing, and other structural repairs.

Scouring at the base of the support columns and piles could result in depressions within the stream channel. As discussed below, unarmored threespine stickleback are unlikely to enter these depressions and are unlikely to become stranded within them.

Accidental Construction in Wetted Channel

The modified bridge construction approach requires that all construction activities take place outside the wetted channel of the Santa Clara River. Consequently, no construction equipment or personnel would have access to the wetted channel where unarmored threespine stickleback may be present. It is possible, however, that construction activities, equipment, or personnel could inadvertently make contact with the wetted channel and thereby crush or smoother unarmored threespine stickleback. This would be a **potentially significant impact without mitigation**.

Increased pH Levels in River Due to Accidental Contact with Uncured Concrete

Uncured concrete would not be allowed to contact water in the Santa Clara River. Nevertheless, accidental contact could occur, causing a rise in the water's pH, affecting water quality. The pollutant of greatest concern is lime, a major component of cement and concrete. Lime dissolves easily in water and can change the pH of water by increasing its alkalinity.

The pH of water affects the normal physiological functions of aquatic organisms, including the exchange of ions with the water and respiration (Robertson-Bryan 2004). Such important physiological processes operate normally in most aquatic biota under a relatively wide pH range (e.g., 6-9 pH units). There is no definitive pH range within which all freshwater aquatic life is unharmed and outside which adverse impacts occur. Rather, there is a gradual "deterioration" in acceptability as pH values become further removed from the normal range (Robertson-Bryan 2004).

The potential for impacts from elevated pH is generally greatest during construction when concrete wash-off and slurries may come into contact with water. Contamination of groundwater and, subsequently, surface waters by wet concrete, cement paste, or grout may also be a concern. Where non-displacement piling (such as CIDH) involves the casting of concrete directly against the soil, there is a potential for leaching of wet concrete into fast flowing groundwater (ICF International 2016b). The elevated pH may occur until the concrete, cement paste, or grout is fully set, which generally occurs on a timescale of a few minutes (Westcott et al. 2001).

For the permanent bridges at Commerce Center Drive and Long Canyon Road, the bridge pier footings would have permanent protective casings, which prevent most wet concrete from making contact with the groundwater. This greatly reduces – but does not completely eliminate – the potential for any concrete contamination of adjacent surface water. The CIDH pile construction using the full-depth steel casing method, as previously described, allows the newly poured concrete to make contact with the natural soils and any groundwater that may be present, from a depth of approximately 20 feet below the riverbed surface to the full depth of the pile boring. The groundwater is approximately 0 to 15 feet below the ground surface at pile locations depending on their proximity to the wetted channel ~~The cement endcap, at the base of the pile (approximately 20 feet below the bed), will come in contact with groundwater (0 – 15 feet [(~~currently, in drought conditions~~)~~). The technical memorandum prepared by GSI Water Solutions, Inc. (2016) establishes that a rise in pH levels occurs within a thin interface along the immediate column and pile themselves. The increased pH elevation does not extend outward a measurable distance into the aquifer and away from the column face. During the curing process, pore water leaches from the cement columns and piers into the adjoining groundwater. The pore water, created by a chemical reaction of mixing water with the cement mixture, increases the pH in water to 12 or higher during the first 90-hours of cement curing. However, the volume of pore water and the rate at which it is released is low. The ambient groundwater will mix with this pore water, diluting the higher pH mixture, which will likely have~~ing~~ little to no impact on the pH of the groundwater. The distance the pH mixture travels before discharging to the river's surface water is estimated to be 1 - 2 miles. The length of time required to travel this distance (several months to a few years) indicates

that it is unlikely that any significant change in pH will be noticed in the surface water during column and pile cement curing, even considering the number of columns and piles being constructed (CDFW 2016b).

Because accidental spills or contact of wet concrete to surface water within the Santa Clara River could create deleterious conditions for unarmored threespine stickleback, this would be considered a **potentially significant impact without mitigation**.

Debris Accidentally Falling from Bridge Decks

The project's modified bridge construction methods propose that some portions of the bridge deck would be constructed/installed over water. Construction activities such as finishing work would continue on the bridge decks and the bridges would be used to access opposite sides of the river. Accordingly, there is the potential that construction debris could fall from the deck into the water, where it could crush or injure unarmored threespine stickleback. This would be a **potentially significant impact without mitigation**.

Long-term Maintenance and Repair of Bridges

Once in place, the bridges at Commerce Center Drive and Long Canyon Road would become permanent elements in the project's transportation/circulation network. Because the proposed modifications in bridge construction do not change the location, size, and use of the bridges, the operational impacts of the bridges would be the same as those analyzed in the 2010 Final EIR. In some cases, the impacts will be less because the modified bridges will have a total of five fewer piers (which equates to 20 fewer columns and supporting piles) than the bridges analyzed in the 2010 Final EIR.

The RMDP Maintenance Manual, also analyzed in the 2010 Final EIR, includes measures that encourage bridge repairs to occur from the bridge deck, limit the maintenance area size to up to 30 feet on either side of the bridge, and limit the access of equipment to the riverbed through existing invert access ramps within 1,000 feet of the bridge or through earth ramps constructed on the sideslope in the immediate area of the bridge. However, the RMDP Maintenance Manual also relied upon Mitigation Measures BIO-44 and BIO-46, which no longer will be implemented. Maintenance and repair of the permanent bridges could result in contact with the wetted channel and could result in mortality or injury of unarmored threespine stickleback. This would be a **potentially significant impact without mitigation**.

Scouring at Bridge Piers

Any obstruction in an active mobile-bed river system has the potential to cause scour depressions in areas of the riverbed that are subject to flood flows with erosive flow velocities (Brandimarte et al. 2012). This is true of natural structures, such as trees and rocks, as well as man-made structures, such as bridge piers. In the context of the proposed bridges at Commerce Center Drive and Long Canyon Road, four factors must be considered when assessing scour depressions and their potential to isolate unarmored threespine stickleback when flow velocities in the Santa Clara River return to non-flood levels: (1) what size storm events have the potential to cause such depressions at bridge piers; (2) what residual pool depth may be expected from such events; (3) what flow velocities are likely to occur during the peak and recession of such storm events; and (4) what is the ability and preference of unarmored threespine stickleback -- a fish that depends on slow-moving water – to access such depressions.

To address the first factor, and to provide context for the size of storms that may result in scour at the proposed bridge piers, PACE analyzed the amount of bridge pier scour for the Commerce Center Drive and Long Canyon Road bridges, as well as for the temporary haul route bridges, under a 10-year and a 25-year storm event (Draft AEA Appendix 3). These storms represent the "reset" events for this portion of the Santa Clara River, where major sediment transport and significant fluvial geomorphic processes alter the morphology of the river within a large portion of the floodplain. The PACE analysis (PACE 2016b, 2016c) indicates that:

- During the peak of the 10-year storm conditions, maximum scour depth would range from 2.7 feet to 8.3 feet, with greater scour occurring at columns and piles closest to the current wetted, low flow channel of the river at the Commerce Center Drive Bridge.

- During the peak of the 25-year storm conditions, maximum scour depth would range from 4.2 feet to 10.0 feet at the Commerce Center Drive Bridge.
- During the peak of the 10-year storm, maximum scour depth would range from 8.4 feet to 8.5 feet, with greater scour occurring at columns and piles closest to the current wetted, low flow channel of the river at the Long Canyon Bridge.
- During the peak of the 25-year storm conditions, maximum scour depth would range from 3.2 feet to 10.1 feet at the Long Canyon Bridge.
- During the peak of the 10-year storm, maximum scour depth would be 4.0 feet at the temporary haul route bridge.
- During the peak of the 25-year storm, maximum scour depth would be 4.4 feet at the temporary haul route bridge.

Under both scenarios, six of the seven bridge piers at the Commerce Center Drive Bridge, would experience velocities high enough to cause some pier scour. Whereas for the Long Canyon Bridge, only two bridge piers would experience bridge pier scour during the 10-year storm event, and five bridge piers would experience bridge pier scour during the 25-year storm event. The depths of potential scour depressions identified as a result of the hydraulic modeling is similar to depths that would occur near natural obstructions in the river (such as trees and large boulders). During smaller storm events, less of the floodplain would experience flow, and the depth and velocity of flow would be less, resulting in little to no scour at any given bridge pier row.

The second factor relates to residual pool depth, which is the depth of the scour hole after it is refilled by sedimentary material redeposited by the river. Specifically, as storm flows recede, the resulting scour depressions at trees, rocks, bridge piers, and other obstructions begin to diminish as they fill up with sediment. This is a natural process: as the flow velocity is reduced, bed-mobilized sediments (also known as bedload) and suspended sediments settle out to reform the riverbed and active channel. There is no accepted method for calculating a precise post-storm (residual) depression depth; however, PACE estimates that sediment reclaims two-thirds of the maximum scour depth, leaving a residual pool depth that is one-third of the maximum scour depth at peak flows (PACE 2016b). Thus, for context, it is assumed that the maximum post-storm (residual) depression will be 2.8-feet deep for the 10-year event and 3.3-feet deep for the 25-year event at the Commerce Center Drive Bridge. The maximum post-storm (residual) depression will be 3.5-feet deep for the 10-year event and 3.9-feet deep for the 25-year event at the Long Canyon Bridge. The post-storm (residual) scour is estimated to be 1.3-feet for the 10-year event, and 1.5-feet for the 25-year event at the temporary haul route bridge (PACE 2016b, 2016c). Much shallower residual depressions, or no depression at all, may be expected at columns supported by piles located further away from the wetted channel (PACE 2016b). Another consideration is the area (length and width) of the scour hole created during a storm. According to procedures outlined in the Federal Highway Administration (FHWA) Hydraulic Engineering Circular No. 18 (HEC-18), Evaluating Scour at Bridges, 2001, the top-width of the scour hole at a column and pile is dependent on the angle of repose of the bed material, as well as the depth of scour. For practical applications, FHWA suggests using a value equal to twice the scour depth to determine the top-width of a scour hole. However, based on research of model studies, there is evidence that indicates the limit of scouring will extend farther downstream due to the existence of vortices created by water flowing around the bridge piers. There are currently no published guidelines for determining the extent of the additional scour cause by the vortices as this phenomenon is specific to site conditions and flow characteristics. PACE has estimated the horizontal limits at the bottom of the scour hole (downstream of the column and pile) to be roughly 1.5 times the column diameter. The estimated residual pool scour and area (top width and length) for both the permanent and temporary haul route bridges are included in Table 3.2-1.

Table 3.2-1 Residual Bridge Pier Scour

Storm Event	Commerce Center Drive Bridge			Long Canyon Road Bridge			Temporary Haul Route Bridge		
	Residual Scout (feet)	Areal Extent Top Width (feet)	Areal l Extent Length (feet)	Residual Scout (feet)	Areal Extent Top Width (feet)	Areal Extent Length (feet)	Residual Scout (feet)	Areal Extent Top Width (feet)	Areal l Extent Length (feet)
10 Year	2.8	5.6	14.6	3.5	7.0	16.0	1.3	2.6	4.4
25 Year	3.3	6.6	15.6	3.9	7.8	16.8	1.5	3.0	4.8

Source: PACE 2016b, PACE 2016c. Compiled by Ascent Environmental 2016.

The third factor relates to the velocity of the flow at the scour pools during the storm event, as this will greatly affect whether unarmored threespine stickleback can access the scour pools. As the PACE analysis shows, the bridge pier rows with the deepest depressions are those which encounter the highest flow velocities. In other words, the higher the flow velocity, the deeper the bridge pier scour depression. As explained in an earlier analysis by ENTRIX (2010), unarmored threespine stickleback cannot withstand flow rates in excess of 2 fps; even during non-storm or non-flood periods, stickleback tend to concentrate in the slow-moving waters and eddies (Alexandre and Almeida 2009; USFWS 2009; ENTRIX 2010; Williams 2014) such as those found along the margins of the Santa Clara River, including inundated riparian zones. During a storm event, as the flood plain widens and the flow rates in the middle of the wetted channel increase, stickleback swim to the edges of the river where the flow rates are reduced and seek refuge there until the flood waters recede (Baker 2008; Williams 2014).

Behavioral responses of fish have been found to be an important predictor of fish stranding susceptibility; species favoring littoral, backwater habitats generally moved out during periods of drawdown (either through self-propulsion or passive drift) (Adams et al. 1999). Unarmored threespine stickleback in the Santa Clara River favor littoral, backwater habitats; thus, after storm events, the expectation is that they will swim or passively float out with the retreating tide and resume their normal positions in the standard margins of the river where flow rates are 2 fps or less. This behavior has been observed during dewatering efforts in rivers (e.g., Carmel River, Santa Clara River) (ICF International 2016a). At the locations with the deepest residual scour pools (center channel), the velocity during the storm events are expected to be well in excess of 2 fps. Unarmored threespine stickleback would avoid these areas, as the water is moving too fast and the scour pools provide no refuge from the flood or storm flows. Where residual scour pools are minimal in depth or non-existent (e.g., the bridge pier rows at floodplain margins), the flow velocities may be in the range preferred by stickleback (i.e., less than 2 fps). Such areas would be indistinguishable from the numerous other side channels, depressions, and scour holes present throughout the Santa Clara River's natural riverbed habitat, particularly after a reset event. As with any natural depression in this size range, stickleback at a shallow bridge pier scour pool would be expected to follow their natural life history by pursuing the receding flood flows to slow-moving marginal waters along the wetted channel of the river.

The Santa Clara River is dynamic and subject to flashy flows. Following large storm events, the river is characterized by braided channels and denuded riverbed conditions, where most of the vegetation cover, especially emergent vegetation along the margins of the river channel, has been uprooted and swept downstream. It is evident that stickleback have adapted to this type of periodic disturbance. Furthermore, there are no published studies indicating that stickleback, or other small fish with a similar life history, become routinely stranded during storm induced flood flows. Instead, the literature shows that larger fish such as salmon and trout tend to be the most susceptible to stranding, but even for these species, the greatest incidence of stranding occurs below hydroelectric dams where river flows are rapidly increased due to large water releases and then very quickly shut off, resulting in dramatic flow reductions (Quinn and Buck 2001).

In conclusion, the data indicate that unarmored threespine stickleback are not likely to enter the scour depressions/holes that form at the bridge pier rows (Draft AEA Appendix 4). This is especially the case for

the scour depressions at the bridge pier rows located in the middle of the wetted channel where flow velocities are too high for stickleback to negotiate. With respect to the scour depressions at the bridge pier rows located at the edges of the floodplain, the flow velocities in this part of the Santa Clara River are low enough to support unarmored threespine stickleback and, thus, there would be no need for the fish to seek refuge in a scour pool at the bridge pier rows. Nevertheless, if any stickleback were to enter a scour pool at one of these locations, the pool itself would likely be very shallow and virtually indistinguishable from the many other natural depressions in the riverbed, and should pose no special risk. Furthermore, after a reset event, these pools would be devoid of vegetation and would not provide the habitat that the unarmored threespine stickleback prefers. Scouring at bridge piers would be a **less-than-significant impact and no mitigation is required**.

Mitigation 3-1: Bridge Construction, Maintenance, and Operation

The project applicant, or its designated general contractor, shall implement the following measures to avoid contact with the wetted channel, which would avoid affecting unarmored threespine stickleback.

3-1a: The project applicant, or its designated general contractor, shall implement the PDFs and regulatory measures as incorporated into the project's bridge and bank stabilization designs.

3-1b: The mandated Worker Environmental Awareness Program (Mitigation Measure BIO-52 from the 2010 Final EIR) shall include a discussion regarding restriction of access to the wetted channel of the Santa Clara River and repercussions if encroachment occurs.

3-1c: Prior to the commencement of construction activities, a qualified biologist shall survey the proposed work locations to confirm that the construction zone is outside the wetted channel of the river and that no work takes place where fish may be affected.

3-1d: During permanent bridge construction, a qualified biologist shall monitor all activities that are a threat to adjacent natural habitats or nearby species and prevent equipment, personnel, or debris from entering or making contact with the wetted channel of the river.

3-1e: A clear weather window, defined for this project as a ~~less than~~ 40 percent or less chance of 0.10 inches or greater of precipitation in the next 48 hours as forecasted by NOAA, shall be required for the scheduling of any bridge or bank stabilization-related concrete pours. If a bridge or bank stabilization-related concrete pour is in progress, and an un-forecasted rain event occurs, bridge or bank stabilization-related concrete pours shall be suspended.

3-1f: During all storm events (including summer rains), a monitor shall inspect work sites to make sure that site is secure and that flooding does not cause tarps to break or diversion drains to become plugged, potentially allowing construction materials and debris to flow into the river.

3-1g: Precautionary spill containment devices shall be deployed and maintained during any pouring of concrete related to the bridge structure where released materials or storm water runoff that may have come in contact with uncured concrete could be released to the wetted channel of the Santa Clara River. Containment may be integrated into the K-rail barrier along the perimeter of the Work Zone or may be underslung or integrated into the bridge structure itself (such as storm drain system for the roadway that is directed to a water quality treatment facility within the development areas north or south of the bridge crossing).

3-1h: A K-rail construction barrier shall be deployed between the bridge construction work zone and the wetted channel of the Santa Clara River. A discussion of access restrictions shall be included in the required Worker Environmental Awareness Program training (Mitigation Measure BIO-52 from the 2010 Final EIR).

3-1i: Spill containment shall be deployed and maintained during CIDH pile construction, bridge column construction, cast-in-place girder construction, bridge deck pours, and any other pouring of concrete related to the bridge structure where released materials or storm water runoff that may have come in contact with uncured concrete could be released to the wetted channel of the Santa Clara River. Containment shall be integrated into the K-rail barrier along the perimeter of the work zone or underslung tarp or integrated into the bridge structure itself (such as storm drain system for the roadway that is directed to a water quality treatment facility within the development areas north or south of the bridge crossing).

3-1j: To prevent construction debris from falling into the Santa Clara River during installation of bridge decks, the deck areas shall be fitted with an under-slung debris tarp, debris platform, or equivalent protection, extending at least 50 feet beyond the width of the wetted channel. The project applicant or its designee shall perform periodic maintenance and inspection to confirm that the debris catchment system is performing correctly.

3-1k: To ascertain that water quality is not being affected by bridge and bank stabilization-related concrete pouring activities, the project applicant or its designee shall monitor the water quality at points, upstream, downstream, and immediately adjacent to the ~~bridge~~ construction work zone daily during concrete pouring operations and report the results monthly, or as directed, to CDFW. Key parameters to be monitored include pH and turbidity.

3-1l: All bridge maintenance and repair activities, as described in the RMDP Maintenance Manual, that have the potential to affect the wetted channel of the Santa Clara River shall adhere to the dry season window, as defined for this project, as June 1 through September 30, and shall completely avoid the Santa Clara River wetted channel when performing maintenance activities. All measures implemented during original bridge construction shall also be implemented to avoid accidental contact, spills, or falling debris into the wetted channel. In the future, if the wetted portion of the Santa Clara River shifts in location (for example, in response to a flood event that alters the ~~geomorphology of the channel~~ wetted channel alignment), all maintenance and repair activities shall also be required occur outside of the wetted channel.

Significance after Mitigation

Implementation of Mitigation Measure 3-1 along with those from the 2010 Final EIR (except BIO-44 and BIO-46) would reduce potentially significant impacts on unarmored threespine stickleback from construction activities of the permanent bridges to a **less-than-significant** level, because it would require that the project applicant or its designee implement the adopted PDFs that include restricting bridge component construction to the dry season, as defined for this project, to June 1 through September 30, and completely avoid the Santa Clara River wetted channel by modifying the construction methods. Mitigation Measure 3-1 also requires that the project applicant or its designee install an under-slung debris tarp, debris platform, or equivalent protection extending 50 feet beyond the width of the wetted channel to prevent falling bridge construction material from reaching the river, and daily monitoring water quality during concrete pouring operations to ascertain that water quality is not being affected. Because the impacts to aquatic habitat would be avoided, the proposed modified construction methods can be implemented consistent with Fish and Game Code section 5515.

Impact 3-2: Construction, Operation, and Demobilization of Temporary Haul Route Bridges

Construction and operation of the temporary haul route bridges would result in installation of bridge support piers within the Santa Clara River channel that provides habitat for the unarmored threespine stickleback. Vibratory pile driving methods will be used to install haul route bridge support piles, however vibratory pile driving is not expected to injure or disturb unarmored threespine stickleback. This impact is less than significant and, therefore, no mitigation is needed.

Construction activities, such as accidental entry into the wetted channel, method and timing of installation of the decks and falling construction debris from bridge decks into the water, could lead to direct mortality or

injury to unarmored threespine stickleback. This would be a **potentially significant impact without mitigation**. The revised construction, operation, and demobilization of temporary haul routes bridges do not cause or create any other potentially significant impacts not already addressed in the 2010 FEIR. The project applicant has proposed to modify temporary haul route bridge design and construction methods as mitigation to avoid take of unarmored threespine stickleback. Impacts to unarmored threespine stickleback from temporary haul route bridges would be **less than significant with these mitigation measures**.

As with the permanent bridges discussed above, the project proposes to construct the temporary haul route bridges in a manner that eliminates the need to enter the wetted channel of the Santa Clara River. Instead, the spans of the temporary haul route bridges would be wide enough to allow vibratory installation of the bridge support piers in dry portions of the river, outside the wetted channel where unarmored threespine stickleback would not occur. Modular bridge deck segments would be installed onto these supports from overhead, or "in the air," using cranes positioned on established portions of the haul route. The pile vibration technique does not create a pile hole. Thus, even if a storm were to inundate the pile installation area, there would be no risk of creating a pool where fish might become stranded.

Three potential impacts could occur from the project modifications. The first involves the potential for construction-related equipment, personnel, or activities to accidently enter or make contact with the wetted channel of the Santa Clara River. The second involves potential impacts from vibratory pile driving. The third is related to temporary haul route bridge deck placement, operation, and removal in advance of winter storm flows in the river.

Accidental Construction in Wetted Channel

The modified bridge construction approach requires that all construction activities take place outside the wetted channel of the Santa Clara River. Consequently, no construction equipment or personnel would have access to the wetted channel. It is possible, however, that construction activities, equipment, or personnel could inadvertently make contact with the wetted channel and thereby affect unarmored threespine stickleback. This would be a **potentially significant impact without mitigation**.

Potential Impacts from Vibratory Pile Driving

Sound exposure from activities such as pile driving can adversely affect fish, including physical damage. Behavioral changes also might occur, resulting in animals leaving feeding or reproduction grounds (Popper and Hastings 2009). The temporary haul route bridges incorporate prefabricated steel piles that would be vibrated into place within 10 feet of the wetted channel of the Santa Clara River.

Although vibratory pile driving is commonly used in bridge and other construction, few scientific studies have assessed its impacts to fish. Most studies have focused on "impact" or "hammer" pile driving, which generates peak sound pressures substantially greater than those generated by vibratory pile driving.

The most relevant studies on the impacts of vibratory pile driving include:

- Greeneridge Science (2005) analyzed a water-transmission pipeline repair project conducted by the City of Everett, Washington. The repairs were performed where the pipeline crosses the bottom of the Snohomish River, and involved the insertion of steel H-piles about 60 feet into the wet riverbed using a vibratory pile driver. The analysts monitored the underwater sounds produced during the vibratory pile driving and assessed the potential impact of those sounds on protected fish species, including threatened bull trout and Chinook salmon. This evaluation involved taking a series of underwater acoustic measurements at a variety of depths and distances from the piles being driven. The measured sound levels were well below those which, according to the literature, would cause physiological stress. The study did not evaluate whether pile-driving sound or vibrations induced a short-term avoidance reaction in the fish; but even if such a reaction occurred, it likely had no greater impact than the avoidance behavior commonly carried out by Snohomish salmonids in response to other natural and anthropogenic stimuli in their habitat.

- Greeneridge Science (2005) summarized Nedwell et al. (2003), which examined the impacts of both vibratory pile driving and impact pile driving on caged brown trout at the Red Funnell's Southampton Terminal, England. Caged fish were placed at distances of 25 to 400 meters from the piles being driven in water, with a control cage 10 kilometers away. Animals were observed by closed circuit TV as they were exposed to pile-driving sounds. During the vibratory pile driving portion of the investigation, researchers found that vibratory pile driving generated no measurable increases in sound when compared to other background noise sources, such as passing vessels. "[I]n general, there was no discernable difference between recordings of sound pressure level versus time history made on days on which vibropiling was being conducted and those on which there was no vibropiling" (p. 7.). Behavioral results showed that the fish did not react to vibratory pile driving as close as 25 meters to the source. For example, the report indicates that "[n]o startle response was seen in any of the vibropiling sequences for any of the piles driven by this method" (p. 10). The authors also observed no injuries to the fish.

- NMFS (2011) compared the effects of impact hammers and vibratory hammers on fish and concluded that impact hammers may be more harmful than vibratory hammers because they produce more intense pressure waves and because the sounds produced do not elicit an avoidance response in fishes, which exposes them to harmful pressures for longer periods.

In addition, the piles for the temporary haul route bridges, which are located a minimum of 10 feet from the wetted channel, will be vibrated into place very quickly (i.e., within a matter of hours) and the set-up/take-down time is likewise very short. Installation and removal of the support piles would remain safely outside the areas where unarmored threespine stickleback and other fish might be affected. Vibration of piles within a sandy substrate has a very limited expression beyond the immediate area of the pile, with minimal ground impacts expected 1 to 3 feet from the pile (Moffatt & Nichol 2016a). Vibratory installation and removal of piles is not expected to have an adverse impact on unarmored threespine stickleback based on review of research evaluating the impacts of vibratory pile driving on fish (ICF International 2016a). This would be a **less-than-significant impact and no mitigation is required**.

Deck Installation, Operation, and Removal

As described, the temporary haul route bridge decks are modular and would be in operation only during the non-winter storm season, where they are not likely to be subject to elevated river flows. The bridge deck itself is pre-fabricated modular concrete, but the travel surface placed above the deck would be composed of fill dirt that could fall into the riverbed. To prevent this from happening, K-rails would be used to retain the fill. The K-railing would be securely pinned to the modular bridge deck and, being approximately 8 inches taller than the proposed soil fill, would serve as a minor curb to facilitate safe passage for construction vehicles across the bridge deck. A 6-foot chain link construction fence would be installed along the edge of the bridge deck to prevent construction personnel access to the river and further retain materials to the bridge deck. All installation of these materials would occur from the surface of the bridge and no access to the riverbed adjacent to the temporary haul route bridge would be required.

Once in place, the temporary haul route bridges would be used by construction equipment (e.g., graders and scrapers) moving back and forth across the Santa Clara River. Note, however, that such use would be limited to the period from May 1 through November 30. Outside of this period, there is the potential for strong winter storms to overtop the bridge decks or detach them from the columns and supporting piles and carry them downstream. For this reason, the fencing, soil cover, and K-rail would be removed in a manner similar to the installation, all from the bridge deck. After clearing all material from the modular bridge decks, the project applicant would use cranes to remove the bridge decks from the bridge piers. The modular bridge decks would be installed in May, at which time construction traffic across the bridges could resume for the construction season, and would then be removed in November. The bridge piles, however, would remain in position year-round, as they are designed to withstand winter storm flows in the Santa Clara River. Because the bridge decks are designed to be periodically removed and replaced, no new or more severe impacts than those analyzed in the 2010 Final EIR are expected to occur as a result of this process (ICF International 2016a). After completion of all hauling operations (i.e., up to three construction seasons), the piles would be

removed as described above. Nevertheless, if these measures are not implemented, debris falling from the temporary haul route bridges during deck installation, operation or removal could lead to direct mortality or injury to unarmored threespine stickleback. This would be a **potentially significant impact without mitigation**.

Mitigation 3-2: Construction, Operation, and Demobilization of Temporary Haul Route Bridges

The project applicant, or its designated general contractor, shall implement the following measures to avoid unarmored threespine stickleback.

3-2a: Implement Mitigation Measure 3-1a, 3-1b, ~~3-1c,~~ and 3-1f.

3-2b: Prior to the commencement of construction activities, a qualified biologist shall survey the proposed work locations to confirm that the construction zone is outside the wetted channel of the river, that the proposed vibratory pile installation locations are at least 10 feet away from the wetted channel, and that no work takes place where unarmored threespine stickleback may be affected.

3-2c: Vibratory piles for the temporary haul route bridges shall be installed no closer than 10 feet to the wetted channel of the Santa Clara River, as determined by survey at the time piles are to be installed, and shall only be removed by vibratory methods if the wetted channel is at least 10 feet away.

3-2d: No construction activities or personnel shall occur near the edge of the wetted channel that would have potential to destabilize low flow channel bank. A set-back from the edge of the top of bank for a horizontal distance that is twice the bank height (2 horizontal: 1 vertical) shall be maintained to prevent collapsing the bank of the low flow channel.

3-2e: During temporary haul route bridge construction and demobilization, a qualified biologist shall monitor all activities that are a threat to adjacent natural habitats or nearby species and prevent equipment, personnel, or debris from entering or making contact with the wetted channel of the river.

Significance after Mitigation

Implementing Mitigation Measure 3-2 would reduce potentially significant impacts on unarmored threespine stickleback from installation, operation, and demobilization activities of the temporary haul route bridges to a **less-than-significant** level because it would require that the PDFs are implemented, which include the dry season work restrictions, and that the temporary haul route bridge installation, operation, and demobilization completely avoid the wetted channel of the Santa Clara River. Furthermore, Mitigation Measure 3-2 would require that a qualified biologist monitor the installation and demobilization activities to keep construction outside of the wetted portion of the river and confirm that the temporary pile locations are at least 10 feet away from the edge of the wetted portion of the river. Implementation of these measures would ensure that the installation, operation, and demobilization of the temporary haul route bridges avoid aquatic habitat where unarmored threespine stickleback could occur. Impacts to aquatic habitat would be avoided; therefore, the proposed construction methods can be implemented consistent with Fish and Game Code section 5515.

Impact 3-3: Bank Stabilization Construction

Construction of the bank stabilization measures would occur within the Santa Clara River, which provides habitat for the unarmored threespine stickleback. Bank stabilization locations located within the floodplain could become inundated during winter flows. In addition, the San Jose Flats area is at risk of inundation during late spring or early fall storm events. Inundation of bank stabilization areas could lead to stranding of unarmored threespine stickleback. This would be a **potentially significant impact without mitigation**. The project applicant has proposed to modify bank stabilization methods as mitigation to avoid take of unarmored threespine stickleback. Impacts to unarmored threespine stickleback from bank stabilization would be **less than significant with these mitigation measures**.

The bank stabilization would be installed outside the wetted channel of the Santa Clara River. Construction equipment likewise would be deployed and used without contacting or encroaching into the wetted channel. Therefore, no stream diversion or dewatering within the wetted channel of the Santa Clara River would be required for bank stabilization.

For construction of bank stabilization measures, excavation in areas that may become inundated by high river flows associated with the winter rainy season would not be constructed during periods when high flows typically occur (December 1 through April 30). Instead, excavations in such locations would only take place from May 1 through November 30 when high flows are not expected based on analysis of historical flow data. Because of the proximity to the wetted channel and risk of inundation from seasonal flood events, the work window for the San Jose Flats bank stabilization project (Mission Village) would be further restricted to occur between June 1 and September 30. If the work area were to become inundated during a high-flow storm event, unarmored threespine stickleback could become stranded (i.e., trapped within depressions).

Where necessary, to complete excavations for installation of bank stabilization below the water table, dewatering wells would be employed along the bank stabilization work zone to remove groundwater from the excavation area. Operation of these wells could result in a cone of depression of the groundwater table in the vicinity of the dewatering wells. If wells are proximate to surface waters, this could result in an acceleration of discharge of surface water to groundwater, with a corresponding reduction in stream flow (or a shrinking of the wetted channel of the river). Operational restrictions on dewatering addressed in the 2010 Final EIR require that any dewatering be conducted in a manner that does not affect river flow, and these same restrictions would be observed. Dewatering activities associated with bank stabilization would not involve direct removal of surface water from, or discharge to, the wetted channel of the Santa Clara River. Nor would such activities result in any draw-down of the river's flow such that unarmored threespine stickleback may become stranded. The dewatering "water" also must meet water quality requirements of the Los Angeles Regional Water Quality Control Board for discharge to surface or land, and, therefore, would not cause pollution or degradation of beneficial uses. Accordingly, the impacts of dewatering are the same as those addressed in the 2010 Final EIR.

As with the bridges, the location and size of the bank stabilization would remain unchanged from that analyzed in the 2010 Final EIR. As discussed above, the only adjustments relate to *how*, or more specifically *when* the bank stabilization would be installed.

Construction of the bank stabilization measures could result in stranding of unarmored threespine stickleback within the work zones if flooding occurred during construction. In addition, dewatering groundwater from the work zone could result in a reduction of surface water in the wetted channel of the Santa Clara River which could strand unarmored threespine stickleback. These would be **potentially significant impacts without mitigation**.

Mitigation 3-3: Bank Stabilization Construction

The project applicant or its designated contractor shall implement the following measures:

3-3a: Implement Mitigation Measure 3-1a, 3-1b, 3-1e, ~~and~~ 3-1f, and 3-1k.

3-3b: Prior to the commencement of bank stabilization construction activities, a qualified biologist shall survey the proposed work locations to confirm that the construction zone is outside the wetted channel of the river, that construction BMPs are installed prior to construction, and that no work takes place where fish may be affected.

3-3c: Bank stabilization construction at the San Jose Flats area of Mission Village is restricted to the dry season, as defined as between June 1 and September 30 to preclude the construction work zone from being inundated by seasonal flood flows.

3-3d: Bank stabilization construction locations susceptible to winter flood flows shall be conducted from May 1 through November 30, when winter flood flows do not occur on the Santa Clara River. Other bank stabilization areas not at risk of flood flows shall be constructed year-round.

3-3e: Although a late-spring or early fall flood event is not expected to occur, the project applicant or its designated contractor shall implement Perimeter Best Management Practices, as required under the Environmental Protection Agency's Construction National Pollutant Discharge Elimination System permit, which would deflect minor flows (less than 12 inches deep, and less than ~~15~~ 8 fps velocities) from entering bank protection construction work zones

3-3f: The project applicant or its designee shall develop a Construction Groundwater Dewatering Plan for those areas (i.e., bank stabilization areas) in close proximity to stream flow and submit to CDFW for approval. The plan shall include the following measures and be conducted during construction groundwater dewatering activities:

- Operational restriction on dewatering addressed in the 2010 Final EIR require that any dewatering be conducted in a manner that does not affect river flow, and these same restrictions shall be observed going forward. Bank stabilization dewatering shall be implemented in a manner that (1) does not create temporary wetted channel habitat suitable for stickleback; (2) does not diminish existing river flow, and therefore does not result in stranding of unarmored threespine stickleback or other fish; and (3) does not introduce pollutants to surface waters.

- Dewatering activities shall not involve direct removal of surface water from, or discharge to the Santa Clara River. Nor shall such activities result in any draw-down of the river's flow such that fish may become stranded. Any groundwater discharges shall be directed to an appropriate and legal disposal site in an upland area that will not affect the surface elevation of the wetted channel of the Santa Clara River.

- The project applicant or its designee shall assess local stream and groundwater conditions, including flow depths, groundwater elevations, and anticipated dewatering cone of influence (radius of draw down).

- The project applicant or its designee shall monitor daily surface water elevations upstream, adjacent to, and downstream of the extraction points, to assess any critical flow regimes susceptible to excessive draw down before, during, and after groundwater dewatering activities. The designated monitor shall have the authority to halt dewatering activities if water levels decrease in the wetted portion of the Santa Clara River where unarmored threespine stickleback are present. In the event the designated monitor observes an effect on the wetted channel that necessitates halting of dewatering operations, the applicant will be required to consult with CDFW, revise the Construction Groundwater Dewatering Plan as appropriate, and implement whatever additional restrictions may be necessary to preclude impact to the wetted channel (such as limiting the extent of excavation dewatering, implementing other construction methods acceptable to the Los Angeles County Department of Public Works such as launch stone, or suspending construction until such time as regional groundwater conditions are more favorable for the construction to proceed).

- The project applicant or its designee shall monitor surface water elevations downstream of the project location to assess any flow regimes and overbank areas that may be susceptible to flooding.

- The project applicant or its designee shall monitor upland discharge locations for potential channel erosion from dewatering discharge, and appropriate BMPs must be implemented to prevent excessive erosion or turbidity in the discharge.

- Monitoring reports shall be summarized and provided to CDFW upon completion of construction activities that required dewatering.

Significance after Mitigation

Implementing Mitigation Measure 3-3 would reduce potentially significant impacts to unarmored threespine stickleback from bank stabilization activities to a **less-than-significant** level because it would require that the PDFs are implemented, which include the dry season work restrictions to avoid accidental flooding and potential stranding within the work zone. Additionally, Mitigation Measure 3-3 would require the preparation of a Groundwater Dewatering Plan to be submitted for approval to CDFW. The plan would include measures that would prevent fluctuations in the surface level of the Santa Clara River that could result in stranding of unarmored threespine stickleback. Because adverse impacts to aquatic habitat would be avoided, the proposed construction methods can be implemented consistent with Fish and Game Code section 5515.

Impact 3-4: New or Substantially More Severe Significant Impacts to Unarmored Threespine Stickleback or Other Biological Resources

Modifications to the design and construction methods of the temporary haul route bridges, permanent project bridges and bank stabilization would introduce environmentally protective features and would not modify the location or area of construction disturbance, compared to project evaluated in the 2010 Final EIR. The temporary haul route bridges, permanent bridge alignment and bank stabilization locations determine the area of disturbance, because these areas must be cleared of vegetation and are within active construction zones. The currently proposed temporary haul route bridges, permanent bridge alignment and bank stabilization locations would be essentially identical to the 2010 Final EIR's project description. Therefore, **no new significant impacts nor substantial increases in the severity of previously identified significant impacts would occur** related to unarmored threespine stickleback, other fish and wildlife, or their habitats.

The potential for the proposed modifications to the design and construction methods of the temporary haul route bridges, project bridges and bank stabilization to result in new significant impacts or a substantial increase in the severity of previously identified significant impacts has been considered by CDFW. The proposed modifications introduce environmentally protective features that would reduce the targeted adverse impacts or the risks of adverse impacts. The modifications would not change the location or area of construction disturbance, compared to project evaluated in the 2010 Final EIR.

The temporary haul route bridges, permanent bridge alignment and bank stabilization locations determine the area of landscape disturbance, because these areas must be cleared of vegetation and are within active construction zones. The currently proposed temporary haul route bridges, permanent bridge alignment and bank stabilization locations would be identical to the 2010 Final EIR's project description. As a result, the river channel, floodplain, and riparian areas disturbed by construction, and the attendant biological impacts, would not increase in size, duration, or severity of landscape or river disturbance. In other words, the environmental footprint of the currently proposed infrastructure on the landscape is not substantially different from the footprint of the project evaluated in the 2010 Final EIR. Therefore, **no new significant impact nor a substantial increase in the severity of previously identified significant impact would occur** related to the unarmored threespine stickleback, other fish and wildlife, or their habitats. No other additional or modified mitigation measures are needed.

2.2.5 References – Unarmored Threespine Stickleback

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