Final

Environmental Assessment for the P-637 Infantry Squad Battle Course Range

Marine Corps Base

Camp Pendleton, California

May 2016

DEPARTMENT OF DEFENSE
UNITED STATES MARINE CORPS

FINDING OF NO SIGNIFICANT IMPACT

FOR P-637 INFANTRY SQUAD BATTLE COURSE RANGE, MARINE CORPS BASE CAMP PENDLETON, SAN DIEGO COUNTY, CALIFORNIA

Pursuant to the National Environmental Policy Act (NEPA) (42 U.S.C. §§ 4321-4370h); the Council on Environmental Quality (CEQ) Regulations implementing procedural provisions of NEPA (40 C.F.R. Parts 1500-1508); and the Marine Corps Environmental Compliance and Protection Manual (Marine Corps Order P5090.2A), the Marine Corps gives notice that an Environmental Assessment (EA) has been prepared and an Environmental Impact Statement (EIS) will not be prepared for the P-637 Infantry Squad Battle Course Range project at Marine Corps Base Camp Pendleton (MCB CamPen) California. I find that the proposed action, including adherence to the impact avoidance, minimization, and mitigation measures set forth in detail in the EA, will not have an adverse impact on the human environment. Therefore, an EIS is not required.

Proposed Action: The proposed action is the upgrade of an existing live-fire range within the Range 314 Complex, including demolition of an existing range control tower, ammunition breakdown block, and asphalt around the proposed general instruction building; construction and development of a live-fire Infantry Squad Battle Course Range; installation of Remoted Target Systems; construction or modification of support facilities (including a range control tower, operations storage facility, enclosed bleacher facility, general instruction building, and ammunition breakdown building); and upgrades to the existing access road and construction of a bridge across San Mateo Creek to provide all-weather access to the range.

Purpose and Need: The primary purpose of the proposed action is to construct a modernized live-fire range facility that provides realistic training opportunities and accommodates the requirements of modern weapons, weapon systems, and current tactics, techniques, and procedures. In addition, the proposed action must provide year-round, all-weather access to facilitate required training.

The proposed action is needed because the MCB CamPen ranges are outdated and do not provide adequate training opportunities or formal instruction on modern weapons and techniques for entry and advanced level Marines. Existing ranges are too small and incapable of simulating live-fire combat drills, and supporting new, more powerful weapons and modern weapon systems, and do not provide instant results in shooting training in accordance with Marine Corps requirements.

Alternatives Analyzed: The EA analyzed the potential effects of three alternatives:

- Alternative 1 (Preferred Alternative) Range 314C with New Access Road/Bridge Alternative;
- Alternative 2 Range 314B with New Access Road/Bridge Alternative;
- Alternative 3 No-Action Alternative.

Other location alternatives were considered but not carried forward for analysis for reasons set forth in the EA. Under Alternative 1, the infantry squad battle range would be implemented on 116 acres (67 hectares) within Range 314C at MCB CamPen. Under Alternative 2, the infantry Squad Battle Range would be implemented on 137 acres (55 hectares) within Range 314B. Both alternatives would include construction of an all-weather access road and bridge across San Mateo Creek. Under the No Action Alternative, the proposed range upgrades and construction of an all-weather access road and bridge would not occur.

Selected Alternative: Based on the analysis in the EA, I have selected the Preferred Alternative for implementation.

Summary of Environmental Effects: The EA analyzes the potential environmental impacts resulting from implementation of the Selected Alternative. The resources most likely to be affected by this action are geological resources; water resources; biological resources; air quality; cultural resources; utilities; and safety and environmental health. The potential environmental impacts of the alternatives on these resources were analyzed. Conversely, impacts to the following resources were considered to be negligible or non-existent and were not further analyzed in the EA: land use; aesthetics; socioeconomics; public services; noise; transportation; and environmental justice. The alternatives will have negligible direct, indirect, or cumulative impacts on the quality of the local environment and will comply with all regulatory requirements. With incorporation of the Special Conservation Measures, impacts to all resources would not be significant for the Selected Alternative. Air quality impacts from the Selected Alternative will not exceed any conformity de minimis threshold for the San Diego Air Basin. A Record of Non-Applicability for Clean Air Act General Conformity requirement has been prepared and approved for this project. There are no significant cumulative effects associated with the Selected Alternative.

Findings: There will not be any disproportionately high and adverse human health or environmental effects from the Selected Alternative on minority or low-income populations. Nor will there be any impacts associated with the protection of children from environmental health and safety risks.

The EA and Finding of No Significant Impact addressing this action are on file and may be reviewed at the place of origin: Commanding General, Attn: Director, Environmental Security, MCIWEST-MCB CAMPEN, Box 555008 Camp Pendleton, California 92055-5008, telephone (760) 725-4512.

25 June 2016

Edward D. Banta
Brigadier General, U.S. Marine Corps
Commanding General
Marine Corps Installations West-Marine Corps Base Camp Pendleton

Date

FINAL
ENVIRONMENTAL ASSESSMENT

ABSTRACT

Lead Agency for the EA: United States Marine Corps

Title of Proposed Action: P-637 Infantry Squad Battle Course Range at MCB Camp Pendleton

Affected Region: San Diego County

Designation: Final Environmental Assessment

The United States Marine Corps has prepared this Environmental Assessment in accordance with the National Environmental Policy Act (NEPA) of 1969, 42 United States Code §§ 4321-4370h, as implemented by the Council on Environmental Quality regulations, 40 Code of Federal Regulations Parts 1500-1508, and Marine Corps Order (MCO) P5090.2A, Change 3, Chapter 12, dated 26 August 2013, *Environmental Compliance and Protection Manual*, which establishes procedures for implementing NEPA. The proposed action includes demolition of an existing range control tower, ammunition breakdown block, and asphalt around the proposed general instruction building; construction and development of a live-fire Infantry Squad Battle Course Range; installation of Remoted Target Systems (RETS); construction or modification of support facilities (including a range control tower, operations storage facility, enclosed bleacher facility, general instruction building, and ammunition breakdown building); and upgrades to an existing access road and construction of a bridge across San Mateo Creek to provide all-weather access to the Range 314 Complex, which resides in the Quebec Impact Area on Marine Corps Base (MCB) Camp Pendleton, San Diego County, California. This Environmental Assessment describes the potential environmental consequences resulting from two action alternatives (Alternatives 1 and 2), and the No-Action Alternative on the following resource areas: Geological Resources; Water Resources; Biological Resources; Air Quality; Cultural Resources; Utilities; and Safety and Environmental Health.

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EXECUTIVE SUMMARY

The United States Marine Corps (USMC) has prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) of 1969, 42 United States Code (USC) §§ 4321-4370h, as implemented by the Council on Environmental Quality (CEQ) regulations, 40 *Code of Federal Regulations* (CFR) Parts 1500-1508, and Marine Corps Order (MCO) P5090.2A, Change 3, Chapter 12, dated 26 August 2013, *Environmental Compliance and Protection Manual*, which establishes procedures for implementing NEPA. This EA describes the potential environmental consequences resulting from a proposal to upgrade an existing live-fire range within the Range 314 Complex, which resides in the Quebec Impact Area at Marine Corps Base (MCB) Camp Pendleton, including demolition of an existing range control tower, ammunition breakdown block, and asphalt around the proposed general instruction building; construction and development of a live-fire Infantry Squad Battle Course Range; installation of Remoted Target Systems (RETS); construction or modification of support facilities (including a range control tower, operations storage facility, enclosed bleacher facility, general instruction building, and ammunition breakdown building); and upgrades to the existing access road and construction of a bridge across San Mateo Creek to provide all-weather access to the range. The bridge would be located within the Bravo One Training Area. The USMC has developed two action alternatives to implement the proposed action: Alternative 1 (Range 314C with New Access Road/Bridge) and Alternative 2 (Range 314B with New Access Road/Bridge). The alternatives differ in location within the Range 314 Complex. The EA also evaluates potential environmental consequences resulting from the No-Action Alternative. Under the No-Action Alternative, a modernized live-fire training facility and an all-weather access road and bridge to the Range 314 Complex would not be constructed and training would continue under current conditions.

The purpose of the proposed action is to construct a modernized live-fire range facility that provides realistic training opportunities and accommodates the requirements of modern weapons, weapon systems, and current tactics, techniques, and procedures (TTPs). In addition, the proposed action must provide year-round, all-weather access to facilitate required training.

The proposed action is needed because the MCB Camp Pendleton ranges are outdated and do not provide adequate training opportunities or formal instruction on modern weapons and techniques for entry and advanced level Marines. Existing ranges are too small and incapable of simulating live-fire combat drills, and supporting new, more powerful weapons and modern weapon systems, and do not provide instant results in shooting training in accordance with USMC requirements. Based on a review of available sites on MCB Camp Pendleton, the USMC determined that the Range 314 Complex is the closest to meeting the needs of the Marine Corps and represents the only reasonable location for the proposed action. There are no other ranges available that can be renovated or modernized to meet the required training specifications of modern day arms. Year-round, all-weather access to the Range 314 Complex is necessary to prevent training schedule disruptions which result in inadequate combat training for Marines. Any Marines missing the training cycle will go on without this training. There would be no consequential change in the level of operational activities and number of personnel associated with the proposed action.

The following resources were analyzed for potential environmental consequences: Geological Resources; Water Resources; Biological Resources; Air Quality; Cultural Resources; Utilities; and Safety and Environmental Health. The environmental consequences associated with implementation of Alternative 1, Alternative 2, and the No-Action Alternative are summarized in Table ES-1. As shown in Table ES-1, no significant impacts to any resource area would occur with implementation of the proposed action with the inclusion of Special Conservation Measures. Based on the analysis presented in the EA, the USMC has identified Alternative 1 as the Preferred Alternative.

Table ES-1. Summary of Potential Environmental Consequences by Resource

Resource	*Range 314C with New Access Road/Bridge Alternative (Alternative 1)*	*Range 314B with New Access Road/Bridge Alternative (Alternative 2)*	*No-Action Alternative*
Geological Resources	Alternative 1 would substantially alter existing topography and locally result in steep cut and fill slopes. These impacts would be managed through incorporation of standard erosion control measures into project design. This alternative would include grading, which would temporarily exacerbate the potential for erosion-induced sedimentation of San Mateo Creek. Such impacts would be managed through best management practices (BMPs), implementation of temporary and permanent erosion and sediment control measures, and compliance with measures included in the Construction General Permit Order 2009-0009-DWQ and established plans and policies, including the *Riparian/Estuarine Biological Opinion* (BO), *MCB Camp Pendleton Soil Erosion Management Practice Handbook*, and *Integrated Natural Resources Management Plan* (INRMP). MCB Camp Pendleton is not underlain by any active or potentially active faults. Significant impacts associated with seismically induced ground motion and ground shaking would not occur. Therefore, significant impacts to geological resources would not occur.	Under Alternative 2, impacts would be similar, but greater than those associated with Alternative 1. More grading would be required for Alternative 2, resulting in greater alteration of topography, increased potential for slope instability, and increased potential for erosion-induced sedimentation of San Mateo Creek. Seismic impacts would be similar to those described for Alternative 1. However, significant impacts to geological resources would not occur.	For the No-Action Alternative, the proposed action would not occur, and there would be no change in existing conditions. No impacts to geological resources would occur.

Table ES-1. Summary of Potential Environmental Consequences by Resource

Resource	*Range 314C with New Access Road/Bridge Alternative (Alternative 1)*	*Range 314B with New Access Road/Bridge Alternative (Alternative 2)*	*No-Action Alternative*
Water Resources	Alternative 1 would including grading, which would temporarily exacerbate the potential for erosion-induced sedimentation that could result in impacts to water quality, increased sedimentation, and or flooding potential to San Mateo Creek. This alternative would also potentially discharge waste material during construction and operation that would affect the quality of surface water or groundwater. These impacts would be managed through implementation of Special Conservation Measures 2 through 8, standard BMPs, and compliance with measures included in the Construction General Permit Order 2009-0009-DWQ. Operation of the range would be conducted in accordance with federal, state, and local laws. Alternative 1 would result in an increase in impermeable surfaces, thus increasing potential runoff and associated flooding downstream of the project site. Implementation of proposed on-site drainage improvements (Special Conservation Measure 5) on the range would reduce potential on-site flooding. This alternative would create structures that would potentially affect the volumes or patterns or surface flows or increase potentials for flooding within the 100-year floodplain of San Mateo Creek. The bridge and roadway levee would be constructed to accommodate this increased flood elevation. Implementation of Special Conservation Measure 6 would minimize scour. Therefore, significant impacts to water resources would not occur.	Under Alternative 2, impacts would be similar to but greater than Alternative 1 because it would require more grading resulting in greater temporary soil disturbance and associated potential for short-term erosion induced siltation. Significant impacts to water resources would not occur.	For the No-Action Alternative, the proposed action would not occur, and there would be no change in existing conditions. No impacts to water resources would occur.
Biological Resources	With implementation of Special Conservation Measures 2 through 19 including avoiding and mitigating impacts to federally listed, regionally sensitive, and/or Migratory Bird Treaty Act-protected nesting bird species; avoiding and minimizing disturbances to native plant communities, revegetating cut slopes and other areas disturbed by construction, controlling exotic plant species, and minimizing and mitigating for impact to Waters of the United States (U.S.), significant impact to biological resources would not occur.	Under Alternative 2, impacts would be similar to those described for Alternative 1.	For the No-Action Alternative, the proposed range upgrades and related construction/grading would not occur. There would be no change in existing conditions and there would be no impacts to biological resources.
Air Quality	Annual volatile organic compounds, carbon monoxide, nitrogen oxide, sulfur dioxide, and fugitive dust emissions generated by Alternative 1 would be below the significance thresholds. Additionally, due to the mobile and intermittent operation of the proposed diesel-powered construction equipment over a large construction area, they would produce minimal ambient impacts of Toxic Air Contaminants in a localized area. Therefore significant impacts to air quality would not occur.	Under Alternative 2, impacts on air quality would be similar but greater than Alternative 1 because it would require more equipment usage to grade the existing range and construct the new range and support facilities. However, impacts would not be significant.	For the No-Action Alternative, the proposed action would not occur and there would be no change in existing conditions. No impacts to air quality would occur.

Table ES-1. Summary of Potential Environmental Consequences by Resource

Resource	*Range 314C with New Access Road/Bridge Alternative (Alternative 1)*	*Range 314B with New Access Road/Bridge Alternative (Alternative 2)*	*No-Action Alternative*
Cultural Resources	Alternative 1 would result in impacts to five archaeological sites due to construction of the range upgrades. Due to Unexploded Ordnance (UXO) and safety issues, it is not possible to conduct a Phase II testing and evaluation program at the five sites. The USMC has consulted with the California State Historic Preservation Officer (SHPO), interested federally recognized and non-federally recognized Indian tribes, and other consulting parties regarding potential impacts to these archaeological sites and has entered into a Memorandum of Agreement (MOA) (Special Conservation Measure 23). The MOA has been developed providing stipulations to take into account the effects of the undertaking on historic properties and satisfy the USMC's National Historic Preservation Act Section 106 (54 United States Code §306108) requirement to minimize and mitigate impacts to historic properties for which adverse effects cannot be avoided. The USMC would prepare or cause to be prepared and would subsequently implement a Historic Properties Treatment Plan for the five historic properties located within the undertaking's Area of Potential Effects as well as a monitoring plan and unanticipated discoveries procedures. Materials of cultural sensitivity and/or archaeological significance may be encountered during construction activities within other areas of the project site. Implementation of Special Conservation Measure 24 would ensure that no significant impacts to cultural resources would occur.	Alternative 2 could result in impacts to one archaeological site due to construction of the range upgrades. The USMC would consult with the California SHPO, interested federally recognized and non-federally recognized Indian tribes, and other consulting parties regarding potential impacts to these archaeological sites and would enter into a MOA if necessary (Special Conservation Measure 25). Potential impacts to cultural resources during construction activities within other areas of the project site would be the same as described for Alternative 1.	For the No-Action Alternative, the proposed action would not occur and there would be no change in existing conditions. No impacts to cultural resources would occur.
Utilities	Alternative 1 would increase demands on water, electricity and communication systems, solid waste disposal and wastewater disposal. However the existing capacities of all utilities are adequate to accommodate Alternative 1. Therefore significant impacts on utilities would not occur.	Under Alternative 2, impacts on utilities would be the similar as those described for Alternative 1.	For the No-Action Alternative, the proposed action would not occur and there would be no change in existing conditions. No impacts on utilities would occur.

Table ES-1. Summary of Potential Environmental Consequences by Resource

Resource	*Range 314C with New Access Road/Bridge Alternative (Alternative 1)*	*Range 314B with New Access Road/Bridge Alternative (Alternative 2)*	*No-Action Alternative*
Safety and Environmental Health	Grading activities could spread potential contaminants (e.g., lead) present in on-site soil. Compliance with all applicable federal, state, and local rules during proposed activities would minimize the potential for adverse effects. UXO would present a potential health and safety hazard to personnel during construction. Impacts would be minimized with implementation of Base standard operating procedures for surface/subsurface clearance and Special Conservation Measure 28 (UXO Removal). Operation of the upgraded range could result in an increased risk of wildfires in the project area. Implementation of Special Conservation Measure 29 (Wildland Fire Protection) and compliance with existing Wildland Urban Interface Codes would minimize impacts. Therefore, significant impacts to safety and environmental health would not occur.	Under Alternative 2, impacts on safety and environmental health would be similar to those described for Alternative 1.	For the No-Action Alternative, the proposed action would not occur, and there would be no change in existing conditions. No impacts on safety and environmental health would occur.

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ACRONYMS & ABBREVIATIONS

$\mu g/m^3$	micrograms per cubic meter
af	acre-foot
APE	Area of Potential Effect
ARB	California Air Resources Board
ATFP	Anti-Terrorism and Force Protection
B.P.	Before Present
BEAP	Base Exterior Architectural Plan
BMP	best management practice
BO	Biological Opinion
C&D	construction and demolition
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	cubic foot per second
CH_4	methane
CHRIS	California Historical Resources System
cms	cubic meter per second
CNG	compressed natural gas
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CRAM	California Rapid Assessment Method
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel
DHS	Department of Health Services
DoD	Department of Defense
DoN	Department of the Navy
DPM	diesel particulate matter
DPS	distinct population segment
DRMO	Defense Reutilization and Marketing Office
DWR	California Department of Water Resources
EA	Environmental Assessment
EISA	Energy Independence and Security Act
EO	Executive Order
ES	Environmental Security
ESA	Endangered Species Act
ft	foot
ft^2	square foot
GHG	greenhouse gas
GIS	Geographic Information System
GWP	global warming potential
ha-m	hectare meter
HVAC	heating, ventilation, and air conditioning
I-	Interstate
INRMP	Integrated Natural Resources Management Plan
IR	Installation Restoration
IRP	Installation Restoration Program
ITS	Individual Training Standards
km	kilometer

km^2	square kilometer
kph	kilometers per hour
kV	kilovolt
LEED	Leadership in Energy and Environmental Design®
Leq	average equivalent continuous sound level
LID	Low Impact Development
LNG	liquefied natural gas
m	meter
m^2	square meter
MBTA	Migratory Bird Treaty Act
MCB	Marine Corps Base
MCL	maximum contaminant level
MCO	Marine Corps Order
mi	mile
mi^2	square mile
MILCON	Military Construction
MILES	multiple integrated laser engagement system
MIST	minimal impact suppression tactics
MITS	moving infantry targets
MOA	Memorandum of Agreement
mph	miles per hour
MTID	multiple integrated laser engagement system target interface device
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAVFAC SW	Naval Facilities Engineering Command, Southwest
NAVOSH	Navy Occupational Safety Health
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NRTTP	Northern Region Tertiary Treatment Plant
O_3	Ozone
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PM_{10}	particulate matter less than 10 microns in diameter
POL	petroleum, oil, and lubricant
ppm	parts per million
PSD	Prevention of Significant Deterioration
QRP	Qualified Recycling Program
RAICUZ	Range Installation Compatible Use Zone
RCRA	Resource Conservation and Recovery Act
RETS	Remoted Target Systems
ROICC	Resident Officer in Charge of Construction
RONA	Record of Non-Applicability
RWQCB	Regional Water Quality Control Board
SCIC	South Coastal Information Center
SDAB	San Diego Air Basin
SDCAPCD	San Diego County Air Pollution Control District
SDG&E	San Diego Gas and Electric

SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SITS	stationary infantry targets
SO_x	sulfur oxides
SPCC	Spill Prevention, Control and Countermeasures
SR-	State Route
STP	sewage treatment plant
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminants
TAPS12	Tributary Area Pump Station
TDS	total dissolved solids
TTPs	tactics, techniques, and procedures
U.S.	United States
UFC	United Facilities Criteria
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Society
USMC	United States Marine Corps
UST/AST	Underground Storage Tank/Aboveground Storage Tank
UXO	Unexploded Ordnance
VOC	volatile organic compound
WPP	Wildfire Prevention Plan

1 PURPOSE AND NEED

1.1 Introduction

This Environmental Assessment (EA) has been prepared by the United States Marine Corps (USMC) in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] §§ 4321-4370h, as amended), the Council of Environmental Quality (CEQ) *Regulations for Implementing the Procedural Provisions of NEPA* (40 Code of Federal Regulations [CFR] Parts 1500-1508), and Marine Corps Order (MCO) P5090.2A, Change 3, Chapter 12, dated 26 August 2013, *Environmental Compliance and Protection Manual*.

This EA describes the potential environmental consequences resulting from a proposal for a Military Construction (MILCON) project (P-637) on Marine Corps Base (MCB) Camp Pendleton (herein referred to as MCB Camp Pendleton or Base) (Figure 1.1-1). The proposed action includes demolition of an existing range control tower, ammunition breakdown block, and asphalt around the proposed general instruction building; construction and operation of a live-fire Infantry Squad Battle Course Range; installation of Remoted Target Systems (RETS); construction or modification of support facilities (including a range control tower, operations storage facility, enclosed bleacher facility, general instruction building, and ammunition breakdown building); and upgrades to an existing access road and construction of a bridge across San Mateo Creek to provide all-weather access to the Range 314 Complex. The proposed action would also include the following range and building support: mechanical systems (i.e., heating and cooling), a fire protection system,[1] communications systems, a concrete pad to support fourteen portable toilets, electricity, and a range control system.

1.2 Background

MCB Camp Pendleton's training areas and open space lands facilitate the intensive training mandated by the USMC to acquire a full range of basic and advanced combat readiness skills and weapons proficiency. Training at MCB Camp Pendleton ranges from individual small arms training to larger company/battalion sized training operations. Live-fire ranges are designated areas equipped with a variety of targets and monitoring/scoring devices for live-fire training and validation. These ranges are located within and adjacent to impact areas (i.e., areas designated for receipt of live-fire ordnance such as projectiles and explosives), and are designed to accommodate a broad spectrum of weapons including pistols, rifles, machine guns, mortars, antitank assault weapons, grenades, missiles, and artillery.

Modernization of live-fire ranges is critical to the training requirements of modern, more powerful weapons and modern weapon systems that are key elements of the USMC mission. Presently, the live-fire training ranges at MCB Camp Pendleton do not provide automated feedback or scoring and are not suitable, both in size and infrastructure, for supporting the modern weapons and weapon systems in the USMC inventory. As such, the existing ranges do not possess the standard levels of proficiency required to train Marines per Individual Training Standards (ITS). In letters from Commanding General of MCB Camp Pendleton to the Marine Corps Combat Development Command dated October 29 1998 (1500 O&TTRMD) and 9 November 1998 (1 tr 1500 O&TTRMD) (Appendix A), the Infantry Squad Battle Course Range was identified as one of four RETS ranges most crucial to solving the existing training deficiencies on MCB Camp Pendleton. All of these reasons facilitate the need for a new Infantry Squad Battle Course Range at MCB Camp Pendleton.

[1] A waiver has been obtained to remove the requirement for a fire protection water system from the scope of the proposed action. However, the proposed action includes the fire protection system in the event that it is needed in the future.

1.1-1 Regional Map

1.3

Project Location

The proposed action would occur at MCB Camp Pendleton, the USMC's major amphibious training center for the west coast (Figure 1.1-1). MCB Camp Pendleton is a 200-square mile (mi^2) (518-square kilometer [km^2] area located primarily within the northern portion of San Diego County, 40 miles (mi) (64 kilometers [km]) north of downtown San Diego. The Orange County line is contiguous with the northwest boundary of MCB Camp Pendleton, and Riverside County is to the north but not adjacent to the boundary of MCB Camp Pendleton. The City of San Clemente and the Cleveland National Forest border MCB Camp Pendleton to the north and east, with the community of Fallbrook and the Naval Weapons Station – Seal Beach/Fallbrook Annex to the east, and the City of Oceanside to the south. The major freeways that provide regional access to the Base are Interstate 5 (I-5) and State Route 76 (SR-76) (Figure 1.1-1). The project site is located in the northern portion of the Base. The Range 314 Complex resides in the Quebec Impact Area and the bridge would be located in the Bravo One Training Area adjacent to the Range 314 Complex (Figure 1.1-1).

1.4 Purpose of and Need for the Proposed Action

The purpose of the proposed action is to establish a modernized live-fire range facility that provides realistic training opportunities using modern weapons, weapon systems, and current tactics, techniques, and procedures (TTPs), per ITS or equivalent training standards and consistent with Marine Corps Combat Development Command guidance. In addition, the proposed action must provide year-round, all-weather access to the Range 314 Complex to facilitate required training.

The proposed action is needed because the existing MCB Camp Pendleton ranges are outdated and do not provide adequate training opportunities or formal instruction on modern weapons and techniques for entry and advanced level Marines. Existing ranges are too small, not suitable for simulating live-fire combat drills, or for supporting the modern, more powerful weapons and weapon systems. Specifically, with an ever increasing requirement for immediate feedback during live-fire training and excess demand for existing training facilities, MCB Camp Pendleton requires a dedicated live-fire Infantry Squad Battle Course Range to support the Marine Combat Training Battalion and provide adequate facilities and access to support the sustainment level ITS. Based on a review of available sites on MCB Camp Pendleton, the USMC determined that the Range 314 Complex is the closest to meeting the needs of the USMC and represents the only reasonable location for the proposed action. There are no other ranges available that can be renovated or modernized to meet the required training specifications of modern day arms. However, the existing infrastructure does not provide automated feedback and/or scoring, and only provides the opportunity to train Marines to the minimum level of current training standard. In addition, the existing range is unable to accommodate RETS without infrastructure upgrades and modernization of support facilities (USMC 2011).

Headquarters Marine Corps has a rigid structured training schedule that is essential to facilitate required training. Lost training cannot be made up and results in inadequate combat training for Marines. Access to the Range 314 Complex is currently limited when, as a result of heavy rainstorms, San Mateo Creek rises to a point that impedes and prevents vehicular or pedestrian traffic. Year-round, all-weather access to the Range 314 Complex is necessary to prevent training schedule disruptions and to properly prepare Marines with infantry skills necessary for combat situations. Any Marines missing the training cycle will go on without this training.

1.5 Regulatory Setting

This EA discusses reasonable alternatives for meeting the purpose of and need for the proposed action; existing environmental conditions in the vicinity of the proposed action; direct, indirect, and cumulative impacts that might result from the proposed action; and measures to avoid or minimize potential adverse impacts. Important considerations for identification and analysis of alternatives were the avoidance or minimization of environmental impacts. Given the purpose and need, the MCB Camp Pendleton Commanding General reviews the EA to: (1) choose an alternative; and (2) make a determination that the alternative either has no significant impacts or that an EIS will be prepared.

This EA has been prepared in accordance with applicable federal regulations, instructions, and public law including but not limited to those provided in Table 1.5-1.

Table 1.5-1. Applicable Federal Regulations, Instructions, and Public Law

Name	*Regulation*
National Environmental Policy Act of 1969	42 USC §§ 4321-4370h
Council on Environmental Quality Regulations for Implementing the Procedural Provisions of National Environmental Policy Act	40 CFR Parts 1500-1508
Department of Navy Procedures for Implementing National Environmental Policy Act	32 CFR Part 775 as described in MCO 5090.2B
Environmental Compliance and Protection Manual Chapter 12	MCO P5090.2A, Change 3
National Historic Preservation Act	54 USC § 300101 *et seq.*
Clean Water Act	33 USC §§ 1251-1387
Clean Air Act, as amended, 42, including 1990 General Conformity Rule	42 USC §§ 7401-7671q
Comprehensive Environmental Response Compensation and Liability Act	42 USC §§ 9601-9675
Resource Conservation and Recovery Act	42 USC §§ 6901-6992k
Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations, 11 February 1994	Executive Order 12898
Protection of Children from Environmental Health Risks and Safety Risks, 23 April 1997	Executive Order 13045
Endangered Species Act	16 USC §§ 1531-1544
Migratory Bird Treaty Act	16 USC §§ 703-712
Responsibility of Federal Agencies to Protect Migratory Birds, January 11, 2001	Executive Order 13186
Floodplain Management	Executive Order 11988
Protection of Wetlands, 24 May 1977	Executive Order 11990
Native Americans Graves Protection and Repatriation Act	25 USC §§ 3001-3013 & 40 CFR Part 10
Federal Compliance with Pollution Control Standards	Executive Order 12088
Invasive Species	Executive Order 13112
Energy Independence and Security Act	Public Law 110-140
Strengthening Federal Environmental, Energy, and Transportation Management	Executive Order 13423
United Facilities Criteria for Low Impact Development	United Facilities Criteria 3-210-10
Notes: USC = United States Code, CFR = Code of Federal Regulations, MCO = Marine Corps Order	

The proposed action may require the following permits, certifications, and/or determinations:

- Endangered Species Act (ESA) Biological Opinion (BO) from the United States Fish and Wildlife Service (USFWS) and/or the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS);
- Clean Water Act (CWA) Section 404 permit from the United States Army Corps of Engineers (USACE);
- CWA Section 401 Water Quality Certification from the Regional Water Quality Control Board (RWQCB); and
- National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities from the State Water Resources Control Board (SWRCB).

1.6 Organization of the Document

This EA is organized as follows: Chapter 1 defines the purpose of and need for the proposed action. Chapter 2 describes the alternatives for accomplishing the proposed action, including the No-Action Alternative, and other alternatives not carried forward for NEPA analysis. Chapter 3 describes the affected environment and analyzes the environmental consequences associated with each alternative. Chapter 4 examines the cumulative impacts of the proposed action and other projects in the area. Chapter 5 addresses various other considerations required by NEPA. This is followed by chapters including a list of preparers and their qualifications, a list of persons and agencies contacted, and a list of references. The appendices contain specialized reports and analysis prepared in support of this EA.

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2 PROPOSED ACTION AND ALTERNATIVES

The proposed action addressed in this EA is the construction and operation of a modernized live-fire range facility at the Range 314 Complex and upgrades to the existing access road and construction of a bridge across San Mateo Creek to provide all-weather access to the range complex (Figure 2.1-1). The project would include the following:

- Construction of a live-fire Infantry Squad Battle Course Range;
- Installation of RETS;
- Construction of facilities to support RETS (including a range control tower, operations storage facility, enclosed bleacher facility, general instruction building, and ammunition breakdown building);
- Demolition of the existing range control tower, ammunition breakdown block, and asphalt around the proposed general instruction building for compliance with Anti-Terrorism and Force Protection (ATFP) setbacks;
- Utilities (mechanical systems, fire protection system, communication, portable toilets, electricity, and a range control system); and
- Upgrades to the existing access road and construction of a bridge across San Mateo Creek.

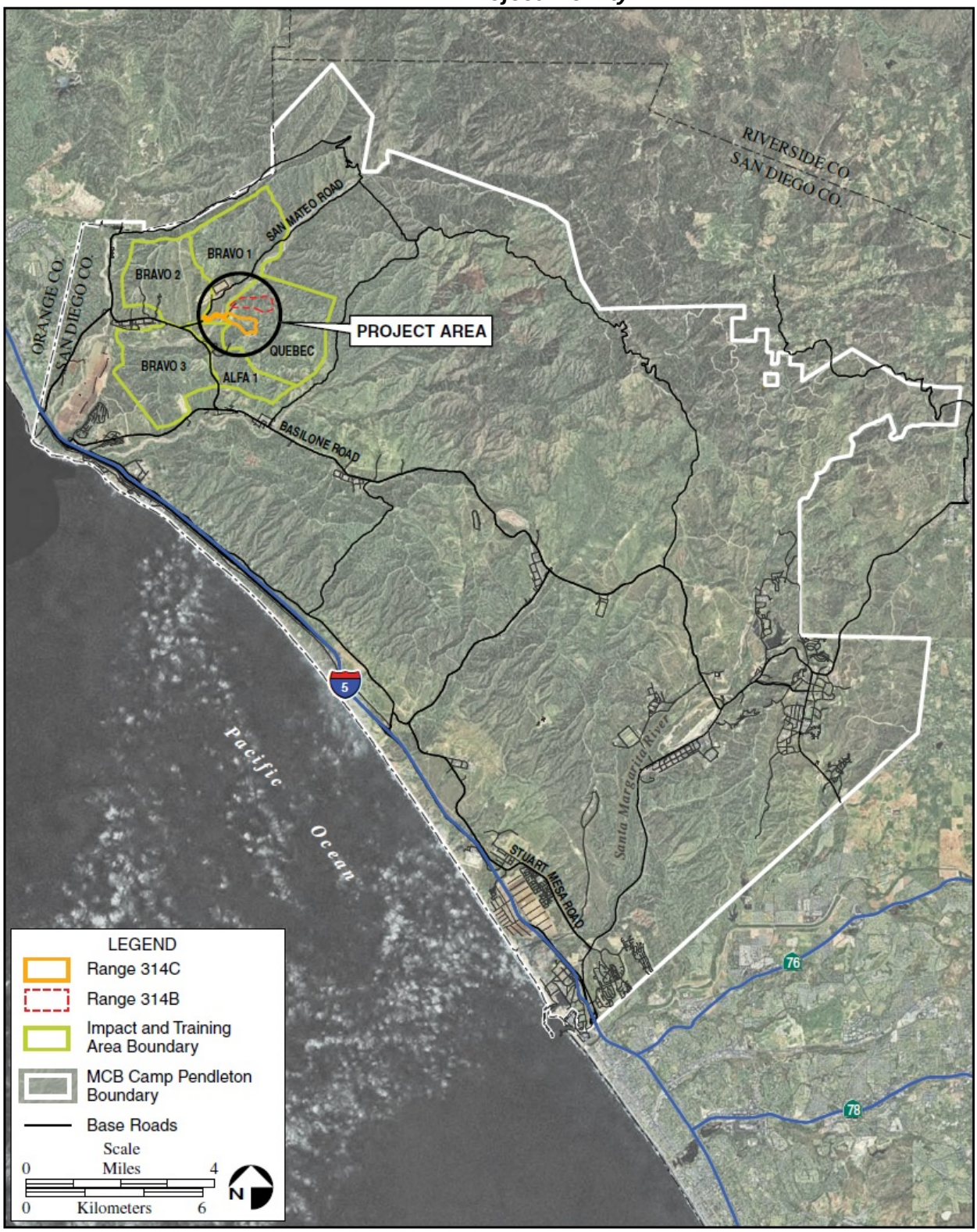
A MILCON project (P-637) is proposed for this action. This chapter describes the reasonable alternatives for accomplishing the proposed action. The CEQ *Regulations for Implementing the Procedural Provisions of NEPA* (40 CFR Parts 1500-1508) establish a number of policies for federal agencies, including "using the NEPA process to identify and assess reasonable alternatives to the proposed action that will avoid or minimize adverse effects on the quality of the human environment" (40 CFR § 1500.2 (e)). Therefore, the EA only addresses those alternatives that could reasonably meet the purpose of and need for the proposed action.

The USMC identified several selection criteria to develop reasonable alternatives that meet the purpose of and need for the proposed action. These criteria were based on the characteristics needed to accommodate a modern live-fire range, including RETS and support facilities, at MCB Camp Pendleton. These criteria include:

- A controlled location for the use of non-dud producing ordnance as part of basic training requirements;
- A location that utilizes existing infrastructures and is not limited by existing training restrictions;
- Sufficient area to accommodate required training infrastructure (e.g., firing lanes, targets, and support infrastructure);
- Maximize accessibility to facilitate required training;
- A location that avoids or minimizes potential impacts to natural and cultural resources; and
- Economic feasibility defined as funding constraints, needs, and timelines required to complete the project.

Based on a review of available sites on MCB Camp Pendleton and the need for a modernized live-fire range facility, the USMC determined that the Range 314 Complex represents the only reasonable location for the proposed action.

2.1-1 Project Vicinity



However, two locations within the Range 314 Complex (Range 314C and Range 314B) have been considered for the facility. Thus, the following two alternatives were carried forward for evaluation in this EA:

- Alternative 1: Range 314C with New Access Road/Bridge Alternative
- Alternative 2: Range 314B with New Access/Road Bridge Alternative

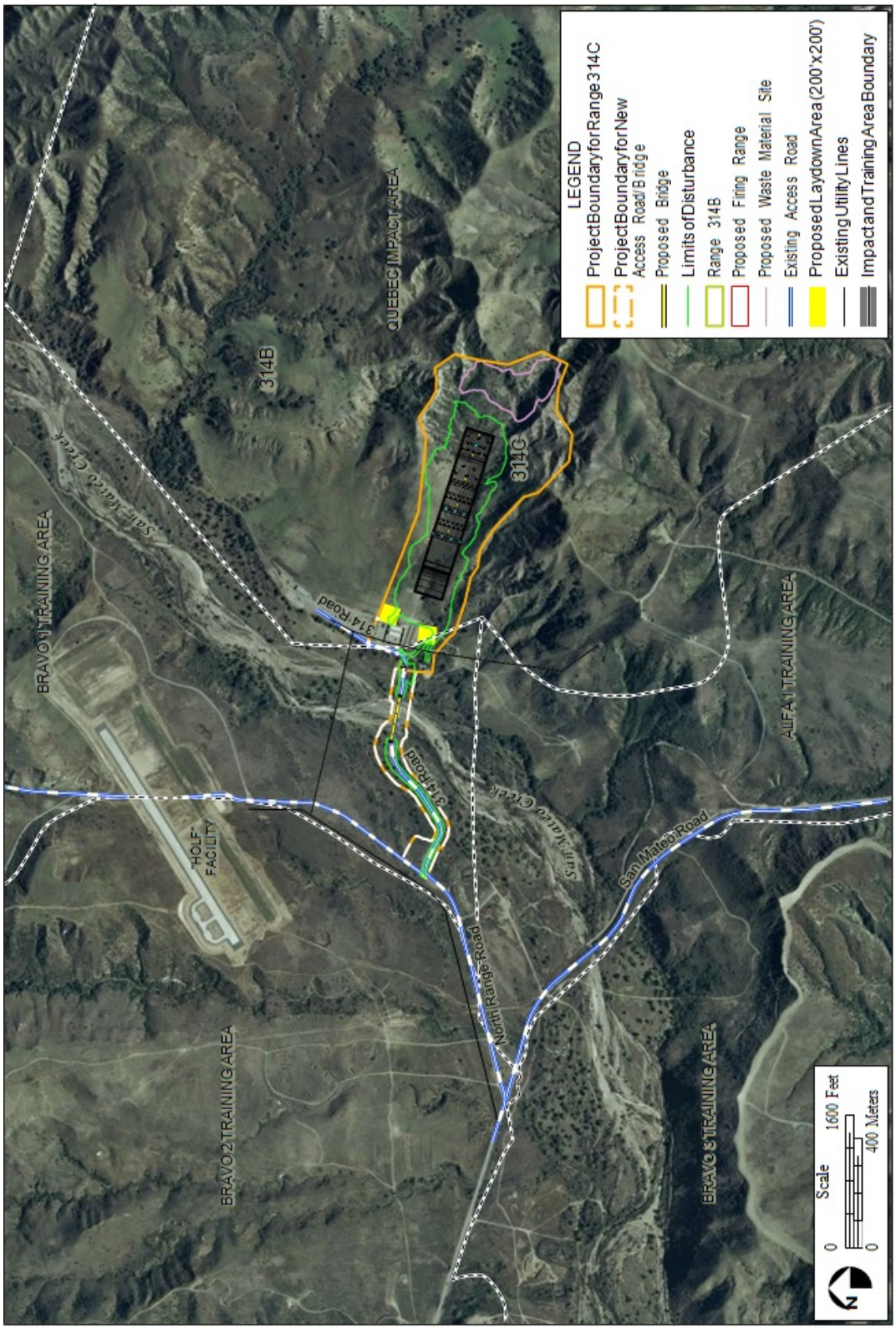
The final construction plans would be developed as part of a design-bid-build process. Therefore, minor deviations from the current conceptual plan may be required during the final design phase. The discussions below represent the conceptual design that all future project components would be based on. The conceptual project layout was designed to represent the maximum level of disturbance and all areas potentially disturbed are included within the project boundaries. All design modifications would occur within the project boundary (Figure 2.1-2). During this process, any design modifications would be reviewed and authorized by the MCB Camp Pendleton Environmental Security (ES). Final design plans would be provided to the appropriate regulatory agencies (e.g., USFWS/NMFS and USACE) before the start of construction.

2.1 Alternative 1: Range 314C with New Access Road/Bridge Alternative

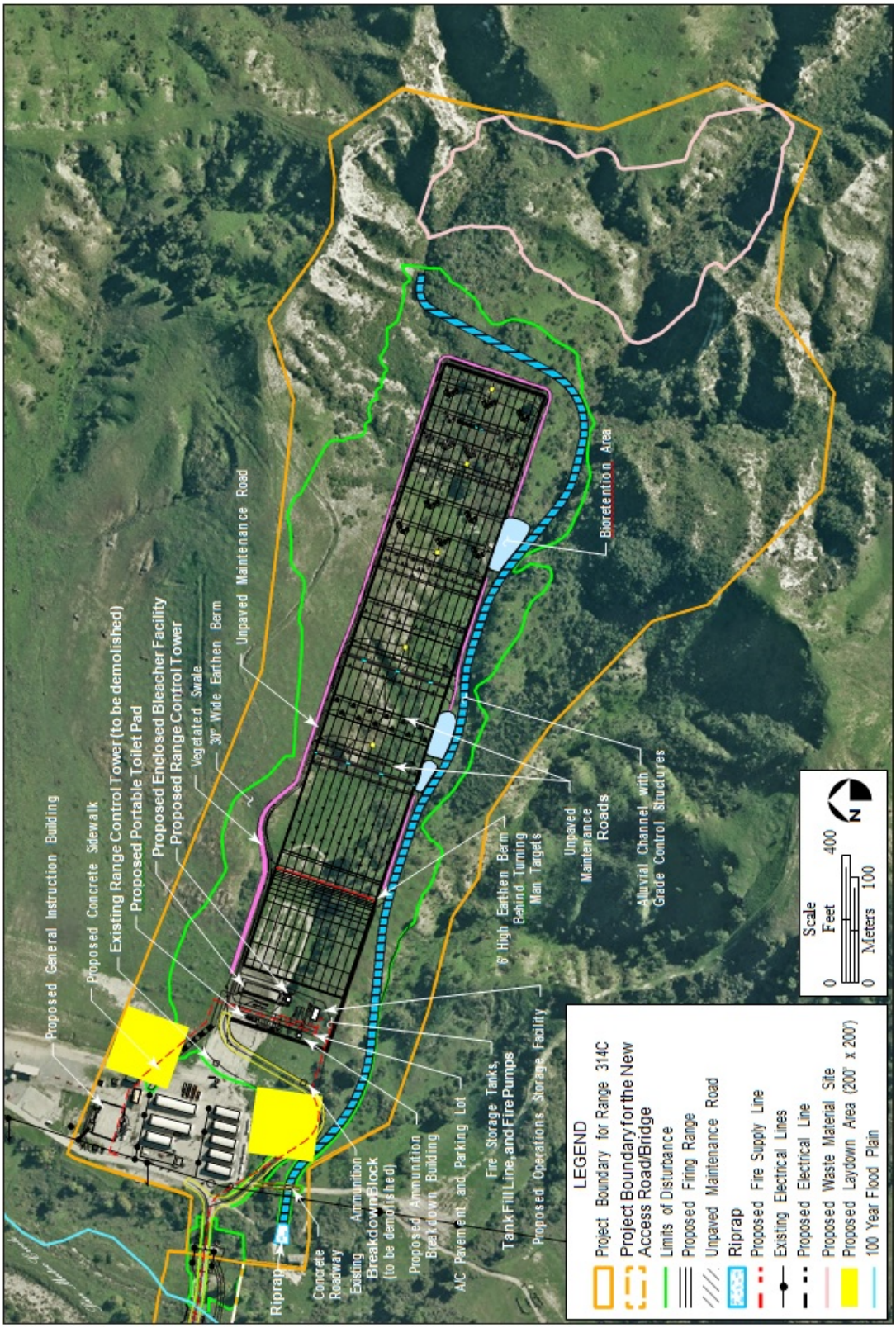
The Range 314C with New Access Road/Bridge Alternative (Alternative 1) would be located on an approximately 116 acre (67 hectare) site within Range 314C (Figure 2.1-1). The project components associated with this alternative include: demolition of existing range control tower, ammunition breakdown block, and asphalt around the proposed general instruction building; construction of RETS and support facilities (including a range control tower, operations storage facility, enclosed bleacher facility, general instruction building, and ammunition breakdown building); and construction of a bridge across San Mateo Creek and improvements to the existing access road to the Range 314 Complex. Additional supporting improvements include drainage improvements and utility infrastructure upgrades (i.e., mechanical systems, fire protection system, communication, a concrete pad to support fourteen portable toilets, electricity, and a range control system). The proposed project components for this alternative are shown on Figure 2.1-2 and described below. The conceptual layout for the proposed range is shown in Figure 2.1-3 and the layout for the new all-weather access road and bridge is shown in Figure 2.1-4.

Construction of the range would occur over approximately a 12-month period and require up to 25 workers per day. Construction of the bridge would occur over approximately a 7-month period and would require up to 10 workers per day. Unexploded Ordnance (UXO) clearance and grading of the range would take approximately five months. Construction would involve grading the project site, excavating for utility lines, pouring building/facility pad foundations, erecting structures, and installing other ancillary facilities. In general, the following equipment would be used during construction: forklift, dump trucks, scrapers, backhoes, concrete mixers, pickup trucks, loaders, cranes, compactors, electrical generators, air compressors, and miscellaneous smaller equipment (e.g., pumps). Construction staging and laydown areas would be located within the project site (Figures 2.1-2, 2.1-3, and 2.1-4). Live-fire training at Ranges 314, 314A, 314B, and 314C would stop during construction. The existing Live Fire and Maneuver Range 706, located in the northwest portion of the Quebec Impact Area near Range 314B, would be temporarily used for live-fire training during construction activities and usage of Range 314D would remain unchanged. The existing K-spans (pre-engineered or prefabricated buildings) would be utilized for bivouacking. Administrative classes and use of the indoor simulated marksman trainer would continue. The same volume of students and instructors would use the temporary road to access training sites. The temporary access road would remain unobstructed by construction vehicles and equipment during live-fire training events at Live Fire and Maneuver Range 706.

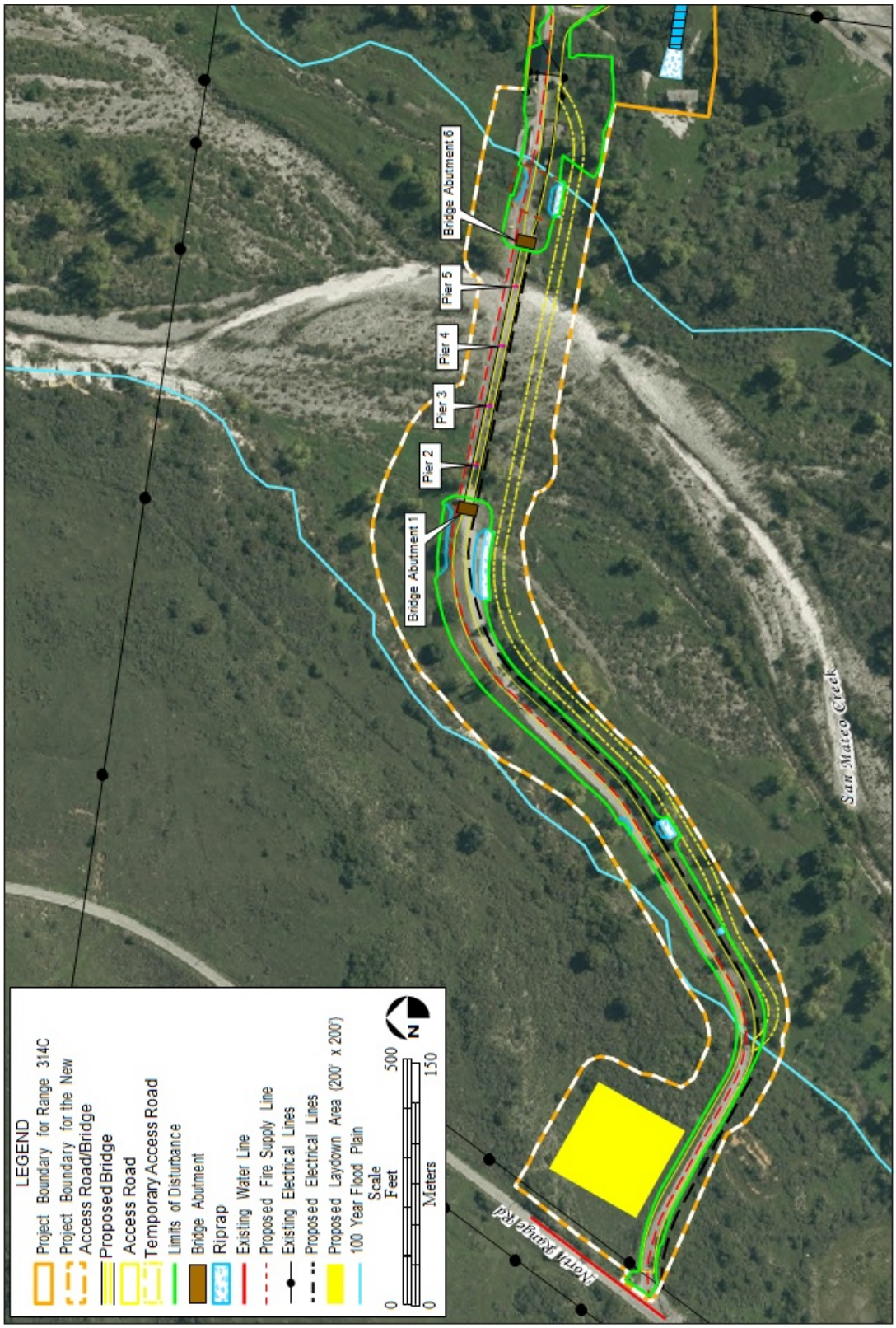
2.1-2 P-637 Infantry Squad Battle Course Range: Project Components



2.1-3 P-637 Infantry Squad Battle Course Range: Conceptual Layout for Range 314C with New Access Road/Bridge Alternative



2.1-4 P-637 Infantry Squad Battle Course Range: New Access Road/Bridge Alignment



The primary change from existing operations would be the use of modernized facilities at Range 314C. This alternative would not result in an increase in operations at Range 314C due to the construction of modernized facilities. Accordingly, there would be no consequential change in the level of operational activities associated with Alternative 1. Maintenance of Range 314C, access facilities, utilities, and drainage facilities would be conducted by the MCB Camp Pendleton Facilities Maintenance Department and Range Maintenance as needed.

Special Conservation Measures and Standard Construction Measures identified in Section 2.3 would apply to this alternative.

2.1.1 Remoted Target Systems

Proposed live-fire facility improvements at Range 314C would include installation of RETS and support infrastructure that are designed to accommodate existing small arms weapons (e.g., M16 series rifles and M4 Carbines) and training requirements employed by the USMC. The RETS provide immediate, automated feedback and scoring to the student and instructor during live-fire and moving target training. RETS ranges provide the flexibility to integrate the multiple integrated laser engagement system (MILES) training system or other similar systems through the use of the MILES target interface device (MTID). RETS support infrastructure would include buried electrical wiring for all targets, installation of stationary and moving targets, hostile fire emplacements, and related target mechanisms (Figure 2.1-3).

The range would include 12 firing lanes, each approximately 28 feet [ft] (8.5 meters [m]) in width; approximately 14 moving infantry targets (MITS); approximately 156 stationary infantry targets (SITS); and 50 turning man targets. The MITS and SITS would be concrete coffins with a 5 ft- (1.5 m-) thick protective berm. Each turning man target would be comprised of a 3 ft- (1 m-) high and 5 ft- (1.5 m-) thick concrete wall and floor that spans the width of the range. The range would have multiple firing line distances. The turning man portion would have 11 firing lines (100 m, 75 m, 50 m, 36 m, 25 m, 20 m, 15 m, 10 m, 7m, 5m, 3m) designated by physical markings on the ground and painted signs on both sides of the extents of the firing lines. The Known/Unknown Distance firing line will be a prepared pad, 10 ft by 335 ft (3 m by 102 m) across the width of the range for prone position firing.

Illuminated lateral limit markers would be installed down range on each side of the range denoting the limit of fire and would be visible to the students. If feasible, the lateral limit marker would be hardwired to the electrical system through underground conduits and tied into the nearest connection point.

2.1.2 Support Facilities

Five support facilities totaling approximately 125,080 square feet (ft^2) (1,160 square meters [m^2]) would support the RETS (Figure 2.1-3). All support structures would be situated on the northwestern portion of the project site (Figure 2.1-3). Access to this area would be via the new access road and bridge located along the western site boundary (Section 2.1.4). A parking area, consisting of eight unmarked parking spaces, would be constructed to provide parking for this area. In addition, one concrete pad to support fourteen portable toilets would be installed on an approximately 32 ft^2 (3 m^2) area.

Construction and design would be in accordance with Executive Order (EO) 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* standards; regulations stipulated in the Energy Independence and Security Act (EISA) (2007); official Department of the Navy (DoN), Marine Corps, and Leadership in Energy and Environmental Design (LEED®) design standards; Department of Defense (DoD) Low Impact Development (LID) policies (2007, 2008, 2010); NPDES General Permit for Waste Discharge Requirements for Storm Water Discharges from Municipal Separate Storm Sewer Systems (Order No. 2013-0001-DWQ; NPDES No. CAS000004) design standards; and United Facilities Criteria (UFC) 3-210-10.

On-site renewable energy could be provided by solar or photovoltaic panels installed on the roofs of the ammunition breakdown building and/or the general instruction facility. Buildings, as required, would also include ATFP features, physical security, and progressive collapse (i.e., when a structure fails and causes the collapse of adjoining structures, leading to further collapse) mitigation in accordance with UFC 4-010-10, *DoD Minimum Anti-Terrorism Standards for Buildings*.

2.1.2.1 Range Control Tower

The range control tower would be approximately 260 ft^2 (24 m^2) and provide space for two personnel conducting range training exercises and would house the required range electronics and communications equipment. The tower would be up to 20 ft (6 m) high and located approximately 66 ft (12 m) behind the firing line to provide a clear view of the firing line area and impact area. The tower would be designed with galvanized steel structure and chair, insulated metal panels walls, and standing seam metal roof. The facility would be fenced at the base and would include bird deterrent devices, roof drainage (e.g., splash blocks, down spout chains, and roof gutters), and lightning protection. The range control tower would include:

- Mechanical systems, such as heating, ventilation, and air conditioning (HVAC). Fire protection is not required for this facility.
- Electrical systems such as power distribution, lighting, telecommunications, fire alarm (connected to the Base alarm via phone), and a public address system for the range. Lighting would include red and white lighting, inside and out, to allow use at night with minimal effect on night vision. Emergency lighting would be provided for all exits. A warning light to indicate that the range is in use (i.e., 'hot') would be installed on the roof. The tower would also provide lighting to illuminate the firing line with instant on fixtures in case of emergency.
- Site utilities including connection to electrical and telephone.

Existing utility infrastructure would be upgraded as necessary to meet the requirements of the new range control tower. Site improvements would include earthwork and grading.

2.1.2.2 Operations Storage Facility

The operations storage facility would provide office space for range personnel and storage space for supplies, spare parts, and tools (on separate sides of the building). Target maintenance would also occur in this building. The operations storage facility would occupy an approximately 800 ft^2 (74 m^2) area west and south of the range control tower. The building would be constructed of concrete masonry unit walls, a metal roof on a concrete slab, and would include bird deterrent devices and lightning protection features. The operations storage facility would include:

- Mechanical systems, including a ground-mounted HVAC unit and vent storage area. Fire protection is not required for this facility.
- Electrical systems such as power distribution, lighting, telecommunications, fire alarm (connected to the Base alarm via phone). Lighting would be the same as described above for the range control tower. No data connection is required for this building.
- Site utilities including connection to electrical and telephone.

Existing utility infrastructure would be upgraded as necessary to meet the requirements of the new operations storage facility. Site improvements would include earthwork and grading.

2.1.2.3 Enclosed Bleacher Facility

The enclosed bleacher facility would provide a pre/post training area instruction for up to 440 fully equipped Marines and would occupy an approximately 3,300 ft^2 (306 m^2) area at the west end of the range behind the range control tower so as not to obstruct range views from the tower (Figure 2.1-3). The facility would be constructed of a concrete slab with pre-engineered metal shade structure. Metal skirt sides would be installed on the three sides not facing the firing range. The side skirts would not extend to the ground to allow for a breeze. A railing and paved area would be provided. The facility would include bird deterrent devices, roof drainage (e.g., splash blocks, down spout chains, and roof gutters), and lightning protection. The enclosed bleacher facility would include:

- Electrical systems such as power distribution and lighting. No data connection is required for this building. Lighting would include red and white lighting, inside and out, as described for the range control tower. One electrical receptacle would be provided.
- Site utilities including connection to electrical.

Existing utility infrastructure would be upgraded as necessary to meet the requirements of the new enclosed bleacher facility. Site improvements would include earthwork and grading.

2.1.2.4 General Instruction Building

The general instruction building would provide instruction space for up to 440 Marines and would be constructed of concrete masonry unit walls and a metal roof on a concrete slab. The building would occupy an approximately 7,965 ft^2 (740 m^2) area north of the existing K-span structures and west of the existing bleachers (Figure 2.1-3). The building would allow for the option of mounting solar or photovoltaic panels and would include bird deterrent devices, roof drainage (e.g., splash blocks, down spout chains, and roof gutters), and lightning protection. In addition, the building would incorporate ATFP features in compliance with UFC 4-010-01, Change 1. The general instruction building would include:

- Mechanical systems including a ground-mounted HVAC unit. Fire protection is not required for this facility.
- Electrical systems such as power distribution, lighting, telecommunications, fire alarm (connected to the Base alarm via phone), audio/visual system and microphone. Lighting would be the same as described above for the range control tower. No data connection is required for this building.
- Site utilities including connection to electrical and telephone.

Existing utility infrastructure would be upgraded as necessary to meet the requirements of the general instruction building. Site improvements would include earthwork and grading.

2.1.2.5 Ammunition Breakdown Building

The ammunition breakdown building would provide space for breaking down and issuing ammunition to personnel involved in range training exercises. It would not be used for storage. The 194 ft^2 (18 m^2) building would be located southwest of the range control tower behind the firing line and would comply with the mandatory 50-ft (15-m) ATFP setback from all other buildings (Figure 2.1-3). The building would be designed with a concrete slab (high enough above the finished grade to keep ammunition dry while being issued), a single slope shed roof facing south to allow for the option of mounting solar or photovoltaic panels, bird deterrent devices, roof drainage (e.g., splash blocks, chain down spout, and

gutters at the roof), and lightning protection. The ammunition breakdown building would include the following support facilities:

- Electrical systems such as power distribution and lighting. No data connection is required for this building. Lighting would include red and white lighting, inside and out, as described for the range control tower. One electrical receptacle would be provided.

- Site utilities including connection to electrical.

Existing utility infrastructure would be upgraded as necessary to meet the requirements of the ammunition breakdown building. Site improvements would include earthwork and grading.

2.1.3 Site Improvements

2.1.3.1 Demolition

An obsolete range control tower and ammunition breakdown block would be demolished to support construction of the range upgrades (Figure 2.1-3). In addition, existing asphalt would be removed in the location of the proposed general instruction building for compliance with ATFP setbacks. Testing of on-site facilities for lead has been completed. None of the samples collected contained lead in concentrations that exceed the California Division of Occupational Safety and Health or United States Environmental Protection Agency (USEPA) action limits. Pre-test visual inspections by a licensed inspector deemed asbestos tests unnecessary. The demolition debris (i.e., building or infrastructure debris) would be hauled to an approved disposal location either on- or off-Base. Demolished asphalt would be reused/recycled or transported to an approved landfill. Hazardous waste and demolition waste would be contained, tested, handled and disposed/recycled in accordance with Base, local, state, and federal laws and requirements.

2.1.3.2 Grading

Development of the range, including RETS, support facilities, and site improvements, would require grading of up to approximately 41 acres (17 hectares). The range elevation would be raised from existing levels to maintain a balance of earthwork. Most earthwork would consist of cutting slopes around the 1,968-ft (600-m) long range and placing waste fill material (i.e., soil removed from the project site) behind the 1,968-ft (600-m) firing line. Excess soil would remain on site within the waste material site, which is a designated area not to exceed 11 acres (5 hectares) (Figure 2.1-3). During earthwork, soil would be stockpiled in a manner that would facilitate survival of mycorrhizal organisms. Graded slopes would have varying steepness and would be stabilized by a combination of methods (e.g., jute netting, geo-textile fabrics, fiber rolls, planting, coir erosion netting/blankets, or other effective materials). Slopes would be contoured to the extent possible to provide smooth transitions between the proposed grading and the adjacent landforms. Following grading, the cut slopes would also be stabilized through revegetation in accordance with Special Conservation Measure 11, described in Section 2.3. The new access road and bridge would require grading of up to approximately 2 acres (1 hectare).

All grading/excavation activities would be conducted in compliance with 40 CFR Part 260 (*Federal Hazardous Waste Regulations*), the Resource Conservation and Recovery Act (RCRA), CWA, California Code of Regulations (CCR) Title 22 (*Minimum Standards for Management of Hazardous and Extremely Hazardous Wastes*), and USEPA *Best Management Practices (BMPs) for Lead at Outdoor Shooting Ranges* (EPA-902-B-01-001). Work would be accomplished with every effort to prevent the spread of any potential contamination or release of any potential existing contaminants to the environment in accordance with all federal, state and local laws, regulations, and instructions.

Range soil would remain within the range boundary and shot fall area. In the event soil is removed from the project site, appropriate hazardous constituent sampling and testing would be completed in accordance with the regulations noted above. If soil and/or construction debris is determined to be hazardous waste, it would be packed, stored, and transported in accordance with 40 CFR Part 260 and CCR Title 22 regulations. In addition, if any wood and construction debris to be removed has been used in live-fire training and received impact from rounds, the debris should be sampled for lead and other constituents. Any treated wood materials (e.g., power poles) removed during project activities but not recycled would undergo the California Waste Extraction Test, and wastes failing the test would be disposed of as a regulated hazardous waste per the California Health and Safety Code Sections 25150.7 and 25143.1.5. Hazardous waste would be stored in compliance with local, state, and federal regulations and removed from the Base within 60 days of initial generation. Proper waste manifest procedures would be followed for all waste generated and transported off MCB Camp Pendleton. All hazardous waste manifests would be signed and approved by MCB Camp Pendleton ES, Hazardous Waste Section personnel before the waste leaves the Base. In the event lead or copper is removed from the project site, it would be recycled in compliance with Base Qualified Recycling Program (QRP) regulations.

2.1.3.3 Unexploded Ordnance Removal

Removal of UXO would be required to accommodate proposed site improvements. The range would be cleared before construction begins. Surface and subsurface UXO clearance would be completed in accordance with standard operating procedures (Appendix B), a Work Plan, and a Health and Safety Plan. Surface clearance operations in sensitive areas (environmental and/or archaeological) would be conducted in accordance with all federal, state, USMC, and MCB Camp Pendleton regulations and orders.

UXO accumulated during removal activities would be blown up in place or consolidated at a collection point and transported off-site. Munitions components would be removed, stored, transported, and disposed of in accordance with the Military Munitions Rule (40 CFR Part 266, Subpart M) and MCB Camp Pendleton standard practices. In addition, UXO removed from the site would be transported in accordance with DoD shipping controls applicable to the transport of military munitions. Proper hazardous waste manifest procedures would be followed for all munitions components transported off-Base. MCB Camp Pendleton ES, Hazardous Waste Section personnel are the only personnel authorized to sign manifests for the Base. All hazardous waste manifests would be signed and approved by MCB Camp Pendleton ES, Hazardous Waste Section personnel before the waste leaves the Base. In the event UXO is found during construction activities, the “Three R’s” method would be used: Recognize, immediately Retreat, and Report to Longrifle (MCB Camp Pendleton Range Control) first and to the Provost Marshall’s Office second.

2.1.3.4 Drainage

On-site drainage improvements may include construction of ditches, vegetated swales, an alluvial channel, and bio-retention basins that would provide stormwater control of run-on and runoff flows and sheetflow from the range (Figure 2.1-3). The ditches and a vegetated swale would be constructed along the northern boundary of the range to convey stormwater flows to an existing dual corrugated metal pipe culvert that discharges to San Mateo Creek. The vegetated swale would consist of a 10-ft (3-m) top width, a 2-ft (0.6-m) base width, and 3H:1V side slopes. Drought tolerant, native vegetation would be established within the flow path.

An alluvial channel would be constructed along the southern edge of the range to re-create two existing jurisdictional drainages, defined as Waters of the United States (U.S.) and regulated by the USACE, that would be permanently impacted by construction of the proposed range (Figure 2.1-3). The channel would be 25-ft (8-m) wide at the top with a 10-ft (3-m) wide base with 2h:1V side slopes. The channel would

not be lined with concrete or any other hard material that may pose a threat to personnel using the firing range. Rather, it would be lined with high performance turf reinforcement matting (which is pervious and allows vegetation to grow) and vegetated with native grasses and native trees. An Arizona crossing (i.e., low-water crossing consisting of a raised concrete slab) would be installed within the existing access road to allow flows from the alluvial channel to continue downstream of the channel. Natural riprap energy dissipaters would be installed downstream of the Arizona crossing and before the outfall to San Mateo Creek.

Bio-retention basins would be constructed along the southern range boundaries within the open spaces created by the alluvial channel (Figure 2.1-3). The bio-retention areas would include a 2-ft (0.6-m) layer of engineering media and a 6-inch (15-centimeter) sub-drain. Native vegetation would be established along the surface of the bio-retention areas.

The drainage facilities would be designed to comply with DoN design manuals and local standards and guidelines, and the regulations stipulated in UFC 3-210-10 for LID. Per LID requirements, a comprehensive set of stormwater planning, design, and construction elements must be used to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow. This requirement would be achieved with LID techniques using the 95th percentile, 24-hour storm, or via a site-specific hydrologic analysis using continuous simulation modeling or other tools. Additionally, the policies set forth a goal of reduced pollutant loading. LID techniques may also be used to meet LEED requirements.

2.1.4 Improved Range Access Road and New Bridge

Range 314C is currently accessed via North Range Road and 314 Road. The access road to the Range 314 Complex (314 Road) extends eastward from North Range Road onto the project site crossing San Mateo Creek. The road is currently approximately 3,000 ft long and 20 ft wide throughout and is composed of gravel and asphalt. The existing road crosses San Mateo Creek via an unimproved streambed crossing. No formal crossing structures exist where the road and San Mateo Creek meet. When seasonal storms increase flows in San Mateo Creek, the crossing is impassable. Therefore, a bridge and upgrades to the existing access road are planned as part of this alternative to provide year-round, all-weather access to the Range 314 Complex (Figure 2.1-4).

The existing access road would be improved with asphalt with embedded side edges. The improved road would follow the existing grade and alignment to the extent feasible. The bridge would be approximately 16 ft (5 m) wide and 560 ft (171 m) long and would include one 13 ft (4 m) wide lane for vehicular traffic and a 1.5 ft (0.5 m) wide barrier on each side of the bridge. The bridge would be constructed to clear the 100-year flood level. During a 100-year storm event, it is anticipated that there would be an 8-ft (3-m) wide dry driving surface on the bridge deck. Stormwater runoff would be removed from the bridge deck through openings in the bridge barrier. Runoff would fall into the creek.

The existing creek crossing road would be removed and the areas restored to natural conditions following construction of the new road and bridge.

The bridge would include four 9-ft (3-m) diameter piers and two abutments. Culverts would be placed along the road and bridge approaches, as necessary, to allow arroyo toad and stormwater passage and to reduce stream impediment. The new bridge would be constructed with concrete. Traffic signals would be installed at both ends of the bridge approaches to control traffic. The posted speed on the road would remain 15 miles per hour following construction. During construction, temporary site access would be provided as described in Section 2.1.6.1.

A 24-ft wide, asphalt driveway would be constructed to provide vehicular access between Range 314 Range Road and Range 314C. The road would be gated to restrict access to authorized vehicles only. In addition, a staircase for direct pedestrian access to the range would be constructed.

A 12-ft wide, gravel maintenance road would be constructed from the proposed parking lot along the northern boundary of the range adjacent to the vegetated swale to provide access to the range and behind each grouping of targets. Turnarounds would be provided at the end of each access road. A gate would be installed at the base of the range access road to restrict access to authorized vehicles only.

2.1.5 Utilities

Utility system upgrades and modifications would be required to support the live-fire Infantry Squad Battle Course Range and support facilities.

Water. Potable water is not currently provided to Range 314C.

Fire Protection System. As described in Section 1.1, a waiver has been obtained to remove the requirement for a fire protection water system from the scope of the proposed action. However, this alternative includes the fire protection system in the event that it is needed in the future. Therefore, the project could include construction of a fire protection system comprised of two 83,000-gallon (314,000-liter) water tanks, a non-potable well (approximately 100 ft [30 m] deep) that would feed the tanks, a booster pump station, fire hydrants, and water distribution lines from the tanks to the fire hydrants. One hydrant would be located on top of the range and the other near the new general instruction building. The fire protection tanks would be used by MCB Map Pendleton Fire Protection as needed. The tanks could also provide water for on-site irrigation if necessary. The tank maintenance and testing would be conducted by MCB Camp Pendleton personnel consistent with all public utilities on Base.

In lieu of a well, a potable water line could be used to feed the water tanks. The potable water line would be installed along the Range 314 access road, mounted on or in the proposed bridge, and would tie-in to the existing water line in North Range Road. Water infrastructure would be designed and constructed in accordance with CCR Title 22 (*Lead and Copper Rule*) and would be designed to comply with DoN design manuals and local standards and guidelines.

Communication System. Communication system improvements would include provisions for telephones, a fire alarm system, and public address system. The public address system would include pole-mounted, out-door type speakers connected back to the range control tower. The system would be capable of broadcasting audible instructions and alarms throughout the range.

Natural Gas. No natural gas would occur on the project site.

Sewer System. Range 314C does not currently connect to the Base sewer infrastructure. A 32 ft^2 (3 m^2) concrete pad would be constructed within the project site to support fourteen portable toilets.

Electrical. Electrical power service lines would be installed at the project site with connections to buildings and other support structures (e.g., lighting and range control system) on the range and to the bridge. These lines would connect to an existing overhead transmission line that runs adjacent to the project site (Figures 2.1-2 and 2.1-3). Electrical and power lines would be buried within the boundaries of Range 314C. The power distribution system would include main circuit breaker and feeder-breakers, lighting, electrically powered targets, and receptacles. The ammunition breakdown building and general instruction facility would include roofs facing south to allow for the option of mounting solar or

photovoltaic panels. Three new wooden poles with cross-arms and insulators would be installed outside of the range. The overhead lines would be designed to conform to MCB Camp Pendleton requirements.

Lighting System. Exterior lighting would be installed for safety purposes and to illuminate range areas, including night training lights at the initial positions fire line and lighted lateral limits signs. Light fixtures mounted on building exterior and poles would provide emergency lighting. Lighting for the range would be placed on poles behind the shooting locations to avoid damage from shooting operations. Lighting fixtures would be controlled by a centralized lighting control panel. Interior lighting would be provided with energy efficient fluorescent lamps and electronic ballasts. Exterior and interior lighting in the immediate vicinity of the range would have alternate red-lighting for normal night-time operations. The red lights would be switched separate from white lights and provisions would be included to prevent accidental illumination of white lights while red lights are in use. Lighting would be directed away from sensitive riparian habitat to the maximum extent practicable. For lighting of the bridge, pedestrian-style fixtures would be installed. These fixtures would be automatically activated by photocells.

Range Control System. A range control system would remotely control targets, run automated simulations of targets, and collect shooting accuracy data. The system would include a computer terminal, data and termination rack, and a combination of fiber optic and cable to the target locations. The computer terminal would be located within the range control tower.

2.1.6 Temporary Site Access and Staging Areas During Construction

2.1.6.1 Temporary Site Access

During construction, a temporary, unimproved creek crossing located downstream of the existing crossing would be used as the single point of access to the Range 314 Complex (Figure 2.1-4). This crossing would be utilized by both the range users and Construction Contractors during construction of the access road and bridge. In addition, temporary access south of the K-span buildings would be required for use by construction vehicles to reach down-range areas of Range 314C.

2.1.6.2 Staging Areas

The staging area for the bridge and road construction would be approximately 200 ft (61 m) by 200 ft (61 m) and located adjacent to North Range Road and north of the proposed access road located in the Bravo One Training Area (Figure 2.1-4). The staging areas for the range construction and upgrades would be located either south or northeast of the K-spans (Figure 2.1-3).

2.2 Alternative 2: Range 314B with New Access Road/Bridge Alternative

The Range 314B with New Access Road/Bridge Alternative (Alternative 2) includes constructing a live-fire Infantry Squad Battle Course Range with targets, supporting facilities, and utilities on approximately 137 acres (55 hectares) at the existing Range 314 multipurpose training facility (Range 314B). Development under this alternative would include the same proposed project components and range design as Alternative 1 (Figures 2.1-2, 2.1-3, and 2.1-4). In addition, Alternative 2 would include construction of a new access road and bridge in the same location and according to the same design as described for Alternative 1. The project site is located approximately 0.25 mi (0.4 km) to the north of Range 314C (Figure 2.1-1 and 2.1-2).

Alternative 2 would require more site grading to accommodate site improvements compared to Alternative 1 due to the existing topography at Range 314B. Therefore, a greater area for UXO clearance

would be required compared to Alternative 1. In addition, the proposed utility system upgrades would require extending the existing utility lines approximately 0.5 mi (0.8 km) to reach Range 314B.

The Special Conservation Measures and Standard Construction Measures identified in Section 2.3 apply to this alternative unless otherwise noted.

2.3 Special Conservation Measures and Standard Construction Measures

2.3.1 Special Conservation Measures

The following Special Conservation Measures would be included in all the action alternatives, as applicable. These measures would be included as contract requirements on all relevant project scoping, scheduling, design, construction, and planning documents.

2.3.1.1 Topography, Geology, and Soils

Special Conservation Measure 1. Slope and Soil Stability. Recommendations provided in the Geotechnical Reports (Kleinfelder 2012, 2013, and 2014) would be adhered to during final project design and construction to prevent slope instability and seismically induced damage.

2.3.1.2 Water Resources

Special Conservation Measure 2. Temporary Erosion Control Measures. Temporary erosion control measures would consist of bonded fiber matrix with local native hydroseed, in accordance with an approved Revegetation Plan (see Special Conservation Measure 10). All disturbed slopes would require the application of a bonded fiber matrix with a local native hydroseed mixture. Any disturbed portion of the project site left unattended for more than 14 days would be covered to prevent erosion during construction. When hydroseed cannot be established in advance of forecasted rain, another equally effective erosion control method (e.g., coir erosion blankets) would be applied in accordance with the General Construction Permit obtained from the SWRCB and installed to manufacturer's specifications. Photodegradable double nylon straw blankets would not be utilized. All erosion control materials would be weed-free.

Special Conservation Measure 3. Temporary Sediment Control Measures. Temporary sediment control practices would be applied throughout the construction phase within the project site and would include fiber roll and/or silt fence perimeter protection, fiber roll slope protection, gravel bag, check dam protection, and a minimum of one stabilized construction entrance. A proposed basin, located adjacent to the access road that leads up to the firing range, would serve as a sediment basin during construction activities.

Special Conservation Measure 4. Permanent Erosion Control Practices. Permanent erosion control practices would be applied to the project in the form of riprap energy dissipaters at all proposed channel discharge locations. The alluvial channel would be lined with high-performance turf reinforcement matting (which is pervious and allows vegetation to grow) and vegetated with native grasses and native trees. An effective slope of six percent would be achieved through evenly spaced grade control near the upstream portion of the meandering alluvial channel. An effective slope of 0.5 percent would be achieved where the alluvial channel parallels the range.

Special Conservation Measure 5. Construction, Operation and Maintenance of an On-site Drainage System. A drainage system would be constructed at the facility to minimize impacts to water resources.

The system would be designed and located to provide on-site stormwater retardation of runoff flows, trap eroded soils, and filter out surface water contaminants. The drainage system would implement LID in accordance with EISA (2007) and official DoN, USMC and DoD LID policies (2007, 2008, 2010). The system would include various stormwater management features, which may include, but are not limited to vegetated swale(s), an alluvial channel, and bio-retention basins (Figure 2.1-3). The bio-retention basins would be of sufficient size to manage anticipated water flows and volumes.

A Maintenance Plan for the on-site drainage system would be prepared by the project Design Contractor and approved by MCB Camp Pendleton before the start of construction. This plan would include measures to address the following maintenance issues:

- Management of trash, debris, and excessive sediment.
- Vegetation trimming to maintain a clear flow path.
- Visual inspection of conveyances before and after storm events to be sure the systems are clear of trash, sediment, and debris.
- Hydro-jetting, as necessary, to clear blocked storm drain pipes or culverts.
- Clearing riprap areas of sediment; clearing activities include removing the riprap, clearing excessive sediment and debris, checking filter fabric, and placing riprap back as it was designed.
- Removal and replacement of the engineered media in the bio-retention areas to remove clogging from fine sediment.

Special Conservation Measure 6. Scour Protection. Recommendations provided in the Storm Water Protection Report (RBF Consulting 2014) and Geotechnical Reports (Kleinfelder 2012, 2013, and 2014), would be adhered to during access road/bridge final design and construction to prevent scour adjacent to piers and embankments, as required.

Special Conservation Measure 7. Stockpile Containment. Stockpiles of soil would be properly contained and covered to eliminate or reduce sediment transport from the site to streets, drainage facilities, or adjoining properties via runoff, vehicles, tracking, dispersal by wind and to minimize impacts to water quality and arroyo toads.

Special Conservation Measure 8. On-site Equipment and Vehicle Washing. Runoff from on-site equipment and vehicle washing would be contained at the construction site and would not be discharged to receiving waters or the local storm drain system.

2.3.1.3 Biological Resources

Special Conservation Measure 9. Avoid Impacts on Migratory Bird Treaty Act-Protected Species. To the maximum extent feasible, vegetation removal would occur from 01 September to 14 February, which is outside the bird breeding season for nesting birds under the Migratory Bird Treaty Act (MBTA). Trimming or removal of vegetation during the peak breeding season (15 February to 31 August) would require a pre-activity survey by a qualified wildlife biologist, hired by the project proponent and approved by MCB Camp Pendleton ES, to confirm that active nests would not be affected. The wildlife biologist must conduct the survey within three days of the start of vegetation removal.

Special Conservation Measure 10. Avoid and Minimize Disturbance to Upland Native Plant Communities; Develop a Revegetation Plan to Compensate for Disturbance to Native Plant Communities. The final project would be designed to minimize impacts by reducing disturbance

footprints to native grassland and areas densely vegetated with native vegetation to the maximum extent practicable. In addition, staging areas or other temporary construction-related requirements would be located on previously disturbed areas to the maximum extent feasible. For native plant communities impacts that would not be avoided by the project design, the Construction Contractor would develop a Revegetation Plan that would be approved by MCB Camp Pendleton ES before the start of construction. MCB Camp Pendleton ES would provide a copy of the Revegetation Plan to the USFWS for comment, review, and approval. The Revegetation Plan would be submitted to the USFWS before initiating project activities that would impact federally listed species. This plan would include the following:

- The Revegetation Plan would include the proposed restoration location, existing conditions of the restoration site, methodology for creating/restoring habitat, monitoring requirements and time periods, success criteria, and follow-up measures if needed.

- For temporary impacts to federally listed species occupied habitat, restoration would be initiated within six months of completion of construction.

- The Revegetation Plan would address all revegetation efforts associated with the proposed action and include specific erosion control measures, irrigation requirements, species composition, seed mix origins and ratios, weed control, water regimes, maintenance activities, success criteria, and monitoring requirements. Weed treatment addressed in the Revegetation Plan would include all erosion control areas and permanent non-vegetated areas such as gravel associated with erosion control features. The plan components would be implemented as soon as feasible after construction.

- Temporary disturbance to riparian habitat would be restored in accordance with the *BO (1-6-05-F-02), Programmatic Activities and Conservation Plans in Riparian and Estuarine/Beach Ecosystems on MCB Camp Pendleton* (Riparian BO) (USFWS 1995a).

- The Revegetation Plan would consider replacing disturbed native vegetation. In addition, for upland areas temporarily impacted, the Revegetation Plan would consider the appropriate planting mix for the areas of the project site relative to impact conditions, fire spread potential, and annual fire maintenance activities. Seed mixes used for native grassland and coastal sage scrub revegetation would be from locally collected sources. A suggested seed mix includes the following species: purple needle grass (*Stipa* [= *Nassella*] *pulchra*), black sage (*Salvia mellifera*), coastal sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), golden yarrow (*Eriophyllum confertiflorum* var. *confertiflorum*), California everlasting (*Pseudognaphalium microcephalum* [= *Gnaphalium canescens* ssp. *microcephalum*]), deerweed (*Acmispon glaber* [= *Lotus scoparius*]), sticky monkeyflower (*Mimulus aurantiacus*), and vinegarweed (*Trichostema lanceolatum*). The Construction Contractor would obtain approval of seed mixes, container plants, and planting/seeding methods proposed for use in revegetation.

- The Revegetation Plan would outline a monitoring program for the revegetated areas, including success criteria and the duration and frequency of monitoring. Non-native invasive species should be monitored and treated with Base-approved herbicides for a minimum of three years following application of the first treatment. Areas impacted by construction would be inspected by MCB Camp Pendleton ES within one year following the completion of construction to determine whether any remedial measures are required. Remedial measures may include reseeding/replanting, weed control, watering, and/or erosion control. The results of the monitoring would be summarized in an Annual Monitoring Report and would indicate if success criteria have been met. The Construction Contractor would obtain approval of the monitoring

methods proposed for use in revegetation. The Annual Monitoring Report would be submitted to MCB Camp Pendleton ES annually until the success criteria are met.

- A Post Project Report would be prepared that details the exact acreage of all vegetation communities, including riparian, that were impacted by the project.

Special Conservation Measure 11. Revegetate Cut Slopes and the Waste Material Disposal Areas with Drought Tolerant Local Native Vegetation. Cut slopes, staging, and lay down areas not planned for development would be restored and revegetated to their original condition, or better, using local, native, drought tolerant vegetation in accordance with the Revegetation Plan (Special Conservation Measure 10). The affected areas would be stabilized to prevent erosion during and following construction per standard construction BMPs. The removed soil (waste material) site would be delineated before construction, and placed to minimize the disturbance area while maintaining approximately the same topographic characteristics of the site. To the extent feasible, topsoil would be collected in areas of native vegetation to conserve natural seed banks and stockpiled for replacement where cut slopes are to be revegetated. To the extent practicable, soil layers excavated from the site would be returned in the same order they were removed (i.e., the topsoil is to be returned to the topmost level). In accordance with Standard Construction Measure 15, topsoil would be stockpiled in a manner that would facilitate survival of mycorrhizal organisms.

Special Conservation Measure 12. Exotic Plant Species Control. All equipment and/or vehicles would be power-washed before entering MCB Camp Pendleton property and the project site. While washing wheeled vehicles, the front wheels would be turned lock-to-lock to allow for exposure of surfaces that may hold weed seeds. This is to control the spread of invasive (non-native) weeds and is in support of EO 13112, National Invasive Species Act, Federal Noxious Weed Act, the Noxious Plant Control Act, and MCO P5090.2A, 11200.7 that requires installations to restrict the introduction of exotic species into natural ecosystems.

Species-Specific Impact Avoidance, Minimization, and Compensation Measures

In addition to locating the proposed action in previously disturbed areas, such as roads and graded and paved areas, and the incorporation of the abovementioned general avoidance and minimization measures, the proposed action incorporates a number of species-specific measures to ensure the avoidance of take and minimization of environmental impacts to listed species. These are described below and would be required of the Construction Contractor.

Special Conservation Measure 13. Avoid Impacts on Southwestern Willow Flycatcher, Least Bell's Vireo, and Other Sensitive Riparian Wildlife Species and Habitats.

a. Parking, driving, laydown, stockpiling, and storing vehicles and equipment would be limited to existing roads and previously compacted and developed area. No off-road traveling would be permitted outside the project boundary.

b. Due to the known proximity of federally listed species, any removal of surface vegetation occurring within 1,600 ft (500 m) of San Mateo Creek would not be scheduled between 15 March and 31 August, to the maximum extent feasible, to avoid potential impacts to nesting. If surface vegetation removal cannot be completed outside of the breeding season, a nest survey would be completed within 330 ft (100 m) of proposed vegetation removal by a MCB Camp Pendleton ES-approved biologist immediately before construction to ensure that no nests would be affected. If active nests are observed, the biologist, in coordination with MCB Camp Pendleton ES and USFWS, would determine adequate setbacks from nests to prevent nest disturbance.

c. Grading and removal of riparian vegetation would be minimized. Subsequent construction in woody riparian habitat would occur outside of the southwestern willow flycatcher/least Bell's vireo breeding season (15 March to 31 August) whenever feasible.

d. A qualified biologist would be required for project work adjacent to the San Mateo Creek riparian corridor during the breeding season. The biologist would be a trained ornithologist with at least one field season (minimum of 40 hours) of documented experience conducting least Bell's vireo and southwestern willow flycatcher surveys. The biologist would also be capable of visual and auditory identification of typical southern California riparian bird species. Qualifications for this biologist would be reviewed and approved by MCB Camp Pendleton ES before initiation of this action. If deemed appropriately qualified, a single person may act as the arroyo toad and bird biologist.

e. If seasonal avoidance is not feasible, at least three protocol-level pre-construction surveys would be conducted by the approved biologist in accordance with USFWS requirements for the least Bell's vireo and southwestern willow flycatcher and their active nests in all suitable habitats within 330 ft (100 m) of the proposed construction area and weekly throughout the breeding season. The biologist would not be authorized to use recorded vocalizations to locate or attract vireos or willow flycatchers. If an active southwestern willow flycatcher or least Bell's vireo nest occurs within 250 ft (76 m) of the proposed construction corridor, the biologist would coordinate with MCB Camp Pendleton ES to determine whether project activities need to be temporarily modified or halted to avoid impacts to these species. MCB Camp Pendleton ES would coordinate with the USFWS directly to discuss potential additional avoidance measures, such as sound attenuation devices. An approved biologist would monitor nest progress and construction activities in and adjacent to the riparian habitats to ensure compliance and would keep the project engineer informed of construction activities that may threaten significant biological resources.

f. Final designs for construction would minimize the removal of riparian habitat that could support federally listed species (riparian arroyo toad aestivation habitat is included in this habitat type). The following measures would be taken:

- Areas temporarily disturbed by construction activities would be treated for a minimum of three years post-construction to control the establishment of exotic vegetation within the cleared or otherwise disturbed area.
- Biological monitoring and reporting would be implemented during construction activities occurring in or adjacent to riparian areas.
- Signs would be placed to indicate the necessity for all activities to be strictly confined to the project area.
- Construction site boundaries would be clearly delineated on the ground by flagging, survey lath, or wooden stakes.

In addition, the permanent loss of riparian habitat would be compensated in accordance with the Riparian BO (USFWS 1995a). MCB Camp Pendleton proposes two alternatives for compensating impacts to riparian habitat: (1) on-Base at the Santa Margarita River in the form of native riparian habitat, with costs identified in the Riparian BO adjusted for inflation and (2) utilizing MCB Camp Pendleton's future mitigation requirements to be fulfilled by conservation actions elsewhere within the ecoregion that promote recovery efforts of endangered and threatened species or their habitats (up to 20 percent annual total as named in the Riparian BO). Any reduction of impacts to riparian habitat achieved as a result of further minimizing the project footprint would proportionally reduce the amount of restoration implemented.

g. Construction project personnel would be briefed by the prime Contractor during all project phases regarding the potential presence of listed species, the requirements and boundaries of the project, the importance of complying with measures designed to avoid and minimize adverse effects to listed species potentially resulting from project activities, and problem reporting and rectification.

Special Conservation Measure 14. Avoid and/or Reduce Potential Effects on Arroyo Toad. Although measures to protect sensitive riparian bird species (above) would provide protection for arroyo toad habitat during the breeding season (15 March to 30 September), if riparian avoidance during the entire period is not feasible, the following specific toad-specific measures would be implemented.

a. Nighttime construction is not anticipated as a requirement of the proposed action. However, if night work and lighting are required, a biological monitor would be required for the duration of any nighttime construction activities. In addition, any proposed work at night would require nighttime-specific measures approved by MCB Camp Pendleton ES and in compliance with Riparian BO.

b. Before commencement of the proposed project, the project proponent would submit the resume from the qualified biologist to MCB Camp Pendleton ES for review and approval. The designated project biologist for measures associated with arroyo toads would have at least two years of independent experience conducting arroyo toad surveys and have demonstrated experience in handling arroyo toads.

c. For range improvements and construction, toad exclusionary fencing would be installed along the range side of San Mateo Creek by the Construction Contractor at least two weeks before construction and monitored by the approved toad biologist for the entire construction period within the arroyo toad activity period (1 February to 30 September). Where movement of arroyo toads into the construction area is possible, a toad flap or other approved device would be installed at access points to prevent movement of arroyo toads into the enclosed area. Toad flaps would be inspected every morning for arroyo toads by the project biologist. The linear extent of fencing necessary to reasonably limit access to the range would be determined by the approved toad biologist and MCB Camp Pendleton ES.

   For bridge construction, temporary silt fencing would be installed by the Construction Contractor at least two weeks before construction activities around the perimeter of work areas including laydown areas, to the maximum extent feasible and would remain in place for the duration of bridge construction. Where construction is to occur in the creek, design of the exclusionary fencing would be developed by the approved toad biologist and MCB Camp Pendleton ES to exclude arroyo toads from entering work areas to the maximum extent feasible.

d. The following specific toad-specific measures would be implemented.

   - Fencing would extend below ground to a depth of about 6 inches (15 centimeters) to prevent arroyo toads from burrowing beneath the fence. If it is not possible to extend fencing below ground, sand bags would be placed over the bottom lip of the fence to hold it in place.

   - Before construction activities within the project footprint for the bridge, but after exclusionary fencing has been installed, at least two nights of surveys for arroyo toads would be conducted within the fenced areas by the project biologist. The total number of surveys necessary would be determined based on the findings from the minimum two nights of surveys. These surveys would be conducted during appropriate climatic conditions and at the appropriate time of day or night to maximize the likelihood of encountering arroyo toads.

- If arroyo toads are found within the project site, they would be captured and translocated by the project biologist to the closest area of suitable habitat along San Mateo Creek.
- After the initiation of construction, the project biologist would be present each morning before construction activities begin and during removal of excavation unit covers and soil stockpile tarps. The project biologist would check the integrity of the arroyo toad fence and locate and remove any arroyo toads that may have entered the area.
- Access to project construction sites would occur via the temporary access road. Project-related vehicle travel would be limited to daylight hours to the extent feasible, as arroyo toad movement across roadways occurs primarily during nighttime hours and ingress and egress of construction equipment and personnel would be kept to a minimum. Dirt/sand piles left overnight would be covered with tarps or plastic sheeting with the edges sealed with sandbags, bricks, or boards to prevent arroyo toads from burrowing into the dirt. Holes or trenches would be covered with material such as plywood or solid metal plates with the edges sealed with sandbags, bricks, or boards to prevent arroyo toads from falling into holes or trenches. All holes and trenches within potential arroyo toad habitat would be inspected each morning by the project biologist.
- The project biologist would be present at the end of the day to ensure that the excavations are properly covered to prevent arroyo toads from entering any open pits and to check the integrity of the arroyo toad fence. The project biologist would be on call and available as needed at other times in the event that an arroyo toad is encountered during the activities. The project biologist would be present on site full-time for the three days following any measurable rainfall event (i.e., 0.05 inch [0.13 centimeter] or greater) or other appropriate climatic conditions (e.g., high relative humidity and moderate temperatures) that are likely to elicit above-ground arroyo toad movement.
- The project biologist would contact MCB Camp Pendleton ES regarding any arroyo toad sighting within the project footprint. Any incidental excavation, capture and relocation, injury, or death of arroyo toads in association with project activities would be reported immediately to MCB Camp Pendleton ES.
- The project site would be kept as clean as possible to avoid attracting arroyo toad predators or small insects (i.e., arroyo toad prey items). All food-related trash would be placed in sealed bins or removed from the site regularly.
- Dust control measures (i.e., water truck spraying) would be conducted in a manner that does not attract arroyo toads into the project activity areas (e.g., avoid over-spraying of water; near occupied habitat, spraying would occur only when arroyo toad exclusion fence has been installed).
- Fencing would be removed immediately after work is completed.

All temporary impacts to riparian habitat, regardless of listed species presence, would be offset as specified in the Riparian BO (USFWS 1995a). Compensation for individual impacts to habitat occupied by arroyo toads, vireos, and flycatchers is not additive, as some areas may be occupied by more than one species. Compensation is based on the total amount of riparian habitat impacted.

Special Conservation Measure 15. Restoration of Arroyo Toad Upland Aestivation Habitat. Permanent impacts to occupied arroyo toad upland aestivation habitat (all habitats within the 82-ft [25-m] relative contour from occupied riparian habitat) would be offset by restoring riparian habitat that has been invaded by non-native plant species on MCB Camp Pendleton at a ratio of 0.5:1 (restored:impacted). The

permanent loss of arroyo toad upland aestivation habitat would be offset by compensation/restoration of riparian habitat following the Riparian BO. Alternatively, upland habitat on MCB Camp Pendleton that is mutually agreed to by MCB Camp Pendleton ES and the USFWS could be restored at a ratio of 2:1.

Special Conservation Measure 16. Removal of Thread-leaved Brodiaea Populations. Boundaries of sensitive plant communities located in the vicinity of Range 314C were mapped in support of the project and identified in a *Rare Plant Report* (SAIC 2007b). One occurrence (defined by USFWS as a plant or group of plants that occurs farther than 0.25 mi from another individual or group of plants) of thread-leaved brodiaea (represented by 0.05 acres [0.02 hectares] and 26 flowering individuals that survey year) was mapped on the north edge of Range 314C. To avoid effects to the species, the known occurrence would be specified on construction plans. As determined necessary by MCB Camp Pendleton ES or the project biologist, and in coordination with the Range Safety Officer, populations would be clearly marked in the field with markers or exclusion fencing. Known populations and restricted areas would be monitored by the project biologist (familiar with the ecology and display of thread-leaved brodiaea) during construction phases, as determined necessary by MCB Camp Pendleton ES. Avoidance within 200 ft (61 m) of known thread-leaved brodiaea (sub) populations would occur to the maximum extent feasible. Where avoidance is not feasible, MCB Camp Pendleton would compensate for the permanent loss of about 0.05 acre (0.02 hectare) of occupied thread-leaved brodiaea at a 2:1 ratio at the Lima thread-leaved brodiaea Mitigation Area at MCB Camp Pendleton. Any reduction of impacts to thread-leaved brodiaea-occupied grassland achieved as a result of further minimizing the project footprint would proportionately reduce the amount of restoration implemented.

Special Conservation Measure 17. Minimize Impacts at San Mateo Creek Crossing for Fish. All traffic accessing the project site would reduce speeds to less than 5 miles per hour (mph) (8 km per hour [kph]) when utilizing the current access road or temporary access road during construction. In addition, construction activities would be avoided within or near San Mateo Creek when flow is present. Erosion and sedimentation control measures (Measures 1 through 3) adjacent to San Mateo Creek would be established and maintained if construction activities have the potential to increase sedimentation into San Mateo Creek.

Special Conservation Measure 18. Investigative Measures. MCB Camp Pendleton ES would be notified at least 15 days in advance of ground-disturbing activities associated with investigative activities (e.g., geotechnical borings, potholing), with MCB Camp Pendleton ES authorization required prior to these activities. All impacts associated with these surveys would remain within the project footprint. A project biologist would be present during investigative surveys and would work with the geotechnical crews to avoid and minimize impacts to natural resources to the maximum extent practicable. Due to the short duration of investigations, neither arroyo toad fencing nor species-specific surveys are required.

Special Conservation Measure 19. Mitigation for Permanent Impacts to Waters of the U.S. Unavoidable impacts to jurisdictional non-wetland Waters of the U.S. would require mitigation. Temporary impacts would also occur associated with construction and temporary access. The development of a mitigation and monitoring plan is a requirement of the Clean Water Act Section 401 and 404 permit applications for activities that would discharge dredge or fill materials into jurisdictional Waters of the U.S. This plan should include details regarding site appropriateness, preparation (e.g., grading), recontouring, planting specifications (including seed mixes and plant palettes), and irrigation design (if determined necessary), as well as maintenance and monitoring procedures (including monitoring period and reporting). The plan should also outline yearly success criteria and remedial measures should the mitigation effort fall short of the success criteria.

2.3.1.4 Air Quality

Special Conservation Measure 20. Fugitive Dust Control. The project proponent, construction oversight authority, or duly designated Contractor would ensure that fugitive dust emissions do not extend beyond the property line for more than 3 minutes in any 60-minute period and would mitigate fugitive dust to minimize track out/carry out emissions during demolition, construction, and transport in accordance with the San Diego County Air Pollution Control District (SDCAPCD) Rule 55. The Construction Contractor would implement the following measures, where applicable, to minimize fugitive dust emissions:

a. Use water trucks or sprinkler systems to keep all areas of vehicle movement damp enough to prevent dust from leaving the construction area.

b. Minimize the amount of disturbed ground area at a given time.

c. Minimize traffic speeds on all unpaved roads.

d. Install gravel pads at construction area access points to prevent tracking of soil onto paved roads.

e. Provide temporary wind fencing around sites being graded or cleared.

f. Suspend all soil disturbance activities when winds exceed 25 mph (40 kph) or when visible dust plumes emanate from the site. Stabilize all disturbed areas at this time.

g. Cover truck loads that haul dirt, sand, or gravel or maintain at least 2 ft of freeboard in accordance with Section 23114 of the California Vehicle Code.

h. After completion of clearing, grading, earthmoving, or excavation, treat the disturbed areas by watering, re-vegetation, or by spreading non-toxic soil binders until they are paved or otherwise developed to prevent dust generation.

i. Designate personnel to monitor the dust control program and to order increased watering, as necessary, to prevent the transport of dust off-site. Their duties would include holiday and weekend periods when work may not be in progress.

Special Conservation Measure 21. Construction Equipment Emission Control Measures. The Construction Contractor would implement the following measures during proposed construction activities, where feasible.

a. Maintain equipment according to manufacturer specifications.

b. Restrict idling of equipment and trucks to a maximum of five minutes at any location.

c. Install diesel oxidation catalysts and/or catalyzed diesel particulate traps on equipment exhaust systems.

d. Use electricity from power poles rather than temporary diesel- or gasoline-powered generators.

e. Provide temporary traffic control, such as a flag person, during all phases of construction to maintain smooth traffic flow.

f. Keep construction equipment and equipment staging areas away from sensitive receptor areas (such as day care centers).

g. Re-route construction trucks away from congested streets or sensitive receptor areas.

h. Use construction equipment with engines that meet USEPA Tier 3 and 4 nonroad standards.

i. Use alternatively-fueled construction equipment, such as compressed natural gas (CNG), liquefied natural gas (LNG), or electric.

Special Conservation Measure 22. Procurement of Operational Equipment. MCB Camp Pendleton ES would approve all operational equipment proposed for use on site that would generate air emissions before procurement.

2.3.1.5 Cultural Resources Protection

Special Conservation Measure 23. Memorandum of Agreement with the State Historic Preservation Officer. The USMC has consulted with the California State Historic Preservation Officer (SHPO), interested federally recognized and non-federally recognized Indian tribes and other consulting parties regarding potential impacts to five recorded archaeological sites within the project area for Alternative 1 and has entered into a Memorandum of Agreement (MOA) with the SHPO. The MOA has been developed providing stipulations to take into account the effects of the undertaking on historic properties and satisfy the USMC's requirement under National Historic Preservation Act (NHPA) Section 106 (36 CFR 800.6) to minimize or mitigate impacts to historic properties for which adverse effects cannot be avoided. The USMC would prepare or cause to be prepared, and subsequently implement, a Historic Properties Treatment Plan for the five historic properties located within the undertaking's area of potential effect (APE) as well as a monitoring plan and unanticipated discoveries and procedures.

Special Conservation Measure 24. Archaeological and Native American Monitoring. A professional archaeologist and a Native American representative would monitor ground disturbing activities during construction, once UXO clearance has been completed and the project site deemed safe by MCB Camp Pendleton personnel, to ensure that the project does not adversely affect cultural resources that may be discovered during construction. A Monitoring Discovery Plan must be submitted 30 days before the construction begins, for approval by MCB Camp Pendleton ES. A technical monitoring report would be prepared and submitted to MCB Camp Pendleton ES. This requirement would be subject to any additional requirements resulting from Section 106 consultation with SHPO.

Special Conservation Measure 25. Phase III Data Recovery Project. If the recorded archaeological sites within the project site for Alternative 2 are determined by the SHPO during Section 106 consultation to be eligible for inclusion in the National Register of Historic Place (NRHP), the USMC would enter into a MOA with the SHPO and consult on ways to "avoid, minimize or mitigate the adverse effects" (36 CFR 800.6), which may include conducting a data recovery project based on criteria and procedures outlined by the SHPO and MCB Camp Pendleton ES.

2.3.1.6 Safety and Environmental Health

Special Conservation Measure 26. Contaminated Soil Testing and Management. In the event soil is removed from the project site, appropriate hazardous constituent sampling and testing would be completed in accordance with applicable regulations. During grading and construction, if soil contamination (discolored and/or odorous soil) is discovered, MCB Camp Pendleton ES would be contacted for necessary remedial requirements. Work would be accomplished with every effort to prevent the spread of any potential contamination or release of any potential existing contaminants to the environment, in accordance with all federal, state, and local laws, regulations, and instructions.

Special Conservation Measure 27. Construction Debris Management. The action proponent, or their Contractor, would ensure that all trash and construction debris resulting from construction activities, including asphalt or concrete, would be properly disposed of and would not be discarded on site. In the event of excavation of asphalt or concrete, excess material would be disposed of in accordance with

CCR Title 14, Division 3, Article 5.9. To the greatest extent possible, the construction debris generated from this project would be diverted from placement in a landfill through recycling or reuse (EO 13423; MCO P5090.2A, 17200.3.3(b)).

Special Conservation Measure 28. Unexploded Ordnance Removal. Removal of UXO would be required before the start of construction to accommodate proposed site improvements. UXO would be handled, stored, transported, and disposed of in accordance with the Military Munitions Rule (40 CFR Part 266, Subpart M).

Special Conservation Measure 29. Wildland Fire Protection. The following measures/BMPs would be implemented to reduce the possibility of a wildfire including:

a. The MCB Camp Pendleton Wildland Fire Prescription Burn Plan would be updated by MCB Camp Pendleton ES to accommodate the project.

b. The Wildfire Prevention Plan (WPP) would be updated yearly by MCB Camp Pendleton ES and would incorporate changes to the Range 314 Complex resulting from the proposed action.

c. Compliance with the WPP would continue.

d. The WPP would continue to use minimal impact suppression tactics (MIST) for fire suppression.

e. Range users would continue to comply with the Fire Danger Rating on the Base.

f. Activities on the range would be limited to non-dud producing ammunition and tracer rounds when approved by the fire marshal. There would be no firing rockets, dropping bombs, detonating ordnance, or other types of activities that would be more likely to start fires.

g. The range would be mowed on a regular basis.

h. There would be Class 2 base material and asphalt on the roads and parking lot.

2.3.2 Standard Construction Measures

Several non-project specific measures that are standard requirements for construction contracts on MCB Camp Pendleton would also be implemented as part of all action alternatives

1. A qualified biological monitor would be present during all construction activities; however, MCB Camp Pendleton ES may reduce the requirement for monitoring during periods of low-impact construction. This monitor would be either designated by MCB Camp Pendleton or meet the approval of MCB Camp Pendleton. As required, a qualified biologist would conduct the Special Conservation Measures listed in Section 2.3.1 of this EA. The qualified biologist would: (1) have demonstrated experience working with and/or monitoring the federally listed species and their associated habitats described in Section 2.3.1 of this EA; (2) be familiar with the native and invasive plant species on Base; (3) have a bachelor's degree with the emphasis in ecology, natural resource management, wildlife science, or related science; and (4) have previous experience with applying the terms and conditions of a BO.

2. Before the bidding process, the Construction Contractor(s) would be informed of the biological constraints for this project by MCB Camp Pendleton. The Contractor(s) would be responsible for impacts to biological resources that occur as a direct result of construction activities outside the limits of construction. All areas to be avoided would be clearly marked on project maps provided to the Contractor. These areas would be designated as "no construction" zones. These areas would be flagged by the project biologist before the onset of construction activities. The project

footprint, including staging areas and temporary access roads, would be sited to avoid or minimize impacts to native vegetation and listed species. Final construction designs for the project would be provided to MCB Camp Pendleton ES. These designs would include the final footprint of all facilities relative to listed species and their habitat and would include a table showing final permanent and temporary impacts by habitat type.

3. At least 14 days before project initiation, the project boundary, including temporary features, would be clearly marked with flagging, fencing, or signposts. All project activities are limited to this project boundary. In some cases, resources may need to be fenced or otherwise protected from direct or indirect impacts. A qualified biologist would monitor any initial brush removal required for fence installation and the installation of the fence. In addition, a qualified biologist would monitor construction of the project facilities to ensure construction activities do not encroach upon the arroyo willow and mule fat vegetation.

4. Before the initiation of construction, a contractor education program would be implemented by a qualified biologist to ensure that Contractors and construction personnel are informed of the biological resources associated with this project. This program would focus on (1) the purpose for resource protection; (2) Contractor identification of sensitive resource areas in the field (e.g., areas delineated on maps and by flags or fencing); (3) environmentally responsible construction practices (see items 5 through 13, below); (4) protocol to resolve conflicts that may arise at any time during the construction process; and (5) ramifications of noncompliance.

5. The Contractor would be responsible for preparing and implementing a Mitigation Monitoring and Reporting Plan. The plan would be reviewed by the biological monitor, MCB Camp Pendleton ES, and Naval Facilities Engineering Command, Southwest (NAVFAC SW), and approved by the Resident Officer in Charge of Construction (ROICC) before the award of construction. All avoidance, minimization, and compensation measures in the BO would be incorporated in this plan. The biological monitor would report the exact acreage of all vegetation communities, including riparian, impacted by the project construction to MCB Camp Pendleton ES so an appropriate level of mitigation would occur.

6. Wildfires would be prevented by exercising care when driving and by not parking vehicles where catalytic converters can ignite dry vegetation. In times of high fire hazard, trucks may need to carry water and shovels or fire extinguishers in the field. Shields, protective mats, or other fire prevention equipment would be used during grinding and welding to prevent or minimize the potential for fire. No smoking or disposal of cigarette butts would take place within vegetated areas.

7. During construction, field crews would refer environmental issues, including wildlife relocation, dead or sick wildlife, hazardous waste, or questions about avoiding environmental impacts, to the biological monitor.

8. Construction equipment staging and access, and disposal or temporary placement of excess fill within drainages or other wetland areas, would be prohibited.

9. Construction vehicles would use existing access roads whenever possible. Where new access is required, all vehicles would use the same route. All access routes outside of existing roads or the construction corridor would be clearly marked (i.e., flagged and/or staked before the onset of construction). All access routes outside of existing roads or the construction area would be delineated on the grading plans and reviewed by the biological monitor, MCB Camp Pendleton ES, and NAVFAC SW, and approved by the ROICC.

10. Staging areas would be placed within existing roads or inside the limits of construction. To the degree feasible, staging areas would be located in disturbed habitat, such as existing dirt roadways. Staging areas would be delineated on the grading plans, which would be reviewed by the biological monitor, MCB Camp Pendleton ES, and NAVFAC SW, and approved by the ROICC.
11. Fueling and maintenance of equipment would take place within existing paved areas or the identified laydown area, but not closer than 100 ft (30 m) to drainages (California Stormwater Quality Association 2003). An appropriate fueling area would be marked on construction plans. Emergency provisions would be in place at all crossings before the onset of construction to prevent accidental spills from contaminated downstream habitats. The Construction Contractor would also develop and disseminate a Spill Prevention, Control and Countermeasures (SPCC) Plan. Contractor equipment would be checked for leaks before operation and repaired as necessary. "No-fueling zones" would be designated on construction maps.
12. Cleaning of vehicles and equipment should take place off-site to the greatest extent possible. If washing must occur on site, designated bermed areas must be used to prevent rinse water contact with stormwater, creeks, rivers, and other water bodies (California Stormwater Quality Association 2003). Soap or detergents should not be used.
13. Erosion and siltation of off-site areas during construction would be controlled and minimized. The Contractor would prepare an Erosion Control Plan that would be approved by MCB Camp Pendleton ES before project implementation. The ROICC would be responsible for ensuring that the Erosion Control Plan is developed and implemented. The plan would include appropriate measures such as the use of silt fences, siltation basins, gravel bags, or other controls necessary to stabilize the soil in denuded or graded areas during the construction and revegetation phases of the project. Contractors would use only certified weed-free straw wattles, straw bales, and/or hay bales. This plan would be written in accordance with the relevant sections of the *State of California Stormwater Best Management Practices Handbook: Construction Handbook* (California Stormwater Quality Association 2003).
14. A Site Restoration Plan would be prepared and implemented for all areas in which vegetation would be temporarily removed for construction. The plan would detail appropriate restoration activities for reestablishing native vegetation to the extent feasible, using existing MCB Camp Pendleton restoration plans as appropriate. To guide restoration activities specified in the plan, reference site transects would be placed in plant communities to be impacted and data would be collected on the proposed impacted sites to guide restoration activities within native plant communities before site disturbance. Plan preparation would be coordinated with MCB Camp Pendleton ES, NAVFAC SW, and the ROICC.
15. If required by the Restoration Plan, topsoil would be stockpiled in designated areas presently lacking native vegetation within the limits of construction. Stockpile areas would be delineated on the grading plans and reviewed by a qualified biologist. The soil would be stockpiled in a manner that would facilitate survival of mycorrhizal organisms. To the maximum extent practicable, revegetation of temporarily impacted areas would use seed or container plants grown from seed collected on MCB Camp Pendleton. Following project completion, temporarily disturbed areas would be re-contoured, stabilized, and replanted with native species consistent with existing conditions.
16. All landscaping would be in accordance with the most recent version of the *MCB Camp Pendleton Base Exterior Architectural Plan* (BEAP). In accordance with this plan, and MCO P5090 2A, 11201.2A which calls for the use of native plants in landscaping, only native plants, and non-native plants found in the BEAP "acceptable plant" list, can be planted in landscaping or project revegetation efforts (BEAP, Basewide Master Plant List, pages 3-61 to 3-65).

17. The action proponent, or their Contractor, would ensure that construction and demolition (C&D) debris, including asphalt or concrete, resulting from construction activities would be properly contained, tested, handled, and disposed of in accordance with Base, local, state, and federal law requirements and would not be discarded on site. In the event of excavation of asphalt or concrete, excess material would be disposed of in accordance with CCR Title 14, Division 3, Article 5.9.

18. All trash would be disposed of properly. Following project completion, all equipment and waste would be removed from the site. The site would be restored to the original condition once the project is completed. At least fifty percent of the C&D debris generated would be diverted from placement in a landfill through recycling or reuse (MCO P5090.2A, Chapter 11 (Sec. 2), 11201(4)). Soil would be re-contoured before habitat restoration.

19. If night work and lighting is required, a qualified biologist would monitor all night-time construction activities in and adjacent to sensitive habitat to avoid disturbance to listed species. Any night lighting used would be shielded and directed away from any sensitive habitat.

20. Stormwater BMPs would include, but would not be limited to, the following practices, and these would be detailed in the Stormwater Pollution Prevention Plan (SWPPP). Stormwater and erosion controls would be installed at the very beginning of soil disturbance on the construction site. Silt fencing would be placed around the perimeter of the project site. Stockpiles of soil, concrete material, etc. would be covered with a tarp or blanket and/or surrounded with certified weed-free straw wattles or gravel bags. Slopes would be protected with certified weed-free straw wattles or blankets. Whenever possible, grading would be phased to limit soil exposure. Finished areas would be revegetated or hydroseeded as soon as possible. Storm drain inlets would be protected using gravel bags or straw wattles. Construction entrances would be stabilized. Materials that could impact stormwater runoff would be stored in lockers, on pallets, inside rubber berms or indoors. Material storage areas would be located away from existing storm drains. Sedimentation basins would be constructed where appropriate and would include additional filters for drainage (gravel bags, silt fencing, filter fabric, etc.) where necessary. Sediment would be allowed to settle out for several days before draining sediment basins, and discharge would be filtered or sprayed onto grass when necessary. Check dams would be used to reduce runoff velocities where necessary. BMPs would be regularly inspected and repaired. Damaged or worn silt fences, wattles, gravel bags, etc. would be replaced before rain events.

21. Construction workers would be prohibited from bringing domestic pets to construction sites to ensure they would not affect wildlife through harassment or predation in adjacent natural habitats.

22. Project design for all electrical upgrades and associated facilities would follow the raptor protection guidelines supported by the Base's avian protection program, as stated in Section 4.3.5.2 of the *Integrated Natural Resource Management Plan* (INRMP) (USMC 2007a updated). Following these guidelines would facilitate compliance with the Bald and Golden Eagle Protection Act and the MBTA.

23. In the event that archaeological materials (e.g., shell, wood, bone, or stone artifacts) are found or suspected during project operations or the project footprint is altered, work would be halted in the area of discovery and MCB Camp Pendleton ES notified at 725-9738, as soon as practicable, but no longer than 24 hours after the discovery. Project work at the discovery site would not proceed until the Base Archaeologist has the opportunity to evaluate the find and gives permission to resume construction activities.

24. The project proponent, construction oversight authority, or duly designated Contractor would notify MCB Camp Pendleton ES before the installation of any HVAC or refrigerant system containing 50 pounds or more of refrigerant. The project proponent, construction oversight

authority, or duly designated Contractor would maintain a log of refrigerant use for any HVAC or refrigerant system.

25. The project proponent, construction oversight authority, or duly designated Contractor would exercise caution to prevent damage to existing potable water mains during construction. Facilities Maintenance Department Unit would be notified immediately at (760) 725-4324/4348 if a water main is damaged.

26. The project proponent, construction oversight authority, or duly designated Contractor would coordinate installation and inspection of newly installed backflow control devices and air gaps with the Facilities Maintenance Department Cross Connection Control Manager at (760) 763-0332 in accordance with CCR Title 17.

27. The project proponent, construction oversight authority, or duly designated Contractor would ensure new potable water mains or valves that have been installed or taken out of service are disinfected and sampled for bacteriological quality before use, in accordance with the American Water Works Association Standard C651-05. The Facilities Maintenance Department Water Department would be notified at (760) 725-0602 before disinfection. Water samples would be negative for coliform bacteria before the main is placed in service (CCR Title 22, § 64580).

28. The project proponent, construction oversight authority, or duly designated Contractor would ensure a valve box is installed over each buried valve stem to aid in locating and operating the valve in accordance with CCR Title 22, § 64578. Global positioning system coordinates would be provided to the Facilities Maintenance Department Water Department.

29. For valves buried in trenches greater than 5 ft below the finished grade, the project proponent, construction oversight authority, or duly designated Contractor would supply either a valve stem riser to allow the use of a normal key or make a note on valve records, to indicate that a long key would be required in accordance with CCR Title 22, § 64578.

30. Pipes, solders, and fluxes used in installation of plumbing would be lead free in accordance with CCR Title 22, § 116875. Ensure pipes and fixtures, solder, flux, and plumbing fittings used in the water system meet: 0.2% lead in solder and flux; 0.25% lead in wetted surfaces of pipes, pipe fittings, plumbing fittings and fixtures, as determined by a weighted average.

31. The project proponent, construction oversight authority, or duly designated Contractor would submit an amended drinking water permit to modify, add to, or change the source of supply or method of treatment of, or change in the distribution system, as authorized by a valid existing permit (California Health and Safety Code § 116550), if applicable.

32. Ensure potable water main separation and installation standards are followed, as outlined in CCR Title 22, § 64572.

33. New facility power requirements would not be supplied by generators (tactical or not); facility power requirements would be tied into MCB Camp Pendleton's power grid, if available.

34. The project proponent, construction oversight authority, or duly designated Contractor would report installation and/or replacement of gas insulated switchgear to the ES, Air Quality Branch at (760) 725-9756 for inclusion into the MCB Camp Pendleton's Greenhouse Gas Emission Inventory.

35. The project proponent, construction oversight authority, or duly designated Contractor would ensure that new utilities installed for new construction are equipped with a meter (e.g., to measure electricity usage) to comply with energy reporting requirements.

36. The project proponent, construction oversight authority, or duly designated Contractor would provide power generation equipment (i.e., generators) for supplemental or back-up power requirements. Base-owned, permitted generators would not be utilized to provide supplemental/back-up power for the proposed project.

37. All excavation, grading, and/or digging within the boundaries of a former or current range would be accomplished with every effort to prevent the spread of any potential contamination or release of any potential existing contaminants to the environment in accordance with all federal, state, and local laws, regulations, and instructions. Work would also be accomplished in accordance with USEPA BMPs for outdoor shooting ranges (EPA-902-B-01-001), RCRA, CWA, 40 CFR 260 (Federal Hazardous Waste Regulations), and CCR Title 22 (California Hazardous Waste Regulations).

38. All range soil would remain within the range boundary and shot fall area and would continue to be used for the same purpose. If any soil is to be removed from the range, appropriate hazardous constituent sampling and testing would be completed in accordance with the guidance listed above. If soil is determined to be hazardous waste, it would be packaged, stored, and shipped in accordance with CFR Title 40 and CCR Title 22. Also, if any wood and construction debris to be removed has been used in live-fire training and received impact from rounds, the debris should be sampled for lead and other constituents. Any treated wood materials (e.g., power poles) removed during project activities but not recycled would undergo the California Waste Extraction Test, and wastes failing the test would be disposed of as a regulated hazardous waste per the California Health and Safety Code Sections 25150.7 and 25143.1.5. Proper hazardous waste manifest procedures would be followed for all hazardous waste generated and transported off-Base. Hazardous waste would be stored in compliance with local, state, and federal regulations and removed from the Base within 60 days of initial generation. All hazardous waste manifests would be signed by MCB Camp Pendleton ES, Hazardous Waste Branch personnel prior to the waste leaving the Base. The Hazardous Waste Section would be contacted at (760) 725-4375 for manifest instructions. If solid lead or copper is removed from the range, it may be recycled in accordance with Base QRP regulations. If UXO is found, the "Three Rs" method should be used: Recognize, immediately Retreat, and Report to Longrifle (MCB Camp Pendleton Range Control) first and to the Provost Marshall's Office second.

39. Prior to operations, the action sponsor would ensure structures are surveyed for asbestos, polychlorinated biphenyls, lead paint, lighting ballasts with beryllium, and other hazardous materials. Hazardous waste and demolition waste would be contained, tested, handled and disposed/recycled in accordance with Base, local, state, and federal laws and requirements.

2.4 No-Action Alternative

Under the No-Action Alternative, a modernized live-fire training facility and an all-weather access road and bridge to the Range 314 Complex would not be constructed. The existing training activities at MCB Camp Pendleton would continue to be carried out on ranges that do not provide adequate training opportunities for formal instruction on modern weapons and techniques, which diminish live-fire proficiency and ultimately affect readiness to perform effectively in combat. Existing limited access to the range would continue to cause training schedule disruptions and conflicts. These losses in training time would result in Marines being less prepared for combat.

The No-Action Alternative is not considered a reasonable alternative because it does not meet the purpose of and need for the proposed action. However, it does provide a measure of the baseline conditions against which the impacts of the proposed action can be compared. In this EA, the No-Action Alternative is represented by the baseline conditions described in Chapter 3, Affected Environment and Environmental Consequences.

2.5 Alternatives Considered But Eliminated

As part of the USMC's decision-making process, various alternatives have been considered that could potentially accomplish the purpose and need using approaches that are both similar and dissimilar to current approaches. The following alternatives were considered but eliminated as infeasible, as described below.

2.5.1 16-lane Live-fire Facility

This larger facility was considered to further improve on the capabilities of existing deficient ranges and allow more Marines to train at any given time. However, this alternative would not meet the selection criteria for minimizing potential impacts to natural and cultural resources. The USMC end-user determined that a 12-lane facility could adequately meet the training needs. Therefore, this alternative was eliminated from further consideration.

2.5.2 Locations on MCB Camp Pendleton Other Than the Range 314 Complex

Other locations on MCB Camp Pendleton were considered for establishment of a new, modernized live-fire facility. However, these locations either do not have sufficient area to accommodate required training infrastructure; do not have the required existing infrastructure; or would displace existing uses (e.g., Range 208C). Therefore, this alternative would not meet the selection criteria for the proposed action outlined in Section 2.0 and was eliminated from further analysis.

2.5.3 Alternative Access Road Locations to the Range 314 Complex

Other locations within the Range 314 Complex were evaluated for establishment of a new road to allow year-round access to the Range 314 Complex.

North Road Bridge. This alternative would construct a new access road in a currently undeveloped area north of the existing Range 314 Road. A bridge would be constructed to cross San Mateo Creek. This alternative would require a substantial amount of grading of undeveloped land for the access road. The grading would include a large cut to the cliff and hill on the west side of San Mateo Creek, which could require export or fill at the Range 314 Complex. The bridge would be similar in design, but substantially longer than the bridge proposed in Alternative 1. Therefore, this alternative would not achieve the purpose and need to use existing infrastructure and to develop an economically feasible alternative and was eliminated from further consideration.

Bridge at San Mateo Road. This alternative would construct a road beginning at an unused portion of "old" San Mateo Road, traversing the hillside south of San Mateo Creek following San Mateo Creek, and terminating at the Range 314 Complex. An approximately 4,000 ft (1,200 m) bridge would be constructed to cross a large ravine. Two smaller ravines would be traversed with culvert crossings. This alternative would have resulted in clearing undisturbed habitat, resulting in impacts to multiple species including coastal California gnatcatcher, arroyo toad, least Bell's vireo, and southwestern willow flycatcher. Therefore, this alternative was eliminated from further consideration.

Arizona Crossing at Existing San Mateo Creek Crossing. This alternative would occur in the same location as the access road for the proposed action and alternatives. An Arizona crossing would be constructed within the stream channel to cross San Mateo Creek. The low-water crossing profile would follow the existing creek bed as much as possible and would reduce cut and fill operations along the existing road. However, this alternative could potentially have more severe impacts to the Waters of the U.S. and wetlands. In addition, under flood conditions or during heavy rain periods, water could overtop the pavement crossing and could render the crossing impassable. Therefore, this alternative would not achieve the purpose and need to provide an access road that maximizes availability of the range to facilitate required training and was eliminated from further consideration.

Culvert Crossing at Existing San Mateo Creek Crossing. This alternative would occur in the same location as the access road for the proposed action and alternatives but would involve a culvert crossing across San Mateo Creek. The culvert crossing would consist of a raised concrete crossing, combined with culverts to accommodate medium intensity water flows. The design could reduce the width of major water flows in the channel by approximately 800 ft (240 m). The structure would allow traffic during small and medium sized storm events. However, because the approaches and culverts would restrict major flows and passage of debris, there would be a risk of heavy flows washing out the structure. Therefore, this alternative would not achieve the purpose and need to provide an access road that maximizes availability of the range to facilitate required training and was eliminated from further consideration.

New Road from San Mateo Road Bridge. This alternative would construct a new access road on the south side of the creek from the vicinity of the San Mateo Road bridge through riparian habitat to the Range 314 Complex. Although this alternative would meet the purpose and need, it would require three smaller span bridges to traverse existing deep ravines and two culvert crossings along the proposed route. In addition, it would impact several existing training areas that would require relocation. The estimated financial cost makes this alternative economically infeasible. Therefore, this alternative was eliminated from further consideration.

New Road from Northern Impact Area Control Tower. This alternative would construct a new road from the Northern Impact Area Control Tower to the Range 314 Complex. It would meet the purpose and need; however, there were several safety, costs, and environmental concerns. First, the engineering design would encompass numerous switchbacks, creating a potential safety hazard for vehicles descending the road. Second, this alternative would require a substantial amount of grading that could result in substantial impacts to vegetation including over approximately five acres of coastal sage scrub and a high potential for impacts from erosion. Lastly, the estimated costs make this alternative infeasible. Therefore, this alternative was eliminated from further consideration.

2.5.4 No Access Road/Bridge Alternative

This alternative would be identical to the proposed action, except that an all-weather access road and bridge would not be constructed. Under this alternative, the existing access road and the unimproved streambed crossing would remain the primary access to the Range 314 Complex. This alternative does not meet the purpose and need of the proposed action, which requires year-round, all-weather access. Therefore, this alternative was eliminated from further consideration.

2.6 Resource Areas Eliminated From Detailed Consideration

Several resource areas have not been carried forward for detailed analysis in this EA because potential impacts were determined to be non-existent or negligible. Resources not addressed further in this EA include land use, aesthetics, socioeconomics, public services, noise, and transportation.

Land Use: All live-range training activities would take place within MCB Camp Pendleton boundaries and would be conducted in accordance with all applicable land use restrictions including the Range Installation Compatible Use Zone (RAICUZ) Program contained within the MCB Camp Pendleton Master Plan (DoN 2010a). The RAICUZ Program provides guidance for operations that may adversely impact land use off of MCB Camp Pendleton due to noise or the potential for accidents. Proposed training areas are currently used for live-fire training activities; no additional land-use modifications would occur; and no land use compatibility issues would result from implementation of any alternative. Therefore, impacts on land use would not occur.

Aesthetics: Construction of the live-fire training range and support facilities would be consistent with the general military training nature of MCB Camp Pendleton and would be in accordance with the BEAP. The proposed facilities would not significantly impact the existing visual character of either site. In addition, site improvements would not obstruct existing public vantage points of scenic resources within the proposed project vicinity. Therefore, impacts on aesthetics would not occur.

Socioeconomics: There would be no additional military, government/civilian, and/or contractor support personnel stationed at MCB Camp Pendleton with the implementation of the proposed action. Therefore, impacts on socioeconomics would not occur.

Public Services: There would be no additional military, government/civilian, and/or Contractor support personnel stationed at MCB Camp Pendleton as a result of the proposed action. Consequently, live-fire range training operations would not require any substantial increase in public services. Therefore, no impacts on public services would occur.

Noise: Operations of the proposed action are not expected to generate noise above existing levels. In addition, construction of the proposed action would be temporary (approximately 12 months for construction of the range, approximately 7 months for construction of the bridge, and approximately 5 months for grading and UXO removal). The amount of increase of noise at the construction site would be representative of a typical construction site and would not exceed 85 decibel (dB). Therefore, no impacts would occur.

Transportation: The proposed action is not expected to produce an increase in traffic at MCB Camp Pendleton during proposed operations. However, a temporary increase in traffic during construction is expected. This increase is expected to be no more than 68 trips per day. This would be within the normal flux of vehicles on the Base. Furthermore, the proposed action would include a Construction Traffic Management and Detour Plan that would specify necessary lane closures, detours, signage/lighting, flaggers, and other traffic control measures needed to avoid accidents and provide access and continued traffic movement along North Range Road during construction. Therefore, no impacts on transportation would occur.

Environmental Justice: The proposed action would not result in disproportionate impacts to minority and low-income populations and would not result in environmental health or safety risks to children. Therefore, impacts on environmental justice would not occur.

2.7 Summary of Impacts

Resource areas analyzed in this EA include the following: Geological Resources; Water Resources; Biological Resources; Air Quality; Cultural Resources; Utilities; and Safety and Environmental Health. The environmental consequences associated with implementation of Alternative 1, Alternative 2, and the No-Action Alternative are presented and compared in Table 2.7-1. A detailed description of the affected environment and analysis of the environmental consequences is presented in Chapter 3.

Table 2.7-1. Summary of Impacts

Resource Area	*Range 314C with New Access Road/Bridge Alternative (Alternative 1)*	*Range 314B with New Access Road/Bridge Alternative (Alternative 2)*	*No-Action Alternative*
Geological Resources	NSI	NSI	NI
Water Resources	NSI	NSI	NI
Biological Resources	NSI	NSI	NI
Air Quality	NSI	NSI	NI
Cultural Resources	NSI	NSI	NI
Utilities	NSI	NSI	NI
Safety and Environmental Health	NSI	NSI	NI
NSI = No Significant Impact NI = No Impact			

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the conditions of the existing environment and environmental consequences for resources potentially affected by implementation of Alternative 1 (Range 314C with New Access Road/Bridge), Alternative 2 (Range 314B with New Access/Road Bridge Alternative), and the No-Action Alternative. The resources evaluated in detail in this chapter include Geological Resources (Section 3.1); Water Resources (Section 3.2); Biological Resources (Section 3.3); Air Quality (Section 3.4); Cultural Resources (Section 3.5); Utilities (Section 3.6); and Safety and Environmental Health (Section 3.7).

3.1 Geological Resources

3.1.1 Affected Environment

3.1.1.1 Topography

MCB Camp Pendleton is located within the Peninsular Ranges Geomorphic Province. The project site is located in the northwest portion of MCB Camp Pendleton, in the San Onofre Hills, which lie adjacent to the coastal plain, and rise steeply to an elevation of 1,725 ft (526 m). The project site is located within a southeast-trending tributary canyon along the east side of San Mateo Canyon. The topography within the project site varies from gently sloping at the mouth of the tributary canyon, to moderately sloping within the base of the canyon, to steeply sloping on the hillsides surrounding the project site. The gently to moderately sloped areas have a slight to moderate erosion potential. The steeply sloped areas have a moderate to high erosion hazard (United States Department of Agriculture [USDA] 1973).

3.1.1.2 General Geology

Stratigraphy

The range portion of the project site is underlain by Holocene younger alluvial deposits, Pleistocene older alluvial deposits, landslide deposits, and Tertiary Santiago Formation sediments. Younger alluvium associated with colluvial and stream deposition of the subject tributary drainage underlies the central portion of the range. The alluvium consists of unconsolidated, fine- to coarse-grained, silty to clayey sand, interbedded with layers of clay and silt. Approximately 40 ft of younger alluvium is present beneath the proposed 50-ft high fill embankments and buildings, to be located in the western portion of the range, with the alluvium thinning to the east. Approximately 35 ft of older alluvium underlies the younger alluvium below the western portion of the range. These deposits consist of coarse sand and gravel derived from floodplain deposition on an ancient stream terrace of San Mateo Creek (Kleinfelder 2013).

The Eocene age Santiago Formation underlies the alluvial deposits beneath the site and outcrops on the hillsides surrounding the project site. This formation consists mostly of beds of weakly cemented, green gray to blue gray, fine- to medium-grained, silty sandstone. On unprotected slopes, the sandstone is very prone to erosion; however, locally some areas of the sandstone are moderately cemented and resistant to erosion, forming steep slopes. Interbeds of sandy siltstone and sandy claystone, up to 10 ft thick, are also present in this formation on the steep, north face of the project site. Bedding slopes gently to the south, creating unsupported slope conditions that are conducive to landslides (Kleinfelder 2013).

The proposed bridge location and associated access road are underlain by younger alluvium derived from floodplain deposition of San Mateo Creek. The alluvium consists of unconsolidated, coarse-grained, cobble and boulder conglomerate, with a gravelly and sandy matrix. In addition, discontinuous layers of clay and gravely, fine- to coarse-grained sand and sandy gravel are locally present. The alluvium is underlain by the Santiago Formation, as described above (Kleinfelder 2013).

Landslides

Landslides are well documented in the San Mateo watershed, where they range from less than 1 acre (0.4 hectare) to more than 640 acres (259 hectare) in size (Kellogg and Kellogg 1988). Two large pre-Holocene age landslides (before 11,000 years ago) were identified within the eastern portion of the range, and a third was identified immediately east of the range. These landslides occur within the Santiago Formation, which is prone to slope instability. The landslide on the northeast side of the project site slid southward into the drainage, creating a steep scarp face above the landslide and exposing the Santiago Formation. The landslide mass is accumulated below the scarp and extends to the bottom of the drainage. A second large landslide on the southeastern side of the project site moved northward into the drainage feature, creating a steep scarp face, with the landslide mass broken into several blocks, accumulating along the lower half of the current slope. The toe area of the slide is much steeper than the northeast slide. A third slide located just east of the project site slid from the north to the south. This slide is not expected to influence the proposed range upgrades (Kleinfelder 2013). No landslides or areas of potential slope instability were identified within sediments underlying the proposed bridge and associated access road (Kleinfelder 2012).

Soils

The range portion of the project site is underlain by Carlsbad and Olivenhain series soils (USDA 1973). Carlsbad gravelly loamy sand, which is derived from soft local sandstones, underlies the base of the canyon in which the project site is located. These soils generally have slight to moderate erosion potential and are moderately well drained. Olivenhain cobbly loam is present on the steep slopes of the project site. Runoff is rapid and the erosion potential is high from these well-drained soils (USDA 1973). The proposed bridge location is underlain by active stream channel deposits that generally lack topsoil accumulations.

Faulting and Seismicity

A fault which has exhibited surface displacement within the Holocene Epoch (the last 11,000 years) is defined as active by the California Geological Survey. A fault which has exhibited surface displacement during the Pleistocene Epoch (which began about 1.6 million years ago and ended about 11,000 years ago) is defined as potentially active. Pre-Pleistocene faults are considered inactive. MCB Camp Pendleton, including the project site, is not underlain by active faults, potentially active faults, or Alquist-Priolo Special Study Zones (California Division of Mines and Geology 1999, 1994; Kleinfelder 2012, 2013). However, numerous active faults that could cause ground motion or produce secondary effects are located within 60 mi (97 km) of MCB Camp Pendleton, as identified in Table 3.1-1. Major regional faults located in the vicinity of MCB Camp Pendleton include the Whittier-Elsinore, San Jacinto, and San Andreas faults.

Table 3.1-1. Major Active Faults within 60 mi (97 km) of the Project Site

Major Active Faults	*Distance and Direction of Fault from MCB Camp Pendleton (mi/km)*	*Maximum Creditable Earthquake (Richter Scale magnitude)*
Newport Inglewood/Rose Canyon	8/13 South	7.5
Whittier-Elsinore	19/ 31 Northeast	7.5
Palos Verdes/Coronado Bank	24/38 Southwest	7.0
San Jacinto	40/63 Northeast	7.5
San Andreas	55/88 Northeast	7.0
San Clemente	62/100 Southwest	7.7
Source: Jennings 1994; Woodward Clyde 1998; Kleinfelder 2012		

Inactive faults located on MCB Camp Pendleton include the Las Pulgas Fault, located approximately 6.6 mi (10.6 km) southeast of the project site, and the Cristianitos Fault, located approximately 2.1 mi (3.3 km) southwest of the project site. The latter, which is the largest known fault on MCB Camp Pendleton, is 25 mi (40 km) in length, trending north-northwest and extending off-Base. This fault expresses 90 ft (27 m) of vertical separation at the coast, ranging to a maximum vertical separation of 3,500 to 4,000 ft (1,050 to 1,200 m) off-Base (DoN 1992).

3.1.1.3 Geologic Hazards

The primary potential geologic hazards at the range are liquefaction, severe soil erosion, and slope instability, due to the steep hillsides and underlying landslide deposits within the project site. No active or potentially active faults traverse the site; however, strong seismically induced ground motion is possible at the project site. Liquefaction is possible in the western portion of the project site, where unconsolidated sandy soils and shallow groundwater are present beneath the project site. Liquefaction is the process whereby loose, unconsolidated, saturated sediments lose their stiffness and strength as a result of strong seismically induced ground motion. This phenomenon could result in damage to overlying structures (Kleinfelder 2013). Similarly, the sediments underlying the proposed bridge and access road are prone to liquefaction and lateral spreading, which is lateral movement of unsupported soils during seismically induced ground shaking. Lateral spreading is often associated with liquefaction (Kleinfelder 2012).

3.1.2 Environmental Consequences

3.1.2.1 Alternative 1: Range 314C with New Access Road/Bridge Alternative

Topography and Slope Stability

The range portion of the project site is located in the live-fire training area, which consists of a steep-sided tributary canyon to San Mateo Canyon. The base of the canyon is gently to moderately sloped and the side-slopes are moderately to very steeply sloped.

Alternative 1 would require substantial grading, including up to 41 acres (17 hectares) for the range and up to 2 acres (1 hectares) for the access road and bridge. Approximately 1.2 million cubic yards (900,000 cubic meters) of soil and bedrock would be excavated and placed as compacted fill within the project site boundaries, with the cut and fill being balanced on site. Large cut slopes would be excavated on the back (or eastern) portion of the proposed range and placed as fill to create the front (or western) portion of the range. A maximum of approximately 50 vertical ft (15 m) of fill would be placed for the front portion of the range.

Such grading would substantially alter the existing topography and locally result in steep cut and fill slopes. These locally steep slopes would be stabilized by a combination of methods such as jute netting and geo-textile fabrics. Slopes, terraces, and swales would be contoured to the extent possible to provide smooth transitions between the proposed grading and the adjacent landforms. All grading/construction would be completed in accordance with Chapter 70 of the Uniform Building Code requirements. Earthwork (cut and fill) would be balanced on site to the extent feasible. Excess soil would remain on site within the waste material site. Soil would not be exported off site.

Slope stability calculations by Kleinfelder (2013, 2014) indicated that the currently proposed grading design generally meets the minimum factor of safety requirements established for the project by NAVFAC SW. One exception is the west-facing slope at the east end of the range, which has an unacceptable factor of safety. Kleinfelder (2013) has recommended that either a shear key or soldier piles be used to stabilize this area of the site. Special Conservation Measure 1, which requires adherence to geotechnical recommendations provided by Kleinfelder (2013, 2014), would reduce potential slope stability impacts. Therefore, no slope stability impacts would occur as a result of this alternative.

Sediments underlying the proposed bridge and access road are not prone to slope instability. Fill slopes constructed for the bridge abutments would have maximum inclinations of 2:1 (horizontal: vertical) and a maximum height of about 13 ft near the bridge abutments. Slope stability analyses indicate that the proposed slopes have calculated factors of safety in excess of 1.5 for static conditions and 1.3 for pseudo-static conditions. Therefore, the proposed slopes exceed the conventional design criteria by most government agencies and are considered stable (Kleinfelder 2012). Special Conservation Measure 1, which requires adherence to geotechnical recommendations provided by Kleinfelder (2012, 2013, and 2014), would reduce potential slope stability impacts, such that no slope stability impacts would occur as a result of this alternative.

Soils and Erosion

Soils on steep slopes within the target range project site exhibit rapid runoff and a high erosion potential. Project site grading and construction of the proposed facilities would result in removal of vegetation and associated soil disturbance; thus, temporarily exacerbating the potential for erosion-induced sedimentation of San Mateo Creek. However, since project construction would disturb more than one acre (0.4 hectare), construction would meet SWRCB requirements for a General Permit for Discharges of Stormwater Associated with Construction Activity (Construction General Permit Order 2009-0009-DWQ). Before construction, the ROICC would obtain authorization for construction under the General Permit. Consistent with the RWQCB *Erosion and Sediment Control Field Manual* (RWQCB 1999) and *MCB Camp Pendleton Soil Erosion Management Practice Handbook* (USMC 2000), the Contractor would be required to implement project-specific BMPs per project Risk Determination Type, as outlined in the Construction General Permit Order No. 2009-0009-DWQ and specified in the application to the SWRCB. The Contractor would complete a risk determination and prepare a SWPPP, in accordance with the risk level requirements in the General Permit. The SWPPP and risk determination would be submitted to the ROICC. The SWPPP would include both temporary and permanent erosion and sediment control measures that would be implemented as appropriate for the risk level of the SWPPP, as determined by a Qualified SWPPP Developer.

The ROICC would be responsible for ensuring that the SWPPP is developed and implemented. The SWPPP would include appropriate measures such as the use of silt fences, siltation basins, gravel bags, or other controls necessary to stabilize the soil in denuded or graded areas during the construction and revegetation phases of this alternative. This plan would be written in accordance with the relevant section of the *Stormwater Best Management Practice Handbook: Construction* (California Stormwater Quality Association 2003). All construction contracts on MCB Camp Pendleton are completed in accordance

with standard BMPs, referring specifically to erosion control and management. In addition, the SWPPP would incorporate information and measures from the *Storm Water Protection Report for P-637* (RBF Consulting 2014).

Proposed on-site drainage improvements would also reduce erosion. The drainage improvements would include construction of ditches, vegetated swales, an alluvial channel, and bio-retention basins that would provide stormwater control of run-on and runoff flows and sheetflow from the range. Natural riprap energy dissipaters would be installed downstream of the alluvial channel before discharge to San Mateo Creek, thus reducing erosion of sediments along the banks of the creek. These drainage design features are detailed in the *Stormwater Protection Report for P-6*37 (RBF Consulting 2014). Soil erosion is also minimized on MCB Camp Pendleton through the implementation of terms and conditions of applicable BOs, including the Riparian BO (USFWS 1995a), and by implementation of the measures contained in the MCB *Camp Pendleton Soil Erosion Management Practice Handbook* (USMC 2000) and the INRMP (USMC 2007a updated). Current soil erosion control programs at MCB Camp Pendleton include road maintenance, grading, culvert maintenance and installation, water runoff control, traffic control in erosion damaged areas, and mulching areas with a protective cover of organic material such as wood chips and vegetation. In addition, the INRMP includes measures that minimize the potential for soil erosion from wildfires.

Due to implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design and construction, significant erosional impacts associated with project construction would not occur.

Seismicity

MCB Camp Pendleton is not underlain by any active or potentially active faults. Active faults located within 60 mi (97 km) of MCB Camp Pendleton (Table 3.1-1) could result in strong seismically induced ground motion and associated ground shaking. In addition, an area of potentially liquefiable soils was identified beneath the proposed 50-ft fill in the western portion of the range. Kleinfelder (2013) has recommended that one of three remedial actions be implemented for this area of potential liquefaction: (1) construction of stiff, reinforced shallow structure foundations with six layers of geogrid reinforced soil, (2) deep dynamic compaction, or (3) construction of vibro-replacement stone columns.

Similarly, soils underlying the proposed bridge and access road are subject to liquefaction. Engineering consequences of liquefaction at the bridge site include post-liquefaction reconsolidation settlement, reduction in lateral soil resistance for piles during an earthquake, and potential lateral spreading displacements of the roadway embankments toward the creek. In addition, the surficial soils above the groundwater table are generally loose to medium dense and prone to seismic compaction. In the event of an earthquake, the combination of post-liquefaction reconsolidation settlement and seismic compaction could result in settlement of 2 to 12 inches. Kleinfelder (2012) has provided specific geotechnical engineering recommendations to address the effects of liquefaction and settlement.

All new facilities would be designed and constructed to comply with the seismic design criteria identified in the Uniform Building Code, the *NAVFAC P-355 Seismic Design Manual*, and the most stringent criteria identified in the latest design specifications of the Structural Engineering Association of California. Special Conservation Measure 1, which requires adherence to geotechnical recommendations provided by Kleinfelder (2012, 2013, and 2014), would reduce susceptibility to earthquake damage, such that significant impacts associated with seismically induced ground motion and ground shaking would not occur and mitigation is not required.

3.1.2.2 Alternative 2: Range 314B with New Access Road/Bridge Alternative

Geologic impacts associated with this alternative would be similar, but greater than those associated with Alternative 1. More grading would be required for this alternative, resulting in greater alteration of topography, increased potential for slope instability, and increased potential for erosion-induced sedimentation of San Mateo Creek. Seismic impacts would be similar to those described for Alternative 1. Similar to Alternative 1, grading and construction would be completed in accordance with an NPDES-mandated SWPPP, thus minimizing erosion potential. Construction would be in accordance with provisions of the Uniform Building Code, the *NAVFAC P-355 Seismic Design Manual*, and the most stringent criteria identified in the latest design specifications of the Structural Engineering Association of California. Thus, impacts from geotechnical hazards such as slope instability and earthquakes would be minimized. Therefore, significant geologic impacts would not occur and mitigation is not required.

3.1.2.3 No-Action Alternative

Under the No-Action Alternative, upgrades to the training range and construction of an all-weather access road and bridge would not occur and training would continue under current conditions. Therefore, no impacts on topography, geology, and soils would occur and mitigation is not required.

3.2 Water Resources

3.2.1 Affected Environment

3.2.1.1 Surface Water

The Range 314 Complex is located within the San Mateo Watershed of MCB Camp Pendleton (Figure 3.2-1). San Mateo Creek flows from the top ridges of the Santa Ana Mountains, onto and westward through MCB Camp Pendleton and San Onofre State Park, ending at the Pacific Ocean just south of the city of San Clemente. This 134 mi^2 (347 km^2) watershed has four main tributaries: Cristianitos Creek, Bluewater Canyon, Tenaja Canyon, and Los Alamos Canyon. Existing land uses within the watershed are mixed and range from some smaller urban residential areas to open space, brush, and grassed woodlands. Elevations range from sea level to 3,000 ft (915 m) in the headwater areas. Slopes and grades are moderate and range from 2 to 19 percent. Streams, drainages, and canyons are abundant in the higher elevation regions of the watershed, with many drainage improvements primarily existing in the lower urbanized areas. The majority of the soils are clayey, with more permeable soils and sands present near the creeks (URS 2011). Surface waters in San Mateo Creek have been characterized by total dissolved solids (TDS) levels that exceeded the water quality objectives defined by the RWQCB. Surface waters in San Mateo Creek also contain excessive sulfate and nitrate concentrations (Leedshill-Herkenhoff 1989).

3.2.1.2 Floodplains

The proposed bridge is located within the 100-year floodplain for San Mateo Creek (Figure 3.2-2). The predicted 10-year and 100-year flood events at the proposed bridge location have a peak discharge of 9,792 cubic feet per second (cfs) (277 cubic meter per second [cms]) and 46,635 cfs (1,321 cms), respectively (URS 2011). The proposed bridge across San Mateo Creek would be designed to clear the 100-year flood level with 2 ft of freeboard.

3.2.1.3 Groundwater

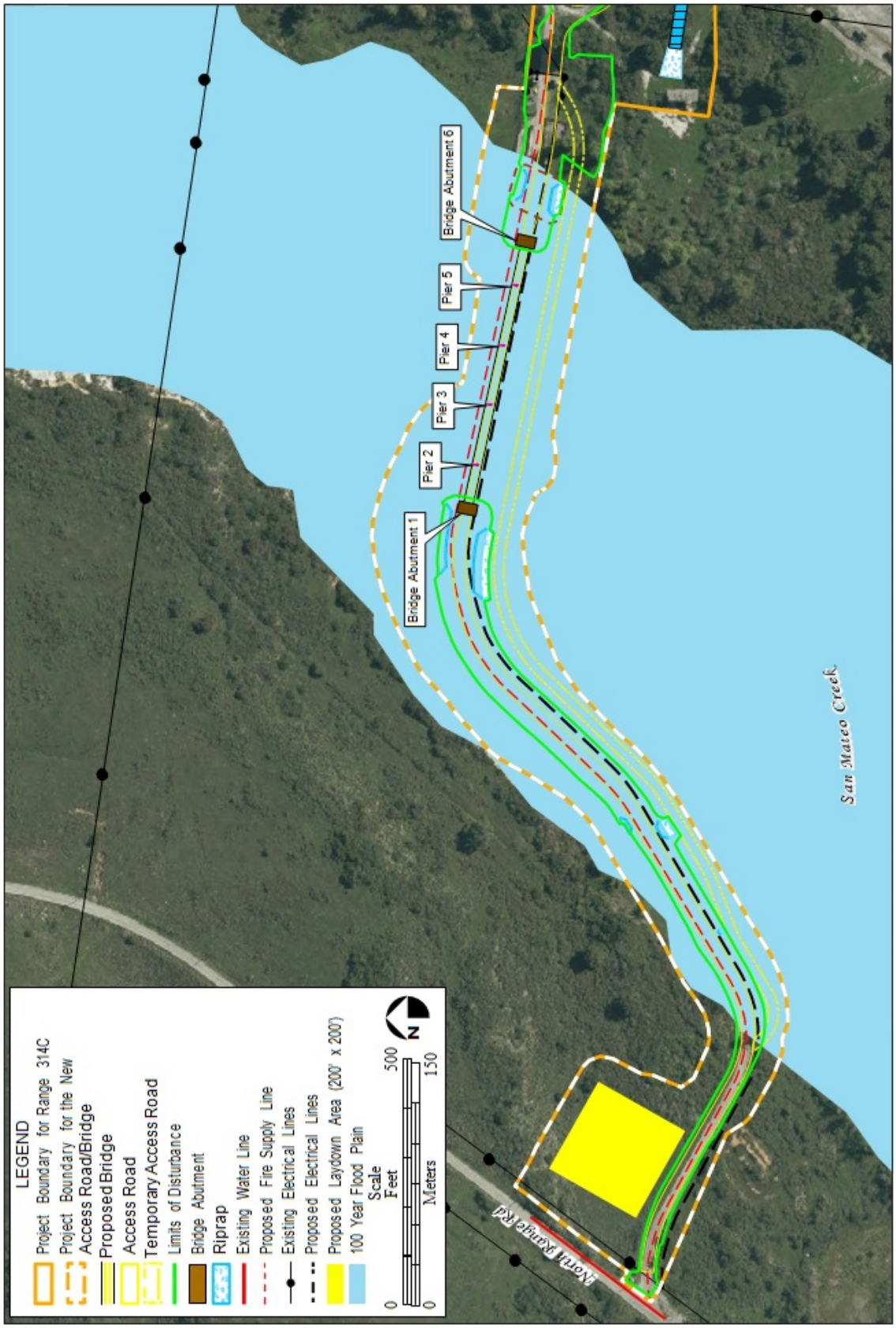
The water supply at MCB Camp Pendleton is primarily produced from aquifers that are recharged by percolation from overlying rivers and streams. The groundwater, which is in hydrologic contact with the Pacific Ocean, occurs in alluvium in the stream valleys, overlying fairly impervious rock units. Drinking water from these sources is provided to all areas of the Base (with the exception of the San Mateo Point Housing area, which receives water from the South Coast Water District) through one of two water systems (Northern and Southern Water Systems).

Total annual water use at MCB Camp Pendleton averages 8,066 acre-feet (af) (994.93 hectare-meter [ha-m]), with the majority of the water being used for military consumption and lesser amounts being used for irrigation. Actual annual use is related to water conservation efficiency during drought years, troop mobilization levels, water system leaks, and other water needs (USMC 2007a updated).

The quality of extracted groundwater used for potable water supply at MCB Camp Pendleton meets the regulatory health-based standards and the maximum contaminant levels (MCLs) for drinking water prescribed by the Office of Drinking Water, California Department of Health Services (DHS). While drinking water standards for groundwater are met for most constituents in the drainages from which groundwater is extracted, including Santa Margarita, Las Flores, San Onofre, and San Mateo watersheds, recurring problems have been noted for TDS, conductivity, nitrate, iron, sodium, and bacteria (*E. coli*) (Leedshill-Herkenhoff 1989). Additionally, there is concern about potential seawater intrusion into the Base wells if water extraction exceeds the safe yield of individual basins (USMC 2007a updated).

3.2-1 MCB Camp Pendleton Watersheds

3.2-2 100-Year Floodplain in the Project Vicinity



To date, frequent monitoring and extraction control of key wells appears to have helped prevent seawater intrusion in the drinking water supply.

The project site is located within the San Mateo Basin of the San Juan Hydrologic Unit. The San Mateo Basin has a surface area of 2,990 acres (1,211 hectares), underlies San Mateo Valley and Cristianitos Canyon, and is bounded by the Pacific Ocean on the west and elsewhere by semi-permeable Tertiary marine sedimentary rocks (California Department of Water Resources [DWR] 1967). The total storage capacity for this basin is estimated to be 14,000 af (1,727 ha-m). The amount of groundwater in storage is unknown. Average groundwater production for potable use is approximately 900 af per year (111 ha-m per year). Recharge of reclaimed water is estimated to be about 250 af per year (31 ha-m per year) (DWR 2003).

3.2.2 Environmental Consequences

3.2.2.1 Alternative 1: Range 314C with New Access Road/Bridge Alternative

Water Supply

This alternative would not result in an increase in operations at Range 314C due to the construction of modernized facilities or the bridge. Therefore, no additional potable water demands would be required. This alternative would include the construction of a fire protection system. The water distribution line for the fire protection system would connect to the existing potable water line located in North Range Road. Water demands associated with the proposed facilities would be minimal with respect to overall water demands at MCB Camp Pendleton. Therefore, significant water supply impacts would not occur. Refer to Section 3.6 (Utilities) for potential impacts related to water supply infrastructure.

Erosion

Increased erosion potential during construction could result from grading (cut and fill operations), removal of vegetative cover, soil compaction by heavy equipment, and off-site transport of soils in vehicle tires. Alternative 1 would include a number of control measures and BMPs to prevent or minimize potential effects to water quality, increased sedimentation, and/or flooding potentials in San Mateo Creek, as specified by Special Conservation Measures 2 through 8 (Section 2.3.1.2). Before commencement of site grading control devices such as silt fences, fiber rolls, gravel bag, and/or check dam protection would be placed within and around the proposed construction sites to reduce surface water flow velocities, retard soil erosion and off-site transport, and protect sensitive habitats. The construction entrance would be stabilized to remove soil from vehicle tires. Temporary erosion control measures would include application of a bonded fiber matrix with a native hydroseed mixture to all disturbed slopes. In addition, any portion of the project site left unattended for more than 14 days would be covered to prevent erosion during construction. Areas disturbed during construction would be revegetated with native vegetation for stabilization. As discussed in Section 3.1, Alternative 1 would require erosion control measures such that significant impacts associated with project construction would not occur.

As discussed in detail in Section 3.1 and specified in Special Conservation Measures 4 and 5, erosion from operation of Alternative 1 would be reduced by proposed on-site drainage improvements, including construction of ditches, vegetated swales, an alluvial channel, and bio-retention basins. Due to implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design and construction, significant erosional impacts associated with project operation would not occur. Refer to Section 3.1 (Geological Resources) for additional information pertaining to erosion.

Water Quality

Surface water and/or shallow groundwater quality impacts could potentially occur as a result of inadvertent dispersion of contaminants during grading, construction, and subsequent operations. Grading and construction would require the use of vehicles and equipment powered by diesel fuel/gasoline and lubricated with oil and other mechanical fluids, which are considered hazardous substances. Accidental releases of such substances (e.g., spills arising from leakage of fuel, motor oil, or hydraulic fluid during operation and/or equipment maintenance) could also occur. All vehicles and equipment would carry supplies of fuel and other mechanical fluids only in the quantities needed for their operation. The use of licensed, trained personnel for the safe operation of vehicles and equipment required for construction/demolition, as well as performance of a regular, comprehensive maintenance program would further reduce the potential for an accident to occur. To minimize the risk of release of fuel or other petroleum products, equipment fueling and maintenance would be completed at designated fueling stations.

Before construction, the ROICC would obtain authorization for construction under the General Permit for Discharges of Stormwater Associated with Construction Activity from the SWRCB. The Contractor would be required to implement all appropriate BMPs for contaminated runoff control, as identified in Order No. 2009-0009-DWQ.

Similarly, post-construction surface water quality could be impacted by runoff of oil and grease from parking areas, illegal dumping, and spillover from designated refuse areas. Alternative 1 includes control measures and BMPs to prevent or minimize potential effects to water quality in the on-site drainage and downstream San Mateo Creek, as specified in Special Conservation Measures 2 through 8 and 27. Runoff from equipment and vehicle washing would be contained at the construction site and would not be discharged to receiving waters or the storm drain system. All drainage infrastructure would be designed to comply with design manuals and local standards and guidelines and the regulations stipulated for LID. Federal projects with a footprint of 5,000 ft^2 (464 m^2) or greater would implement LID in accordance with EISA (2007) and official DoN, USMC, and DoD LID policies (2007, 2008, 2010). A comprehensive set of stormwater planning, design, and construction elements would be used to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow. This would be achieved with LID techniques using the 95th percentile, 24-hour storm, or via a site-specific hydrologic analysis, using continuous simulation modeling or other tools. Additionally, the policies set forth a goal of reduced pollutant loading. LID strategies are described in detail in UFC 3-210-10. LID techniques may also be used to meet LEED requirements. Water quality impacts of downstream San Mateo Creek, and underlying shallow groundwater, would not be significant with implementation of these project design components and BMPs.

Operation of the range would be conducted as under existing conditions. Work on MCB Camp Pendleton is conducted in accordance with federal, state, and local laws, regulations, and instructions; *USEPA Best Management Practices for Lead at Outdoor Shooting Ranges* (EPA-902-B-01-001); RCRA, CWA, 40 CFR 260 (Federal Hazardous Waste Regulations), and CA Title 22 (California Hazardous Waste Regulations). As a result, operation of Alternative 1 would not cause significant impacts to water quality within San Mateo Creek.

Flooding

EO 11988, dated 24 May 1977, and amended by EO 12148 on 20 July 1979, requires agencies to take actions to reduce risks to human safety and property that may be associated with floods, and to preserve the natural and beneficial values served by floodplains. In addition, agencies are required to analyze

potential effects of any actions that may be taken in a floodplain, and include requirements outlined in this order in the planning process.

Proposed paving associated with the range would result in an increase in impermeable surfaces, thus increasing potential runoff and associated flooding downstream of the project site. As specified in Special Conservation Measure 5, proposed on-site drainage improvements on the range would reduce potential on-site flooding associated with creation of new impermeable surfaces. The drainage improvements would include construction of ditches, vegetated swales, an alluvial channel, and bio-retention basins that would provide stormwater control of run-on and runoff flows and sheetflow from the range. The drainage facilities would be designed to comply with DoN design manuals, local standards and guidelines, and regulations stipulated in UFC 3-210-10 for LID. The vegetated swale would be designed to treat the 95th percentile, 24-hour stormwater event. Therefore, post-construction off-site runoff would be equal to or less than existing conditions. Natural riprap energy dissipaters would be installed downstream of the alluvial channel before discharge to San Mateo Creek, thus reducing off-site flow velocities. These drainage design features are detailed in the *Storm Water Protection Report for P-637* (RBF Consulting 2014). In addition, a Maintenance Plan for the on-site drainage system would be prepared by the Design and Construction Contractor, as specified in Special Conservation Measure 5. With construction, operation, and maintenance of an on-site drainage system, Alternative 1 would not cause increased surface flows within San Mateo Creek.

Similarly, proposed paving associated with the access road and bridge would result in an increase in impermeable surfaces, thus increasing potential runoff into San Mateo Creek. However, due to the relatively small area of paving, the increased runoff would not substantially contribute to water level increases within San Mateo Creek, such that there would be an increased risk of flooding. In addition, the drainage facilities would be designed to comply with DoN design manuals, local standards and guidelines, and regulations stipulated in UFC 3-210-10 for LID. Therefore, Alternative 1 would not cause significant flooding impacts to San Mateo Creek.

Although the bridge would be designed to clear projected 100-year flood levels by 2 ft, portions of the proposed bridge (i.e., piers and abutments) and access road would be constructed within the 100-year floodplain of San Mateo Creek (Figure 3.2-2). The bridge would be constructed to accommodate and withstand a 100-year flood event (1 percent annual chance of occurrence). However, bridge construction could alter the floodplain, primarily by constricting the floodway beneath the bridge. Floodway constriction would result in general and local scouring of San Mateo Creek. General scour is the lowering of the streambed across the bridge opening and is typically associated with contraction of flow, but may also result from the presence of a bend in the stream channel. General scour is associated with a flood event and can be cyclic, in that there can be an increase and a decrease of the streambed during the passage of the flood. Local scour involves scour around bridge piers, abutments, and embankments and is caused by acceleration of flow and vortices induced by obstructions, such as bridge piers and abutments (URS 2011; RBF Consulting 2014). Up to 24 ft (7.5 m) of scour was predicted for a 100-year storm event. Impacts from scour would be mitigated through placement of riprap, placement of other scour resistant materials, and/or implementation of other structural scour countermeasures, including Special Conservation Measure 6. Therefore, Alternative 1 would not cause significant flooding impacts to San Mateo Creek and mitigation is not required.

3.2.2.2 Alternative 2: Range 314B with New Access Road/Bridge Alternative

Similar to Alternative 1, this alternative would potentially discharge construction- and operation-related waste materials that would affect the quality of surface water or groundwater in the vicinity of or downstream (downgradient) from the project site. The topography of Range 314B includes two north-south trending ridges and an intervening valley, which trend perpendicular to the elongated shape of

the proposed training range. In contrast, Range 314C consists of a broad-based, east-west trending canyon that is more in alignment with the shape of the proposed range. As a result, grading activities associated with construction of Range 314B would be greater than for Alternative 1, resulting in greater temporary soil disturbance and associated potential for short-term erosion induced siltation of an ephemeral creek located along the north-northeast portion of the range (Figure 2.1-2).

Similar to Alternative 1, this alternative would result in increased surface runoff and create structures (i.e., the access road/bridge) that would potentially affect the patterns of surface flows of San Mateo Creek. However, given that this alternative would construct facilities similar to those for Alternative 1, as well as use similar construction methods and BMPs to prevent soil erosion and water quality impacts, the environmental consequences of this alternative to water resources would be comparable to those associated with Alternative 1. Implementation of Special Conservation Measures 2 through 8 and 27 would ensure significant water quality impacts would not occur and mitigation is not required.

3.2.2.3 No-Action Alternative

Under the No-Action Alternative, upgrades to training range and construction of an all-weather access road and bridge would not occur and training would continue under current conditions. Therefore, no impacts on water resources would occur and mitigation is not required.

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3.3 Biological Resources

3.3.1 Affected Environment

Field surveys were conducted between 2006 and 2012 to determine biological and wetland resources present within the project site including: (1) vegetation community survey and mapping (SAIC 2007a); (2) rare plant survey that focused on thread-leaved brodiaea (SAIC 2007b; ICF 2012a); (3) wetland delineation (SAIC 2007c, 2012); (4) California gnatcatcher protocol surveys (Merkel & Associates 2007; AMEC 2011; Tierra Data 2014); and (5) fairy shrimp protocol surveys (ICF 2012b). Information in support of this analysis was also derived from the following sources: the MCB Camp Pendleton Geographic Information Systems (GIS) database (MCB Camp Pendleton GIS Data 2015) and the MCB Camp Pendleton INRMP (USMC 2007a updated). Plant names follow the *Jepson Manual*, second edition (Baldwin *et al.* 2012). Plant community classification follows Oberbauer (2008).

3.3.1.1 Plant and Aquatic Communities and Associated Wildlife

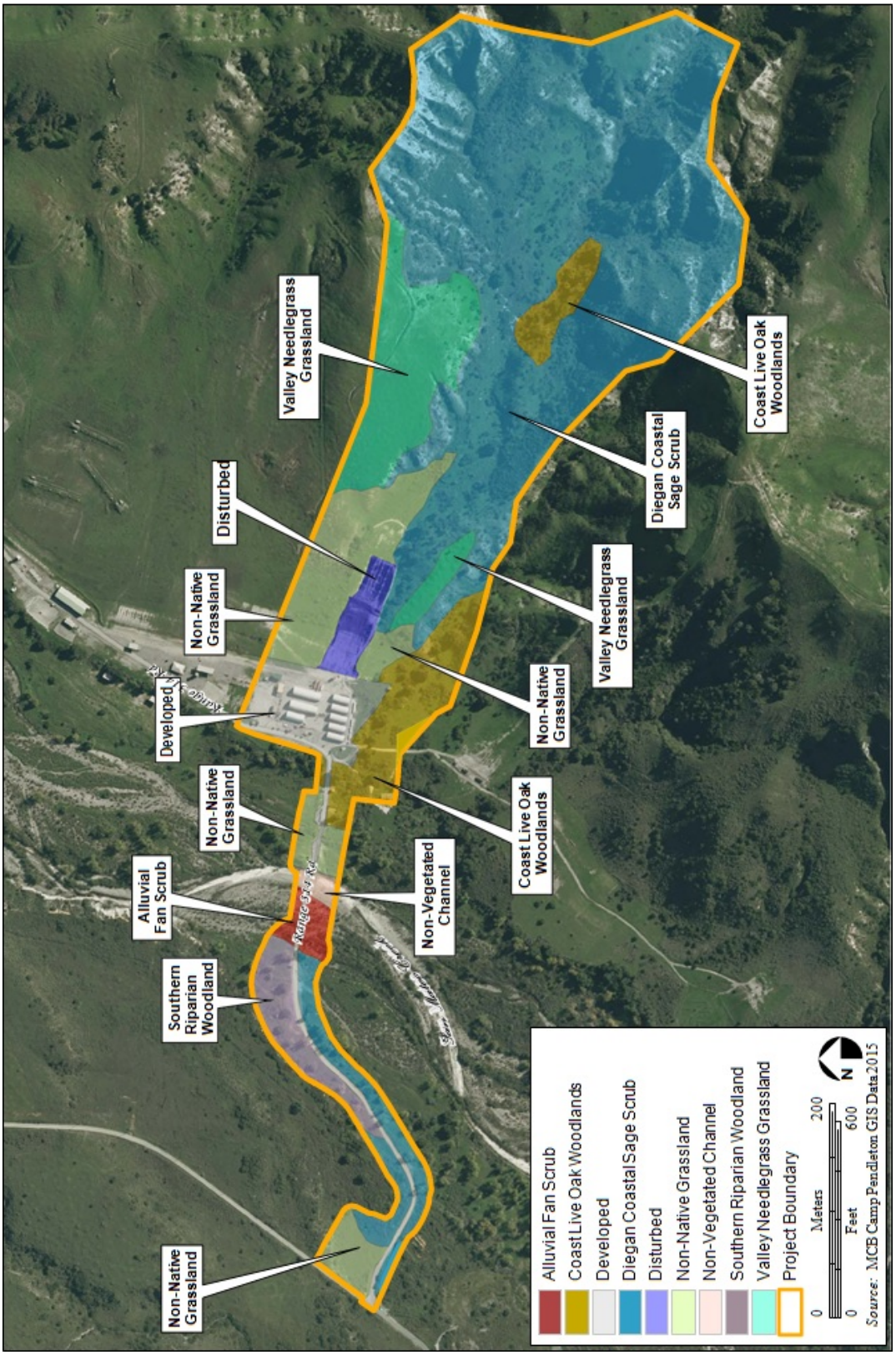
Plant Communities and Habitats

Plant communities mapped within the project area, including Range 314C, Range 314B, and the access road/bridge, are described below and presented in Figures 3.3-1 and 3.3-2.

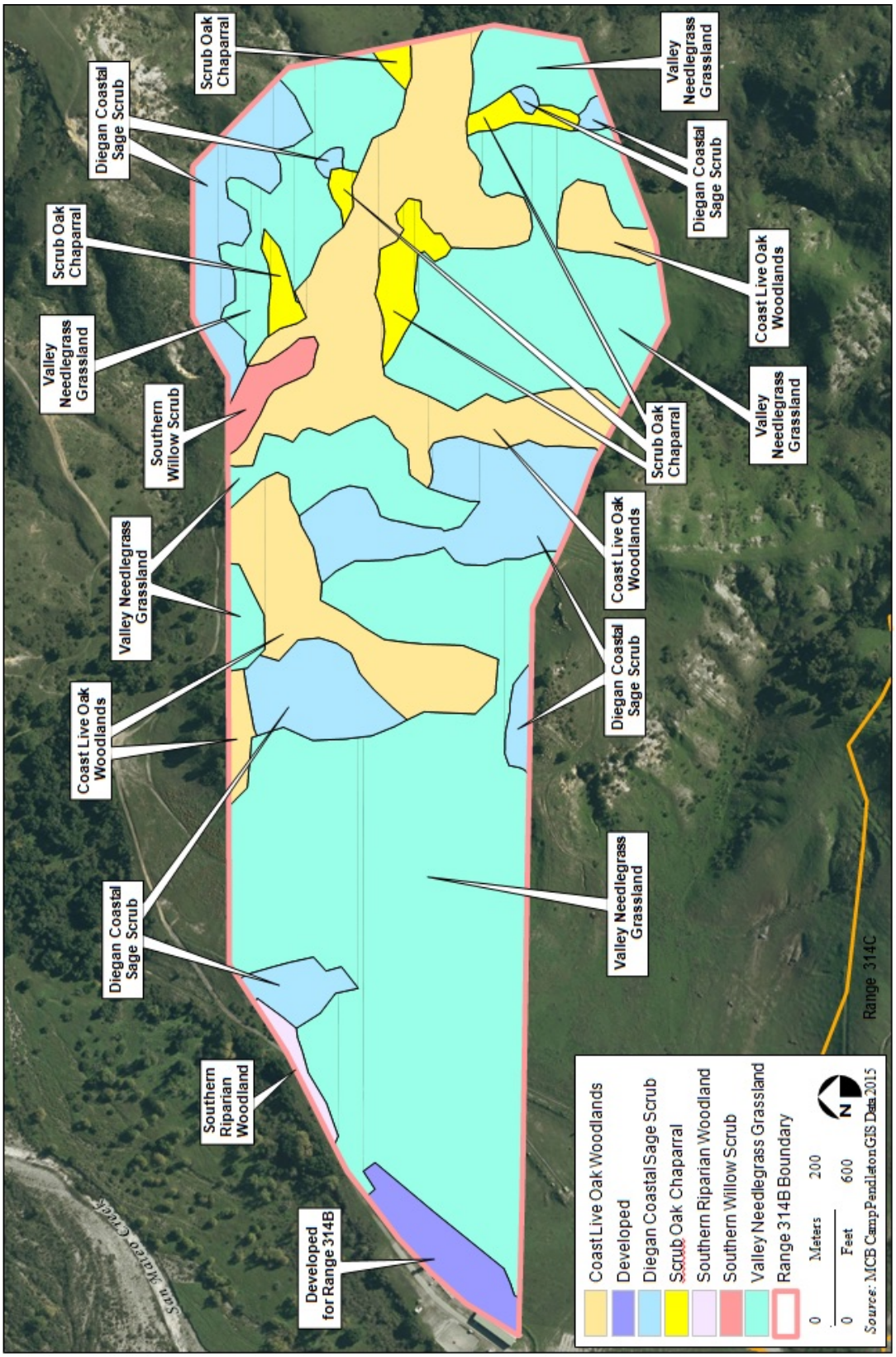
Range 314C. Range 314C is characterized by a long east-west trending valley narrowing from open San Mateo Creek floodplain on the west to a steep, cliff-enclosed terminus at the eastern end. The existing range slopes very gently west. The majority of the vegetation in the vicinity of Range 314C consists of Valley Needlegrass Grassland, Diegan Coastal Sage Scrub, Coast Live Oak Woodland, Non-native Grasslands, and Developed/Disturbed as described below and shown in Figure 3.3-1. Although Range 314C is routinely used for live-fire training and contains debris associated with ordnance, it provides valuable wildlife habitat and supports species typical of upland and riparian environments. Common species observed during field surveys in the upland scrub habitats include California towhee (*Pipilo crissalis*), Bewick's wren (*Thryomanes bewickii*), song sparrow (*Melospiza melodia*), and Anna's hummingbird (*Calypte annae*) (AMEC 2011). Other species expected to occupy the area are the side-blotched lizard (*Uta stansburiana*) and deer mouse (*Peromyscus maniculatus*). Raptors were observed overhead at both sites including red-tail hawk (*Buteo jamaicensis*) and Cooper's hawk (*Accipiter cooperii*). On 14 May 2014, three fires, known as the Basilone Complex fires, started on MCB Camp Pendleton and burned approximately 22,000 acres (8,903 hectares), including most of the Range 314C (the fire that burned the San Mateo Watershed was coined the "Combat Fire").

- *Valley Needlegrass Grassland.* Valley Needlegrass Grassland is dominated by perennial, tussock-forming purple needlegrass (*Stipa [= Nassella] pulchra*) often interspersed with other native and non-native annuals and grasses. The percentage of native grassland species may be fairly low, but in San Diego County, a community is classified as Valley Needlegrass Grassland if 20 percent cover of native species is present (Oberbauer *et al.* 2008). The dominant plant species in the project site are native perennial grasses that include purple needlegrass and nodding needlegrass (*Stipa* [=*Nassella*] *cernua*).

3.3-1 Vegetation at Range 314C and Access Road/Bridge



3.3-2 Vegetation at Range 314B



- *Diegan Coastal Sage Scrub*. Diegan Coastal Sage Scrub consists of low, soft-woody subshrubs that are facultative drought-deciduous and are most active in winter and early spring (Oberbauer *et al.* 2008). Both laurel sumac (*Malosma laurina*) and black sage (*Salvia mellifera*) are common components of Diegan Coastal Sage Scrub. In the project site sumac generally occur in a matrix of grass species, typically purple needlegrass with strong non-native grass components. The black sage-dominated areas occur on rocky hillsides at Range 314C where they cover steep north- and south-facing escarpments.
- *Coast Live Oak Woodlands*. Coast Live Oak Woodlands are dominated by coast live oak (*Quercus agrifolia*) and occurs throughout coastal California. The density of the tree canopy can vary from open (less than 50 percent) to dense (50 to 75 percent) (Oberbauer *et al.* 2008), with the more open form present in the project site. At the project site, coast live oak is limited to two small areas associated with swales. One is located approximately south of the firing line and the other is about mid-range. The understory of a Coast Live Oak Woodland is highly variable depending on proximity to streams, soil type, and fire frequency.
- *Southern Riparian Woodland*. Southern Riparian Woodland consists of moderate-density canopy dominated by small trees or shrubs with scattered taller riparian trees (Oberbauer *et al.* 2008). This vegetation community is common on the floodplains of large streams and rivers throughout California. In the project site, it was found along the access road to the Range 314 Complex and at the western edge of Range 314C, behind the firing line. The dominant species in the overstory is western sycamore (*Platanus racemosa*), and occurs along the entrance road as occasional trees with a mostly non-native grass and herb understory.
- *Alluvial Fan Scrub*. This vegetation type is a sub-type of Riversidean sage scrub, which is a xeric form of coastal sage scrub that occurs in well-drained, rocky soils such as on slopes and in flood scour. The Alluvial Fan Scrub supports some riparian species and is noted as occurring on the floodplain of streams in the project site and project vicinity, including San Mateo Creek (Oberbauer *et al.* 2008). In the project site, it occurs along the access road where it crosses San Mateo Creek. Mulefat (*Baccharis salicifolia*), is the dominant plant species, which occurs as individuals or in small to large patches.
- *Non-native Grassland.* Non-native grassland vegetation has largely replaced native grassland throughout much of California. At Range 314C, this grassland consists of mostly non-native annual grasses and herbs including oats, red brome (*Bromus madritensis* ssp. *rubens*), and Mediterranean mustard (*Hirschfeldia incana*). It is found in low lying areas that are exposed to repeated mechanical disturbance, particularly just forward of the firing line.
- *Developed and Disturbed*. Disturbed areas include areas that have been cleared of vegetation such as the existing firing range and training areas, and Developed areas include access roads, existing buildings and pads, and other paved areas.

Range 314B. Range 314B is characterized by rolling hills surrounding swales and drainages with a similar community composition and species distribution as Range 314C. Low gradient oak-lined swales drain approximately northward into an approximately westward draining willow-dominated tributary to San Mateo Creek. The vegetation in the project vicinity includes Valley Needlegrass Grassland, Diegan Coastal Sage Scrub, Coast Live Oak Woodland, Scrub Oak Chaparral, Southern Riparian Woodland, Southern Willow Scrub, and Disturbed/Developed as described below.

- *Valley Needlegrass Grassland.* This grassland is the most abundant vegetation community present on Range 314B. Characteristics are comparable to Valley Needlegrass Grassland on Range 314C described above. Varying densities of non-native annual grasses are present in scattered patches but in lower abundance than at Range 314C. Many-stemmed dudleya (*Dudleya*

multicaulis; California Native Plant Society [CNPS] List 1b) was also found within the purple needlegrass series on Range 314B.

- *Diegan Coastal Sage Scrub*. Characteristics of this vegetation community are comparable to those described under Range 314C, but sumac is more common on Range 314B. Sumac patches occur on steep hillsides or near swales, just above the area dominated by coast live oak trees.
- *Coast Live Oak Woodland*. Characteristic species of this woodland are similar to Range 314C, but there is greater diversity in the understory in some areas. At Range 314B, coast live oak is well-distributed and more extensive than at Range 314C, particularly in close proximity to swales and other low-lying areas. The upper reaches of the willow-lined tributary to San Mateo Creek supports coast live oak woodlands. More mesic areas have dense stands with overlapping canopies. The density of coast live oak trees decreases further from drainages or adjacent to swales and other areas with less accessible groundwater. The understory of coast live oak is highly variable with some stands comprised of purple needlegrass or non-native grassland understories whereas other areas have an open to dense understory consisting of shrubs, subshrubs, grasses, and herbs such as poison oak (*Toxicodendron diversilobum*) and giant wild rye.
- *Scrub Oak Chaparral*. The scrub oak community occurs in dense, evergreen patches within chaparral in coastal California. At Range 314B, it is dominated by scrub oak (*Quercus berberidifolia*) with an understory that is similar to Valley Needlegrass Grassland, but occasionally consists of soft shrubs such as coastal deerweed. Scrub oaks generally line steep slopes of drainages.
- *Southern Riparian Woodland*. Southern Riparian Woodlands occurs at the western edge of Range 314B, behind the firing line. The dominant species in the overstory is western sycamore (*Platanus racemosa*) which grows with other riparian trees, particularly cottonwoods (*Populus* sp.) in a dense forest. The understory is highly variable and is dominated by non-native annual grasses and herbs including Mediterranean mustard and smilo grass (*Piptatherum miliaceum*).
- *Southern Willow Scrub*. At Range 314B, this community consists of erect arroyo willow (*Salix lasiolepis*) along a westward leading drainage tributary to San Mateo Creek. It is surrounded by dense coast live oaks, both in the drainage and on the banks. The willows have been burned periodically, and are very erect, dense, and narrow-stemmed, due to resprouting. The canopy is dense, and very little direct sunlight filters to the ground. In small openings, the understory consists primarily of mugwort (*Artemisia douglasiana*).
- *Developed.* These types of areas at Range 314B are similar in characteristics and in distribution to Range 314C, but are less extensive. They typically consist of developed areas, including buildings and roads, and berms along the firing line.

Access Road/Bridge. The majority of the proposed access road/bridge is located within or adjacent to the San Mateo Creek riparian corridor (Figure 3.3-1 and 3.3-2). Habitats within this portion of the project site include Diegan Coastal Sage Scrub and Alluvial Fan Scrub, which is composed of the most xeric expression of coastal sage scrub that includes California sycamore and coyote brush (*Baccharis salicifolia*), Southern Riparian Woodland, which contains dense riparian forests dominated by sycamores and cottonwoods (*Populus* spp.) and Non-native Grassland. Non-vegetated areas within the project site include the non-vegetated flow channel of San Mateo Creek. Developed areas include the existing access roads.

Aquatic Communities and Habitats

San Mateo Creek and its associated riparian corridor is the primary aquatic community present within and adjacent to the project site. San Mateo Creek is a primary drainage system on MCB Camp Pendleton. It is a perennial stream; however, the portion of San Mateo Creek within the project site flows seasonally and typically has a dry streambed from July through October and surface water during the storm season. The riparian corridor is dominated by Southern Riparian Woodland and Southern Willow Scrub plant communities. Riparian vegetation is generally sparse near the existing crossing and downstream with individual mulefat and low herbaceous plants dominating. Like all primary drainages on MCB Camp Pendleton, San Mateo Creek is an important migratory corridor and provides cover and foraging opportunities.

Potential wetlands and other Waters of the U.S. were identified and delineated within and in the vicinity of the project site based on the USACE *1987 Delineation Manual* (Environmental Laboratory 1987) and the *Arid West Regional Supplement* (USACE 2008) (Figures 3.3-3 and 3.3-4) (SAIC 2007c, 2012). Acreage of wetlands and other Waters of the U.S. identified at Range 314C and the access road are presented in Table 3.3-1.

Table 3.3-1. Wetlands and Other Waters of the U.S. within the Project Area

Area Surveyed	*Wetlands (acre/hectare)*	*Other Waters of the U.S. (acre/hectare)*
Range 314C	-	0.3/0.17
Access Road and Bridge	-	1.8.0.73
Range 314B	1.4/0.7	0.7/0.3
Source: SAIC 2007c, 2012		

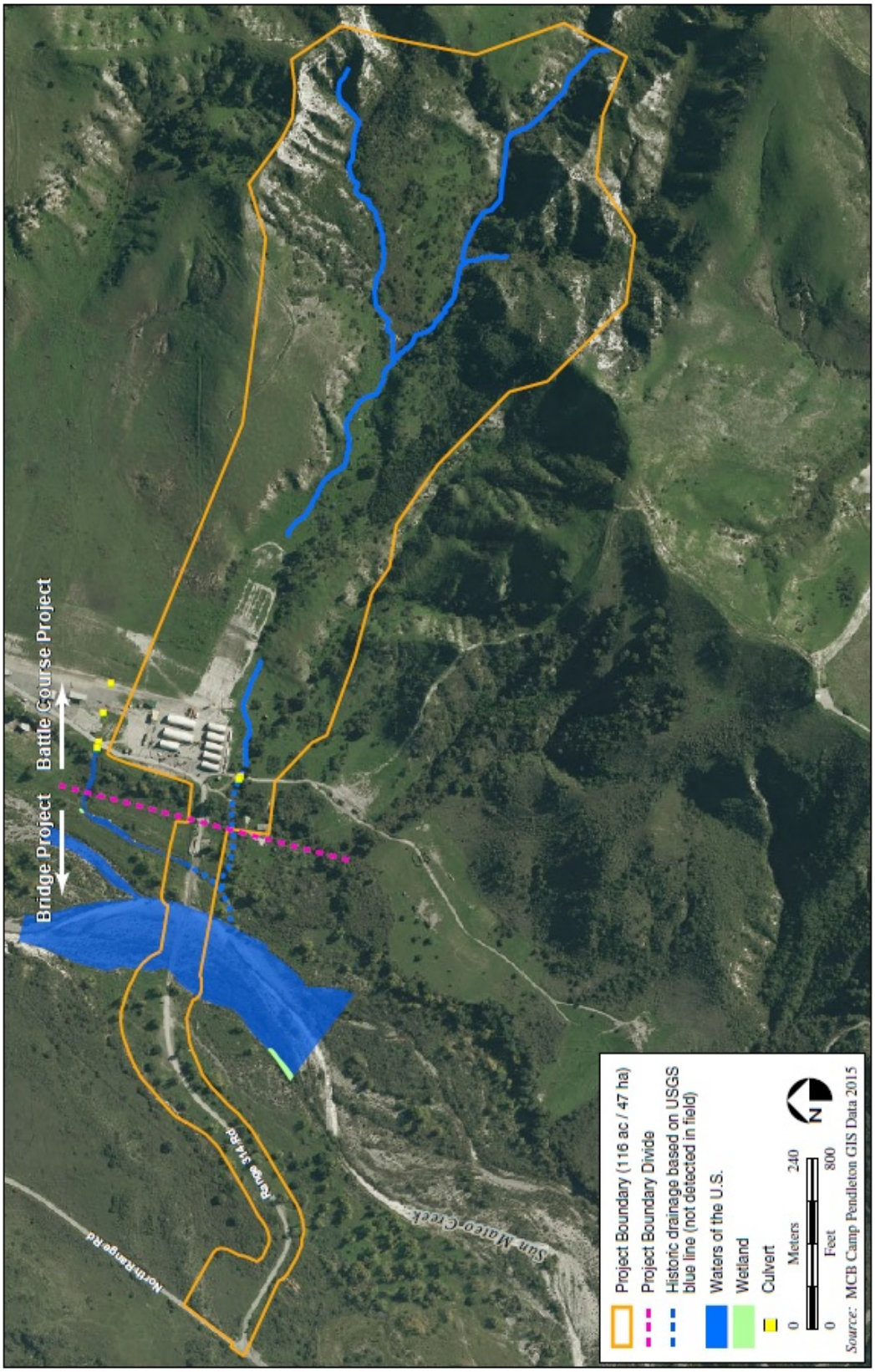
3.3.1.2 Threatened, Endangered, and Other Special Status Species

San Mateo Creek and adjacent upland areas within the project vicinity are known or have the potential to support several federally listed species based on suitable habitat. Several of these species (Stephens' kangaroo rat, Riverside fairy shrimp, San Diego fairy shrimp, coastal California gnatcatcher, and tidewater goby) were not carried forward for further analysis based on the results of site-specific surveys and/or lack of known records.

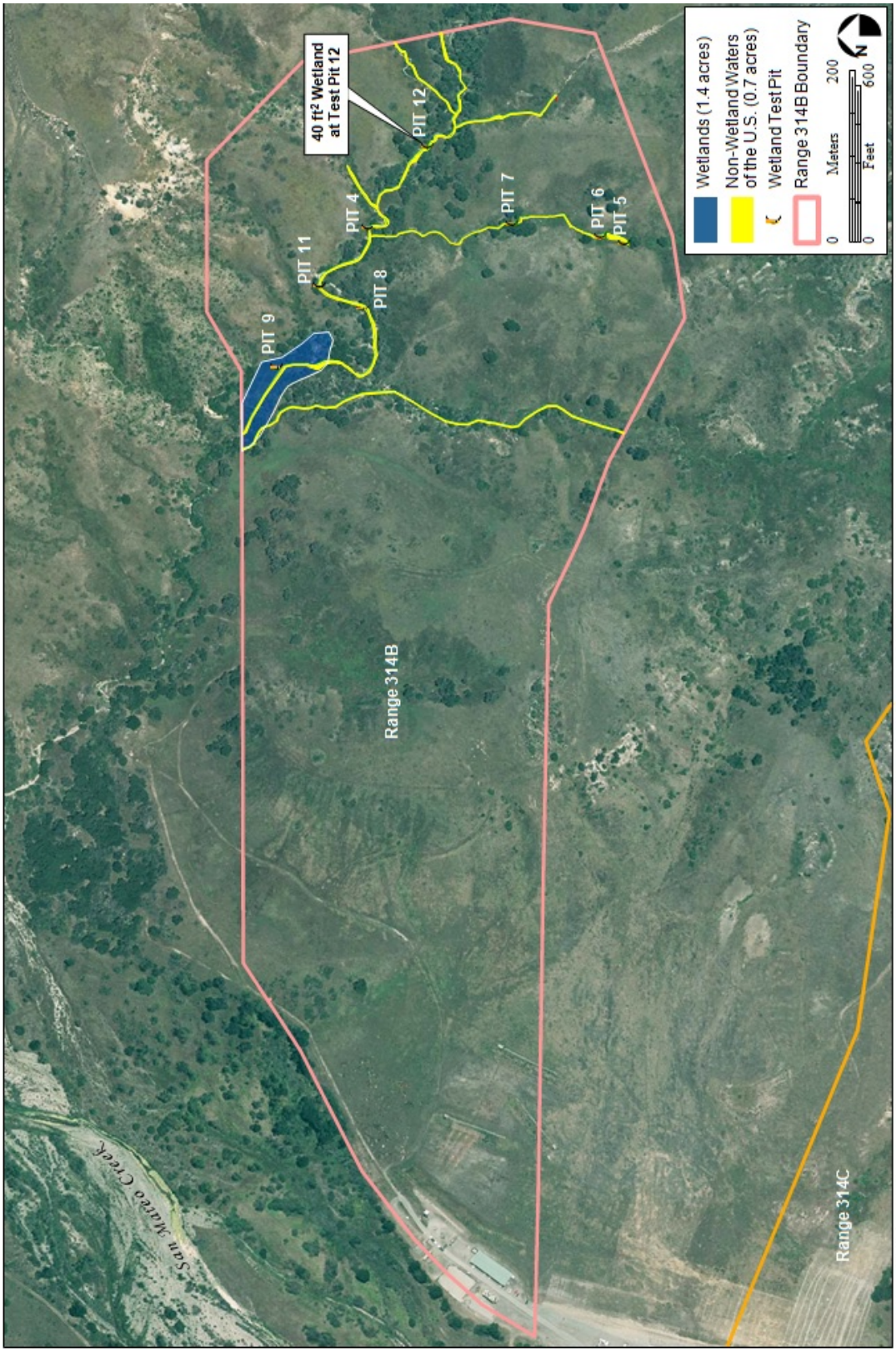
Stephens' kangaroo rat (*Dipodomys stephensi*, threatened) has been found northwest of the project site near the Helicopter Outlying Landing Field (other side of San Mateo Creek). Habitat in the project site is very low quality for this species; therefore, this species is not expected to occur within the project site (Montgomery, personal communication).

Coastal California gnatcatcher (*Polioptila californica californica*, threatened) prefers open coastal sage scrub habitat with California sagebrush. The nearest individuals have been recorded approximately 1,000 ft (305 m) from the proposed access road (MCB Camp Pendleton GIS Data 2015). Marginal suitable habitat for this species is present within the project site; however, site-specific protocol surveys in 2006 and 2011 did not identify any individuals (Merkel & Associates 2007; AMEC 2011). Surveys were conducted adjacent to the project site in 2014 (Tierra Data 2014); a single pair and a single male were observed 1 kilometer from the project site in primarily disturbed coastal sage scrub with a large component of fennel and mustard. These habitats are occasionally used by coastal California gnatcatchers but are not generally preferred.

3.3-3 Wetlands and Other Waters of the U.S. at Range 314C and the Access Road/Bridge Project Area



3.3-4 Wetlands and Other Waters of the U.S. at Range 314B



Riverside and San Diego fairy shrimp (*Streptocephalus woottoni, Branchinecta sandiegonensis,* endangered) occur in seasonal, static pools that are filled by winter and spring rains. These pools occur in coastal sage scrub and may be natural as well as human-made depressions (seasonally ponded features) that temporarily impound water. Neither Riverside fairy shrimp nor San Diego fairy shrimp have been recorded in the project site; however, ephemeral (seasonally ponded) basins were mapped near the project boundary. Protocol surveys did not identify either species or their cysts (ICF 2012b).

Tidewater goby (*Eucyclogobius newberryi*, endangered) is known to occur at the mouth of San Mateo Creek (United States Geological Survey [USGS] 2011); however, the project site is more than five mi (8 km) upstream and no project-related components or associated potential impacts would occur near where the species is known to occur.

Several species that are federally listed as threatened or endangered have the potential to occur within or in the vicinity of the project site based on the presence of suitable habitat, existing records, and/or results of focused surveys, and are listed in Table 3.3-2 and depicted in Figure 3.3-5. A detailed description of each species and their distribution within the project site is provided in text to follow.

Table 3.3-2. Federally Listed Threatened and Endangered Plant and Animal Species Known to Occur or Potentially Occurring in the Project Vicinity

Species	*Status*	*Habitat/Occurrence*
Thread-leaved brodiaea *Brodiaea filifolia*	FT, SE, 1B	Thread-leaved brodiaea typically occurs on clay soils in open grasslands, at the edges of vernal pools, and in floodplains. This species is known to occur within the project site near the northern edge of Range 314C (Figure 3.3-5; SAIC 2007b).
Steelhead *Oncorhynchus mykiss*	FE, CSC	Steelhead enter creeks after the first substantial rains, spawn in gravelly creek beds, and return to the ocean. Young rear in streams for about two years. Steelhead are a known occupant of San Mateo Creek, which is used for migration habitat on MCB Camp Pendleton (USMC 2007). A distributional study of 2002 also determined that *O. mykiss* was present in San Mateo Creek (National Marine Fisheries Service [NMFS] 2011). The portion of San Mateo Creek on MCB Camp Pendleton provides migratory habitat. Due to the characteristics of San Mateo Creek at the project site, steelhead would only be present when the creek flows are high enough to support the passage of adults moving upstream to upper watershed spawning areas or young and adult steelhead moving downstream to the ocean.
Arroyo toad *Anaxyrus californicus*	FE, CSC	Arroyo toads are known to occur in the San Mateo watershed and have been observed breeding in San Mateo Creek adjacent to the project site (Turschak *et al*. 2009; Brehme *et al*. 2012). Previous records documented arroyo toads within the portion of the project site where the access road and new bridge are proposed (MCB Camp Pendleton GIS Data 2015).
Least Bell's vireo *Vireo bellii pusillus*	FE, SE	This species primarily inhabits dense willow-dominated riparian habitats with lush understory vegetation, nesting in the understory and using taller trees for foraging and singing perches. Breeding individuals have frequently been recorded along San Mateo Creek, with the closest occurrence approximately 500 ft (152 m) from the proposed access road/ bridge (MCB Camp Pendleton GIS Data 2015).
Southwestern willow flycatcher *Empidonax traillii extimus*	FE, SE	This bird breeds in dense riparian vegetation along rivers, streams, or other wetlands. Currently, breeding populations on MCB Camp Pendleton occur in the Santa Margarita Watershed. Non-breeding individuals have been recorded within San Mateo Creek near the project site; however, no individuals were mapped in the most recent surveys (MCB Camp Pendleton GIS Data 2015; USGS 2013).

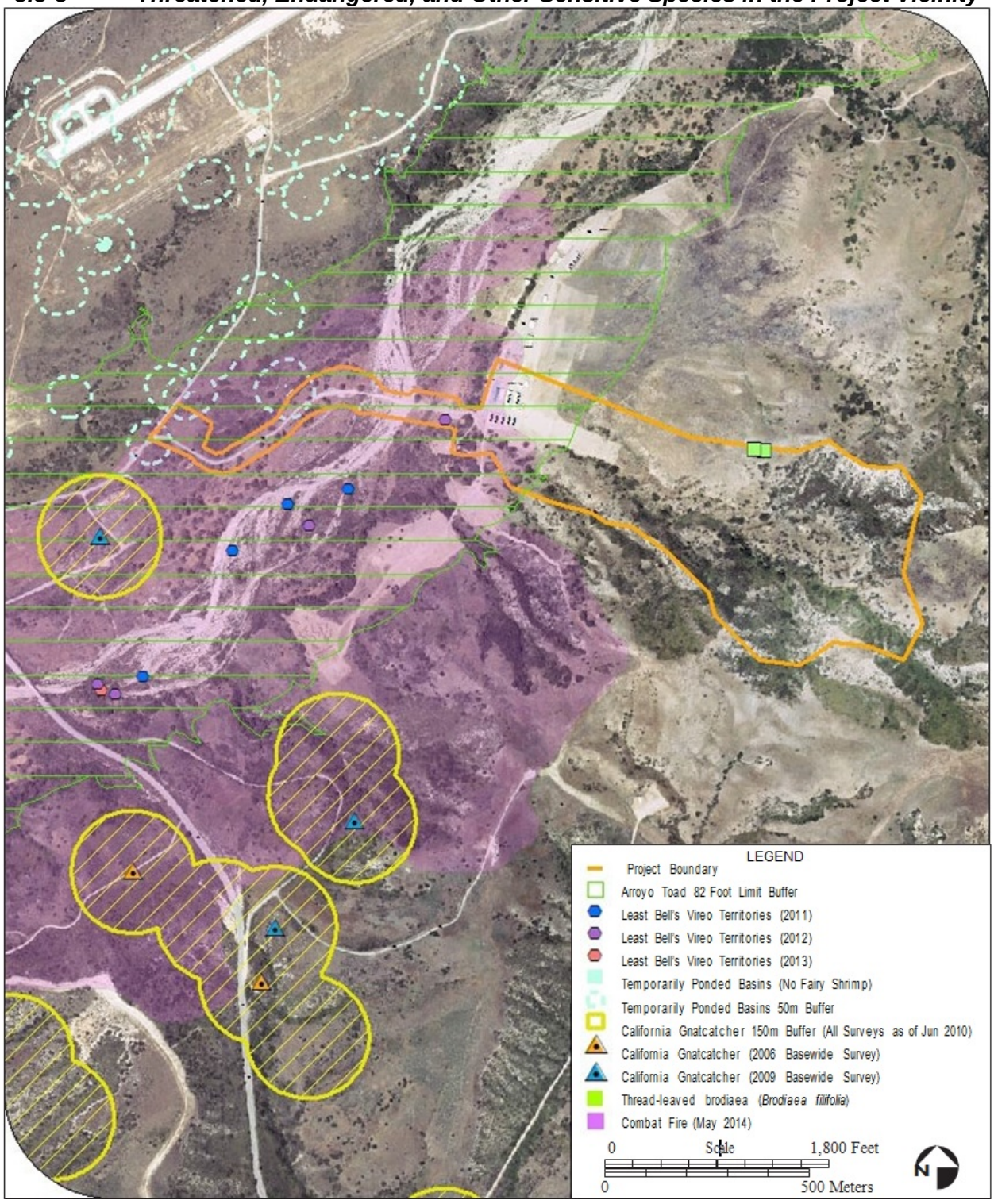
Status:

Federal Status (determined by USFWS):
- FE Federally Listed Endangered
- FT Federally Listed Threatened

State Status (determined by California Department of Fish and Game):
- SE California State Listed Endangered
- CSC California Special Concern Species

California Native Plant Society (CNPS) Listing:
- List 1B: Plants rare, threatened or endangered in California and elsewhere.

3.3-5 Threatened, Endangered, and Other Sensitive Species in the Project Vicinity



Federally Listed and Special Status Species Plants

Thread-leaved Brodiaea

The thread-leaved brodiaea (*Brodiaea filifolia*) was listed by the USFWS as a threatened species on 13 October 1998 (USFWS 1998b) and listed as endangered in California in 1982 (California Department of Fish and Wildlife [CDFW] 2000). On 13 December 2005, the USFWS issued its final rule on critical habitat for thread-leaved brodiaea. A total of 597 acres (242 hectares) in Los Angeles and San Diego counties was listed. The USFWS designated revised final critical habitat for thread-leaved brodiaea on 8 February 2011. The USFWS found that the MCB Camp Pendleton INRMP provides a benefit for the brodiaea and therefore, approximately 1,531 acres (620 hectares) of habitat on MCB Camp Pendleton subject to the INRMP is exempt from critical habitat designation under Section 4(a)(3) of the Act, and is not included in this final revised critical habitat designation (USFWS 2011a). A Recovery Plan has not yet been completed and approved.

Thread-leaved brodiaea occurs in a few scattered occurrences[2] within Los Angeles, Orange, western Riverside, and northwestern San Diego counties (CDFW 2000). MCB Camp Pendleton has developed a survey methodology for thread-leaved brodiaea. The surveys are conducted on a project-by-project basis and identify flowering individuals, which is representative of the total population at a given location. As a result, the size of thread-leaved brodiaea populations and the total number of known thread-leaved brodiaea occurrences on MCB Camp Pendleton continue to change. Presently, 337 populations per the 7-meter mapping rule have been mapped on MCB Camp Pendleton per the 0.25-mile mapping method (Dinkins personal communication).[3] In 2007, one occurrence (total of flowering 26 individuals that survey year) of thread-leaved brodiaea was found within the project site on the northern boundary of Range 314C within native grassland (Figure 3.3-5) (SAIC 2007b). An additional survey in 2011 focusing on the access road/bridge area did not identify any flowering thread-leaved brodiaea (ICF 2012a).

Steelhead Trout

The southern California distinct population segment (DPS) of steelhead trout (*Oncorhynchus mykiss*) was federally listed by the NMFS as endangered on 18 August 1997 (NMFS 1997) and by the USFWS on 17 June 1998 (USFWS 1998c). The final listing determination was issued 5 January 2006. The southern California DPS includes all naturally spawned anadromous steelhead populations below natural and manmade impassable barriers in streams from the Santa Maria River in San Luis Obispo County (inclusive) to the U.S.-Mexico Border. The *Southern California Steelhead Recovery Plan* was released in January 2012; the planning area examined in the document includes the three major creeks on MCB Camp Pendleton: San Mateo, San Onofre, and Santa Margarita (NMFS 2011). The NMFS extended the Southern California Evolutionary Significant Unit listing to include the population rediscovered within San Mateo Creek, as well as any other naturally spawned steelhead occurring south to the Mexican border (NMFS 2002).

Adult steelhead enter creeks in the winter, usually after the first substantial rainfall, and move upstream to suitable spawning areas. Spawning occurs in winter to spring, generally in riffle areas or the tails of pools. Juvenile steelhead often move to deeper pools as they grow and remain in freshwater for an average of 2 years before migrating to the ocean (NMFS 1997; Titus *et al*. 2003). Downstream movement of adults after spawning and juvenile migration to the ocean usually occurs from March through July. Juvenile steelhead may spend several weeks in the coastal lagoon or estuary of a stream before entering the ocean. They reside in the ocean for 2 to 3 years before returning to their natal stream to spawn (NMFS 1997); although in wet years steelhead may return to spawn after only one year in the ocean (Moyle *et al*. 1995).

[2] The USFWS identifies an occurrence as a plant or group of plants that occur greater than 0.25 mile from another individual or group of plants.
[3] Presently 337 populations have been mapped on MCB Camp Pendleton per the 7 meter mapping rule through the 2013 survey season (Kenney personal communication).

The portion of San Mateo Creek on MCB Camp Pendleton provides migratory habitat. Some pools in the northern reaches of San Mateo Creek, beyond the boundary of MCB Camp Pendleton, contain potential spawning habitat and stretch along approximately 0.9 mi (1.5 km) just downstream of the Cleveland National Forest boundary, and along approximately 0.7 mi (1.1 km) of Devil's Creek.

San Mateo Creek is not likely to support spawning or rearing steelhead within the project site. However, when conditions are suitable (i.e., when the creek flows are high enough), the stream crossing may occasionally support the passage of adults moving upstream to upper watershed spawning areas or young and adult steelhead moving downstream to the ocean. In average years, the flow in San Mateo Creek within the project site is low relative to the historical width of the floodplain and is unlikely to provide passage for steelhead.

Arroyo Toad

The arroyo toad (*Anaxyrus californicus*) was federally listed as an endangered species on 16 December 1994 (USFWS 1994a). Critical habitat for this species was issued on 7 February 2001 with a correction on 7 March 2001. The latest revised final rule was issued on 9 February 2011 designating approximately 86,671 acres (35,074 hectares) in Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, Orange, and San Diego Counties, California, as critical habitat for the arroyo toad (USWFS 2011b). A Recovery Plan has been approved for this species (USFWS 1999).

The arroyo toad is managed on MCB Camp Pendleton through the Riparian BO and the Riparian Ecosystem Conservation Plan. MCB Camp Pendleton continues consultation with the USFWS regarding the management and conservation of upland habitat also used by adult arroyo toads. Arroyo toads populate three of MCB Camp Pendleton's major watersheds: (1) Santa Margarita, (2) San Onofre, and (3) San Mateo. These watersheds support the only known remaining coastal populations of the arroyo toad in the United States. In 2003, the USGS, USFWS, United States Forest Service, CDFW, and University of California at San Diego implemented a new monitoring program for the arroyo toad on MCB Camp Pendleton that includes surveys within the three major watersheds (Turschak *et al*. 2009). Base-wide surveys from 1996 recorded arroyo toads within the streambed of San Mateo Creek at various locations within the project site (MCB Camp Pendleton GIS Data 2015). In addition, recent surveys conducted by Brehme *et al*. (2012) documented arroyo toads in the project vicinity.

Least Bell's Vireo

The USFWS listed the least Bell's vireo as an endangered species on 2 May 1986 (USFWS 1986). Critical habitat for this species was designated in six southern California counties on 2 February 1994 (USFWS 1994b), excluding MCB Camp Pendleton. A Draft Recovery Plan is available for this species (USFWS 1998a). The least Bell's vireo and its habitat are managed on MCB Camp Pendleton through the Riparian BO and the Riparian Ecosystem Conservation Plan. The Riparian BO and the Riparian Ecosystem Conservation Plan are found in Appendices B and C of the INRMP, respectively.

The least Bell's vireo arrives at MCB Camp Pendleton from mid-March to early April and leaves for its wintering grounds in southern Baja California in August (Franzreb 1989). Vireos primarily inhabit dense willow-dominated riparian habitats with lush understory vegetation, nesting 3 to 4 ft (1.0 to 1.2 m) above the ground in the understory and using taller trees for foraging and singing perches (Salata 1981). Least Bell's vireos have nested on the edge of riparian habitat or in riparian corridors less than 150 ft (46 m) wide and have been observed foraging up to 180 ft (55 m) away from the willow-riparian edge in coastal sage scrub and chaparral (Kus and Miner 1989). Home range sizes of least Bell's vireos are variable; for example, in the Santa Margarita River habitat home ranges varied from less than 0.5 acre (2 hectares) to over 9 acres (3.6 hectares) in 1988 (Jones 1989).

Base-wide surveys for the least Bell's vireo have been conducted annually since 1978 and have documented occupied habitat on 13 primary drainages on MCB Camp Pendleton including much of the riparian habitat along San Mateo Creek (MCB Camp Pendleton GIS Data 2015) (Figure 3.3-5). Least Bell's vireo territories have been recorded within and adjacent to the project site associated with riparian communities along San Mateo Creek (MCB Camp Pendleton GIS Data 2015). In addition, nesting has been observed over a 12-year period in the project site (MCB Camp Pendleton GIS Data 2015).

Southwestern Willow Flycatcher

The southwestern willow flycatcher was federally listed as an endangered species by the USFWS on 27 February 1995 (USFWS 1995b). On 22 July 1997, the USFWS designated critical habitat for this species (USFWS 1997a, 1997b). Critical habitat for this species was revised on 19 October 2005 and a total of approximately 120,824 acres (48,896 hectares) of critical habitat was designated throughout southern California, Arizona, New Mexico, and Utah (USFWS 2005a). A Final Recovery Plan has been published (USFWS 2002). The southwestern willow flycatcher and its habitat are managed on MCB Camp Pendleton through the Riparian BO and the Riparian Ecosystem Conservation Plan.

In 2013, the resident southwestern willow flycatcher population on MCB Camp Pendleton consisted of three males, ten females, and four non-territorial floaters of unknown sex. Eleven territories were established, consisting of ten pairs (two polygynous groups consisting of two males each pairing with five different females), and one male of unknown status. In total, ten females formed pair bonds with two male southwestern willow flycatchers. The majority of territories were located along the Santa Margarita River. One additional territory was established at Pilgrim Creek. All territories were located in mixed willow riparian habitat. Poison hemlock (*Conium maculatum*) was present in the majority of the territories (USGS 2013). Transient southwestern willow flycatchers have historically been recorded in San Mateo Creek within 150 ft (46 m) south of the project site; however, recent survey efforts have not identified any individuals or pairs (Figure 3.3-5) (USGS 2013).

3.3.2 Environmental Consequences

3.3.2.1 Alternative 1: Range 314C with New Access Road/Bridge Alternative

Plant and Communities and Habitats

Table 3.3-3 lists the plant communities that would be permanently and temporarily impacted by Alternative 1, including construction of the access road/bridge, range upgrades, and waste material area.

Native-dominated grassland is regionally sensitive but relatively abundant on MCB Camp Pendleton, with the ratio of native to non-native constituents varying by location and elevation. The quality of this community varies within the project site (based on the ratio of native/non-native grasses) but generally has a high component of non-native grasses, which reduces the overall value of this community as a habitat. The permanent removal of 3.07 acres (1.24 hectares) of Valley Needlegrass Grassland is relatively small compared to the overall amount of this community available on MCB Camp Pendleton that is of equal or higher quality. In addition, approximately 4.78 acres (1.53 hectares) of Non-native Grassland would be restored in place with native grassland or other native plant communities, which would result in a net increase in native plant communities in the project site. Temporarily disturbed native grassland would be restored in place and monitored as part of the Restoration Plan (Special Conservation Measure 10). Although this represents a temporal loss of the community, the restored habitat would be monitored and managed to minimize non-native species and thus improve the quality of the community over time. In addition, non-native communities that would temporarily be disturbed would be restored with native communities, further increasing the native plant component of the habitats available.

Alternative 1 would permanently remove up to 12.34 acres (4.99 hectares) of Diegan Coastal Sage Scrub for development of the upgraded range and 0.18 acre (0.07 hectare) for development of the bridge and access road. Temporary impacts would affect an additional 19.12 acres (7.74 hectares) associated with the range and an additional 1.36 acres (0.55 hectares) for new road/bridge construction. Diegan Coastal Sage Scrub is a rare community in southern California; however, approximately 3,500 acres (1,416 hectares) are present on MCB Camp Pendleton and 12.52 acres (5.06 hectares) of permanent removal would not represent a significant impact. Approximately 57.98 acres (23.44 hectares) of Diegan Coastal Sage Scrub community within the project site would remain unaffected by project activities or restored after temporary disturbance.

Table 3.3-3. Plant Communities Potentially Removed under Alternative 1

Plant Community	*Habitat Available in the Project Site (acre/hectare)*	*Permanent Removal for Upgraded Range (acre/hectare)*	*Temporary Removal in Waste Fill, Slopes, and Laydown Areas (acre/hectare)*	*Permanent Removal for Bridge and Access Road (acre/hectare)*	*Temporary Removal for Bridge and Access Road Laydown Areas (acre/hectare)*
Valley Needlegrass Grassland	10.8/4.4	3.07/1.24	4.67/1.89	-	-
Diegan Coastal Sage Scrub	70.5/28.5	12.34/4.99	19.12/7.74	0.18/0.07	1.36/0.55
Coast Live Oak Woodland	8.6/3.5	1.11/0.45	2.41/0.97	0.3/0.12	0.65/0.26
Southern Riparian Woodland	3.3/1.4	-	-	0.28/0.11	0.58/0.23
Alluvial Fan Scrub*	1.3/0.5	-	-	-	0.38/0.15
Non-native Grassland	11.7/4.7	2.58/1.05	3.65/1.48	0.12/0.05	1.13/0.46
Non-vegetated Channel or Floodplain*	0.5/0.2	-	-	-	0.17/0.07
Disturbed	2.1/0.9	1.35/0.55	0.63/0.25	0.10/0.04	-
Developed	6.9/2.8	0.29/0.12	0.23/0.09	1.11/0.45	0.45/0.18
Total	**115.9/47.0**	**20.74/8.39**	**30.71/12.43**	**2.09/0.84**	**4.72/1.91**

Notes: Estimates based on CAD files provided by RBF Consulting (2014).
* Alternative 1 has a net increase of 0.05 acre (0.02 hectare) of Non-vegetated Channel habitat and 0.14 acre (0.05 hectare) of Alluvial Fan Scrub with restoration once the existing low-flow crossing is removed with project implementation.

Approximately 0.28 acres (0.11 hectares) of Southern Riparian Woodland would be permanently removed and approximately 0.58 acres (0.23 hectares) temporarily disturbed by construction of the access road and new bridge over San Mateo Creek. In addition, approximately 0.38 acre (0.15 hectare) of Alluvial Fan Scrub would be temporarily disturbed by construction of the access road and new bridge over San Mateo Creek. Compliance with protection measures outlined in the Riparian BO and implementation of Special Conservation Measure 13 would minimize impacts as a Class II impact under the Riparian and Conservation Plan and Riparian BO.

In summary, temporary impacts to plant communities resulting from construction of Alternative 1 would be mitigated through implementation of Special Conservation Measures 10, 11, and 13 and compliance with measures outlined in the Riparian BO. As described above, permanent removal of the plant communities within the project site (Table 3.3-3) would not be significant.

Aquatic Communities and Habitats

Alternative 1 would result in temporary impacts to aquatic and associated riparian habitat during bridge construction (approximately 7 months). San Mateo Creek is dry for much of the year, but if it was flowing at the time of construction, most mobile organisms would be expected to avoid areas of noise and activity and resume use once construction is complete. Several soil erosion protections in place and proper maintenance of the vehicles, as required by MCB Camp Pendleton, would minimize the possible sedimentation and leakage of potential pollutants associated with vehicles into the creek during construction and creek crossings (see Section 2.3.1 for details).

Based on project-specific wetland surveys conducted in 2006, 2008, 2010, 2011, and 2012, no jurisdictional wetlands were identified within the project disturbance boundary for both the range and bridge portions of the project site.

A preliminary identification of Waters of the U.S. was completed and includes San Mateo Creek within the bridge portion of the project and a small east-west feature within the range portion of the project that hydrologically connects San Mateo Creek to downrange areas.

A total of 2.1 acres (0.85 hectare) of Waters of the U.S. were delineated within the project site, including 1.8 acres (0.73 hectare) associated with San Mateo Creek and 0.3 acre (0.12 hectare) associated with Range 314C. Alternative 1 would result in permanent impacts to an estimated total of 0.16 acre (0.07 hectare) of jurisdictional non-wetland Waters of the U.S. This would include permanent impacts to less than approximately 0.009 acre (0.003 hectare) and 29 linear ft (8.9 m) of San Mateo Creek associated with construction of the proposed bridge and 0.16 acre (0.07 hectare) and 3,409 linear ft (1,039 linear m) associated with construction of the range. In addition, Alternative 1 would result in temporary impacts to 1.51 acres (0.20 hectare) and 115 linear ft (35 m) of San Mateo Creek associated with construction of the proposed bridge.

A final jurisdictional determination for wetlands or other Waters of the U.S. have not yet been completed by USACE. However, the USMC would obtain a 404 permit from the USACE for impacts to Waters of the U.S. and a Section 401 Clean Water Certification from the RWQCB to certify that Alternative 1 would comply with all applicable state water quality standards, limitations, and restrictions for work in Waters of the U.S. (Special Conservation Measure 19). Proposed construction of an alluvial channel, vegetated swales, and bio-retention basins within the range may be utilized as mitigation for impacts to Waters of the U.S. if approved by the USACE, resulting in a net increase of 3.23 acres (1.31 hectares) of non-wetland Waters of the U.S. (Figure 2.1-3). In addition, following construction of the proposed bridge, the existing access road through San Mateo Creek would be and restored, resulting in a net increase of 0.13 acre (0.05 acre) of non-wetland Waters of the U.S. (San Mateo Creek). Overall, Alternative 1 would result in a net increase of an estimated 3.36 acres (1.36 hectares) of non-wetland Waters of the U.S.

Erosion and sedimentation from areas disturbed during and after construction have the potential to indirectly affect wetlands and Waters of the U.S. downstream of the project site. However, the upgraded range layout design would include specific measures and requirements addressing erosion, soil management, and water drainage. The upgraded range would also include bio-retention basins that would contain on-site stormwater runoff flows and be designed to comply with MCB Camp Pendleton and DoN standards and guidelines (the final design of the basins would be determined during the design phase). The purpose of the bio-retention basins is to trap sediment and regulate flows of stormwater run-on, which would be collected from existing natural drainages within the range and conveyed through the site by an existing drainage channel. To reduce indirect impacts on San Mateo Creek, water in the bio-retention basins would be allowed to evaporate over time and/or percolate, trap sediment, and regulate flows. A drainage connection would allow for excess water to overflow into San Mateo Creek. Because

there would be avoidance of or complete mitigation for direct impacts on jurisdictional features, and potential indirect impacts would be reduced through stormwater management and components incorporated into the upgraded range layout design, no significant impacts to other Waters of the U.S. would occur.

Threatened, Endangered, and Other Special Status Species

For riparian species, the Riparian BO and the Riparian Ecosystem Conservation Plan outline mitigation activities such as restoration of riparian areas temporarily disturbed to original or better condition, which also would benefit listed species that have the potential to occur in the riparian habitats along San Mateo Creek. Noise levels produced during construction activities may temporarily exceed 80 A-weighted decibels (dBA) average equivalent continuous sound level (Leq) over a seven-day period during the breeding season (levels specified in the Riparian BO). However, longer-term operational activities would not increase noise levels over what currently exists in the project vicinity.

Table 3.3-4 quantifies potential impacts and take estimates for federally listed species that have the potential to occur within the project site.

Table 3.3-4. Summary of Impacts and Potential Take Estimates for Federally Listed Species Within the Project Site for Alternative 1

Species	*Potential Impacts to Habitat*		*Potential Take of Individuals*
	Temporary	*Permanent*	
Thread-leaved brodiea	0	0.05 acre (0.02 hectare)	-
Steelhead	0	0.05 acre (0.02 hectare)	-
Arroyo toad	0.17 acres (0.07 hectare) Non-vegetated Channel	+ 0.05 acre (0.02 hectare)* Non-vegetated Channel	0
Least Bell's vireo	1.1 acres (0.45 hectare) of riparian habitat 5.99 acres (2.42 hectares) of upland habitat	0.09 acre (0.11 hectare) of total riparian habitat, as follows: 0.28 acre (0.11 ha) of Southern Riparian Woodland + 0.05 acre (0.02 hectare)* Non-vegetated Channel +0.14 acre (0.05 hectare)* Alluvial Fan Scrub 1.50 acres (0.61 hectares) of upland habitat	5 in riparian habitat; 1 associated with upland habitat removal
Southwestern willow flycatcher	Same as least Bell's vireo	Same as least Bell's vireo	0**

*Several habitats will result in a net increase in permanent habitat due to restoration of the existing access road and low-water crossing, which would be replaced by a permanent bridge for range access. Increases in habitat are noted with a (+).
**There are no known occurrences of breeding southwestern willow flycatcher within the San Mateo watershed; although riparian habitat will be restored following the Riparian BO, no take of individuals is anticipated.

Thread-leaved Brodiaea

Any effects to occupied habitat (defined as individual thread-leaved brodiaea plants plus a 23-ft [7-m] buffer) within the proposed disturbance area are considered permanent direct effects. Temporary direct and all indirect effects to thread-leaved brodiaea include effects to individuals of the species within 200-ft (30-m) buffers of occupied habitat. Proposed construction disturbance on graded slopes may include some of the occupied thread-leaved brodiaea habitat. Direct impacts from grading or fill or subsequent soil erosion could include loss of 0.05 acre (0.02 hectare) of occupied habitat or associated individuals and the genetic diversity provided by this population and its seed bank for the region. Indirect impacts

could include soil erosion off of or onto the thread-leaved brodiaea population from project areas cleared or graded and not properly stabilized. Removal of vegetation adjacent to the known population could decrease resources available to pollinators of the thread-leaved brodiaea. Indirect impacts would also include reduced potential for the plants to persist or spread (due to nearby land disturbance).

Implementation of Special Conservation Measure 16 (Section 2.3.1.3), including avoidance of the known populations and enhancement of habitat to compensate for permanent loss if avoidance is not feasible, would minimize impacts to this species. Compensation would be determined during Section 7 consultation between MCB Camp Pendleton and the USFWS. Because thread-leaved brodiaea would be avoided, conserved, or impacts mitigated, impacts to this species would not be significant.

Steelhead Trout

Direct, permanent effects to suitable steelhead habitat are any that result from activities within the limits of disturbance (Figure 2.1-3 and 2.1-4) that affect potential creek transit reaches or permanently remove habitat. Direct temporary and all indirect effects are those that may occur as a result of construction activities when flow is present in San Mateo Creek. Potential direct, temporary effects include the temporary interference with migration caused by construction equipment placed in San Mateo Creek and vehicles crossing San Mateo Creek. However, impacts to steelhead would be minimized because construction would not be scheduled, to the maximum extent practicable, when flow is present in San Mateo Creek (Special Conservation Measure 17).

Direct mortality of one or more individuals could result from vehicle use of the temporary creek crossing (for range access) during the steelhead migration period. However, the probability of this happening is so low as to be discountable, because the time it would take for individual fish to cross the road is short (less than 10 seconds) and the number of fish passing through would be small. In addition, steelhead migrating to the ocean are not likely to be present in the immediate vicinity of an oncoming vehicle because adults migrate upstream during higher flows after storm events when vehicles are not likely to be using the crossings. Special Conservation Measure 17 would require vehicles to limit their speed to 5 mph (8 kph) or less. Implementation of this measure would further reduce the risk to fish by allowing them to move out of the way as they sense the noise, vibration, and visual appearance of the vehicles approaching. Since the creek crossing road is in current use, and only a portion of the number of vehicle trips would occur when water is present, effects are expected to be negligible to suitable migration habitat. Other direct, permanent impacts would result from the removal of existing open gravel habitat associated with the placement of bridge piers. Approximately 10 ft^2 (0.9 m^2) of Non-vegetated Channel would be permanently removed with the placement of one bridge pier in the active channel. In addition, temporary impacts from construction would occur to 0.17 acre (0.07 hectare) of Non-vegetated Channel habitat. At project completion, the removal of the existing low-flow crossing (to be replaced by the proposed bridge) would include permanent restoration of 0.05 acre (0.02 hectare) of Non-vegetated Channel habitat. Overall, Alternative 1 would result in the net increase of approximately 2,170 ft^2 (0.05 acre or 0.02 hectare) of habitat (Non-vegetated Channel). Therefore, Alternative 1 would not result in significant direct, permanent or temporary impacts to steelhead. In addition, following construction of the bridge and removal of the existing low-water crossing to the Range 314 Complex, Alternative 1 would provide long-term benefits to steelhead.

Temporary, indirect effects to steelhead could include downstream sedimentation resulting from construction and operation associated with Alternative 1. Runoff carrying soils disturbed during construction could transport sediments and pollutants to San Mateo Creek and potentially downstream to the mouth of San Mateo Creek. Any individual steelhead located in San Mateo Creek downstream of the project site and in the creek mouth would be exposed to these pollutants. However, construction of

Alternative 1 would be unlikely to have any indirect impacts on steelhead at the access road/creek crossings because, to the maximum extent practicable, no work would occur when high flow is present.

Arroyo Toad

Alternative 1 would result in direct, permanent impacts to arroyo toads and their occupied habitat (defined as an individual plus the entire extent of the contiguous suitable riparian habitat) within the project site. Arroyo toad occurs in the channel, as well as in uplands on the western bank of San Mateo Creek. Arroyo toads may utilize upper floodplain terraces, as well as non-riparian uplands throughout the project site for dispersal and aestivation. For the purposes of this analysis, occupied upland aestivation habitat includes native and non-native communities (not including developed or highly disturbed) within the 82-ft (25-m) elevational contour from breeding habitat. The existing firing range and the land surrounding the existing buildings is disturbed or paved. Due to the compacted soils, existing use for heavy equipment training, and the lack of suitable burrowing habitat, arroyo toads are not expected to occur within the developed portions of the project site. Therefore, project activities occurring in these areas are less likely to have direct effects on this species. However, arroyo toads could inadvertently enter the construction area while dispersing through the area. Direct, permanent effects to arroyo toad present within and adjacent to the project site may include injury or mortality from heavy equipment operation during construction. The permanent removal of upland foraging and dispersal habitat and a small area of riparian habitat may restrict the dispersal ability of arroyo toad. In addition, direct temporary impacts from construction-related noise levels, vibration, and construction-related erosion and runoff into San Mateo Creek may mask mating calls and alter sediment deposition. Indirect effects to adjacent habitat could arise from increased human use of the area and the cumulative reduction of dispersal corridors along this stretch of San Mateo Creek.

As noted above, riparian and upland habitat would be impacted within the project boundary. Approximately 0.29 acre (0.12 hectare) of riparian habitat that is occupied by arroyo toad would be permanently impacted (upland arroyo toad aestivation habitat is defined as Coast Live Oak Woodlands, Non-native Grasslands, Diegan Coastal Sage Scrub, and Valley Needlegrass Grasslands within the arroyo toad 82 ft (25 m) elevation buffer). In addition, approximately 1.1 acre (0.45 hectare) of riparian habitat and 5.99 acres (2.42 hectares) of upland aestivation habitat would be temporarily impacted by project activities.

Approximately 10 ft^2 (0.9 m^2) of Non-vegetated Channel would be permanently removed with the placement of one bridge pier in the active channel. However, at project completion, the removal of the existing low-flow crossing (to be replaced by the proposed bridge) would include permanent restoration of 0.05 acre (0.02 hectare) of Non-vegetated Channel habitat and 0.14 acre (0.05 hectare) of Alluvial Fan Scrub. Overall Alternative 1 would result in the net permanent increase of approximately 2,170 ft^2 (0.05 acre or 0.02 hectare) of habitat (Non-vegetated Channel) and the aforementioned amount of Alluvial Fan Scrub. As a result, the total permanent impact to riparian habitat occupied by arroyo toad would be 0.09 acre (0.04 hectare).

For the purposes of quantifying potential take of individual toads, this analysis follows recent density estimates from the MCB Camp Pendleton Basewide Utilities Infrastructure BO (FWS-MCBCP-10B0201-10F0410). The density of arroyo toads in the upland environment near Cristianitos and San Mateo creeks averaged 3.6 arroyo toads/acre (8.8 arroyo toads/hectare) per year. The density of arroyo toads in the upland environment near Cristianitos and San Mateo creeks averaged 0.08 arroyo toad/acre (0.19 arroyo toad/hectare) per year. Therefore, including both permanent and temporary impacts, an estimate of 5 toads/year within riparian habitats (1.38 acres x 3.6 arroyo toads/acre) and 1 toad/year within upland aestivation habitat (7.59 acres x 0.08 arroyo toad/acre) could be taken by project activities.

Implementation of Special Conservation Measures 13, 14, 15, and 17 (installing temporary toad exclusionary fencing, conducting toad surveys, controlling toad predators, implementation of construction monitoring, and seasonal restrictions, to the extent practicable, on construction activities from 15 March through 15 August) would minimize potential impacts to toads during construction and operations. Construction of the proposed bridge over San Mateo Creek would minimize toad injury/mortality by vehicles during operation of the range. Therefore, impacts on arroyo toads would not be significant.

Indirect effects would be similar to those listed for steelhead during the breeding season and for the arroyo toad phases (egg, larvae) that require San Mateo Creek. These include primarily potential runoff from the construction sites carrying sediments and pollutants that would reduce water clarity and quality. Special Conservation Measures 2 through 8, 13 through 15, and 17 would be implemented to reduce impact to arroyo toads from project runoff. With the implementation of Special Conservation Measures 2 through 8, 13 through 15, and 17, including timing of construction outside the arroyo toad breeding and dispersal season to the maximum extent practicable and the installation of arroyo toad exclusion fencing and road/bridge crossing culverts, the potential for direct or indirect adverse effects is low. In addition, ongoing adherence to the protection measures in the Riparian BO and Riparian Ecosystem Conservation Plan would further minimize the potential for adverse effects to this species in the riparian areas. Therefore, impacts on arroyo toads would not be significant.

Least Bell's Vireo

The majority of project activities would not occur within the riparian habitat and would occur at a distance of 1,000 ft (330 m) or great from occupied or potentially suitable least Bell's vireo habitat. However, construction of the proposed bridge (including abutments and realignment of the access road) would result in the permanent removal of approximately 0.28 acre (0.11 hectare) of Southern Riparian Woodland and less than 0.01 acre (less than 0.01 hectare) of Non-vegetated Channel. At project completion, removal of the existing low-flow crossing (to be replaced by the proposed bridge) would include permanent restoration of 0.05 acre (0.02 hectare) of Non-vegetated Channel and 0.14 acre (0.05 hectare) of Alluvial Fan Scrub, which represents a net increase in suitable habitat for these two communities.

Construction would also temporarily affect 0.57 acre (0.23 hectare) of Southern Riparian Woodland, 0.38 acre (0.15 hectare) of Alluvial Scrub, and 0.38 acre (0.15 hectare) of Non-vegetated Channel associated with construction-related access and temporary grading. Direct impacts to least Bell's vireo-occupied habitat would be mitigated in accordance with MCB Camp Pendleton's Riparian BO (USFWS 1995a) (see Special Conservation Measure 13) and based on the current year base and "bank" balance; temporary impacts would be restored following Special Conservation Measure 13.

In the last five years, five least Bell's vireo territories have been recorded within 500 ft (152 m) of the project boundary, which assumes a 2-acre (0.8-hectare) territory size and a 300-ft (91-m) buffer around the project boundary (MCB Camp Pendleton GIS Data 2015). Density around the project site was at a maximum in 2011, with one vireo territory within 300 ft (91 m) of the project boundary. In 2012, one territory was recorded within the project boundary, with all additional 2012 territories greater than 300 ft (91 m). No 2013 survey year territories were recorded within 0.25 mi (0.40 km) of the project boundary.

In May 2014, the Combat Fire burned the majority of riparian habitat surrounding the project footprint (Figure 3.3-5. In 2014, the closest vireo territory to the project footprint was over 3 kilometers to the northwest (Zych, personal communication). Therefore, when construction is presumed to occur, the riparian habitat may still be recovering from the 2014 fires (the San Mateo Creek Watershed has suffered from severe drought and may take longer than three to five years to recover), and least Bell's vireo

populations should not be as dense. However, this analysis assumes that a maximum of one vireo may be impacted annually during project activities associated with Alternative 1.

Temporary, direct impacts to least Bell's vireo, and other bird species, may also occur within and adjacent to the project site due to an increase in dust, noise, or other construction-related disturbances. Temporary disturbances due to noise associated with the operation of construction equipment, as well as an increase in the general activity and human presence, could mask bird vocalizations, invoke stress in birds and reduce breeding success, and cause vireos to avoid the work area during active periods. Implementation of Special Conservation Measure 13 would limit removal of surface vegetation within 1,600 ft (500 m) of San Mateo Creek to outside 15 March to 31 August, to the maximum extent feasible, to avoid potential impacts to nesting. If surface vegetation removal cannot be completed outside of the breeding season, a nest survey would be completed within 330 ft (100 m) of proposed vegetation removal by an MCB Camp Pendleton ES-approved biologist immediately before construction to ensure that no nests would be affected. If active nests are observed, the biologist, in coordination with MCB Camp Pendleton ES and the USFWS, would determine adequate setbacks from nests to prevent nest disturbance. Effects to least Bell's vireo would be minimized through implementation of the measures listed in Section 2.3.1; thus, temporary direct effects due to construction noise or activity would not adversely affect nesting pairs or reproduction. Therefore, significant impacts to least Bell's vireo would not occur.

Southwestern Willow Flycatcher

Direct permanent impacts to potentially occupied riparian habitat would be comparable to those listed for least Bell's vireo. Direct impacts to occupied or potentially occupied habitat would be mitigated in accordance with MCB Camp Pendleton's Riparian BO (USFWS 1995a) (see Special Conservation Measure 13) following the current year base and "bank" balance; temporary impacts would be restored following Special Conservation Measure 13.

Recent survey efforts for southwestern willow flycatcher have not recorded any individuals, pairs, or territories within the San Mateo Creek watershed. Therefore, significant impacts to individuals resulting from Alternative 1 are not likely to occur.

3.3.2.2 Alternative 2: Range 314B with New Access Road/Bridge Alternative

Plant Communities and Habitats

Alternative 2 proposes the same activities as Alternative 1 except that the alternative would be located at Range 314B. Alternative 2 would require more site preparation/grading and a slightly longer access road (0.25 mi [0.4 km]) compared to Alternative 1.

Table 3.3-5 presents anticipated acreages of disturbance to vegetation communities as a result of both construction and soil disposal. Plant communities that may be affected by Alternative 2 within Range 314B are upland habitats. Riparian vegetation is present in a tributary to San Mateo Creek. Areas temporarily disturbed by construction activities would be revegetated (Special Conservation Measures 10 and 11).

Table 3.3-5. Approximate Impacts to Vegetation at the Range 314B

Plant Community	*Habitat Available in the 314B Project Site (acre/hectare)*	*Permanent Removal for Upgraded Range (acre/hectare)*	*Temporary Removal in Waste Fill Area[1] (acre/hectare)*
Valley Needlegrass Grassland	79.6/32.2	31.5/12.7	9.6/3.9
Diegan Coastal Sage Scrub	19.5/7.9	5.5/2.2	4.8/1.9
Coast Live Oak Woodland	27.6/11.2	4.7/1.9	9.3/3.8
Scrub Oak	4.0/1.6	-	0.25/0.1
Southern Riparian Woodland	0.7/0.3	-	-
Southern Willow Scrub	1.4/0.6	-	0.9/0.4
Developed	2.9/1.17	0.01/0.004	-
Total	**135.7/54.9**	**41.7/16.8**	**24.9/10.1**

Note:
1. Areas not permanently disturbed (i.e., building sites and active range) would be revegetated. Species composition and a Revegetation Plan would be approved by MCB Camp Pendleton ES.

Aquatic Communities and Habitats

Direct and indirect impacts to San Mateo Creek would be similar to those described for Alternative 1 because the same access road and bridge would be used for this alternative.

Up to 1.4 acre (0.4 hectare) of jurisdictional wetlands and 0.5 acre (0.2 hectare) of other Waters of the U.S. occur within the area potentially affected by proposed project activities. Losses to these resources would be mitigated to less than significant per the Riparian BO and Riparian Conservation Plan. Impacts to San Mateo Creek by the construction of the new access road and bridge would be the same as described for Alternative 1.

Threatened, Endangered, and Other Special Status Species

As described in Section 3.3.1, thread-leaved brodiaea was not found at Range 314B during protocol surveys for the species in 2007. Therefore, no impacts to thread-leaved brodiaea are anticipated.

Direct and indirect impacts to steelhead, arroyo toad, least Bell's vireo, and coastal California gnatcatcher would be similar to those described for Alternative 1. As significant impacts on biological resources would not occur, no mitigation is required.

3.3.2.3 No-Action Alternative

Under the No-Action Alternative, none of the proposed upgrades to the training range and construction of an all-weather access road and bridge would occur and training would continue under current conditions. Therefore, no impacts on biological resources would occur and no mitigation is required.

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3.4 Air Quality

3.4.1 Affected Environment

Ambient air quality refers to the atmospheric concentrations of a specific pollutant compound (i.e., amount of a pollutant in a specified volume of air) at a particular geographic location. Ambient air quality levels are determined by pollutant emissions (e.g., type and amount of pollutant emitted into the atmosphere), meteorology (e.g., weather patterns affecting pollutant emissions and distribution), and chemistry (e.g., chemical reactions that transform emitted compounds into other pollutants). Air quality in a given location is generally expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). MCB Camp Pendleton is located within San Diego County, which is in the San Diego Air Basin (SDAB).

A measure of significance is a pollutant's concentration in comparison with a national and/or state ambient air quality standard. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare with a reasonable margin of safety. The national standards for seven major pollutants of concern (i.e., criteria pollutants), established by the USEPA, are termed the National Ambient Air Quality Standards (NAAQS). California standards, which differ from NAAQS, are established by the California Air Resources Board (ARB) and are termed the California Ambient Air Quality Standards (CAAQS). The main air quality pollutants of concern for the project region include volatile organic compounds (VOCs), ozone (O_3), carbon monoxide (CO), nitrogen oxides (NO_x), sulfur oxides (SO_x), particulate matter less than 10 microns in diameter (PM_{10}), and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$). Although VOCs or NO_x (other than nitrogen dioxide [NO_2] have no established ambient standards, they are important precursors for O3 formation. Ozone concentrations are the highest during the warmer months of the year and coincide with the period of maximum insulation (i.e., direct solar radiation). Ambient air quality standards are based on both concentration and averaging time.

The USEPA designates all areas of the U.S. in terms of having air quality better than (attainment) or worse than (nonattainment) the NAAQS. Former nonattainment areas that have attained the NAAQS are designated as maintenance areas. Presently, the SDAB is in attainment of the NAAQS for all pollutants except O_3 (ozone). Additionally, the western portion of the SDAB (the portion of the County generally west of the interior desert region) is also a maintenance area for CO.

CAAQS are at least as restrictive as the NAAQS and include pollutants for which national standards do not exist. In addition to the federal criteria pollutants, California has identified four combinations of pollutants and averaging times for CAAQS that differ from NAAQS. Areas within California that have ambient air concentrations of a pollutant that are higher than a national and/or state standard are designated as nonattainment for that pollutant. Presently, the SDAB is in attainment of the CAAQS for all air pollutants, except O3, PM_{10}, and $PM_{2.5}$. The county is considered a severe ozone nonattainment area by the ARB. Table 3.4-1 summarizes the national and state ambient air quality standards for regulated pollutants.

Toxic air contaminants (TAC) include air pollutants that can cause serious illnesses or increased mortality, even in low concentrations. TACs are compounds that generally have no established ambient standards, but are known or suspected to cause short-term (acute) and/or long-term (chronic non-carcinogenic or carcinogenic) adverse health effects. The ARB designates diesel particulate matter (DPM) from the combustion of diesel fuel as a TAC.

Table 3.4-1. California and National Ambient Air Quality Standards

Pollutant	*Averaging Time*	*California Standards*	*National Standards [a]*	
			Primary [b, c]	*Secondary [b, d]*
Ozone (O3)	8-hour	0.07 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3)	Same as primary
	1-hour	0.09 ppm (180 µg/m^3)	---	---
Carbon monoxide (CO)	8-hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	---
	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	---
Nitrogen dioxide (NO_2)	Annual	0.03 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as primary
	1-hour	0.18 ppm (339 µg/m^3)	0.10 ppm (188 µg/m^3)	---
Sulfur dioxide (SO_2)	24-hour	0.04 ppm (105 µg/m^3)	---	---
	3-hour	---	---	0.5 ppm (1,300 µg/m^3)
	1-hour	0.25 ppm (655 µg/m^3)	0.075 ppm (196 µg/m^3)	---
PM_{10}	Annual	20 µg/m^3	---	---
	24-hour	50 µg/m^3	150 µg/m^3	Same as primary
$PM_{2.5}$	Annual	12 µg/m^3	15 µg/m^3	---
	24-hour	---	35 µg/m^3	---
Lead	Rolling 3-month average	—	0.15 µg/m^3	Same as primary
	Quarterly Average	—	1.5 µg/m^3	Same as primary
	30-day average	1.5 µg/m^3	—	—

Notes: ppm = parts per million; µg/m^3 = micrograms per cubic meter

a Standards other than the 1-hour ozone, 24-hour PM_{10}, 24-hour $PM_{2.5}$, and those based on annual averages are not to be exceeded more than once a year. The 8-hour ozone national standard has replaced the 1-hour ozone national standard.

b Concentrations are expressed first in units in which they were promulgated. Equivalent units given in parenthesis.

c Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state would attain the primary standards no later than three years after that state's Implementation Plan is approved by the USEPA.

d Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

Source: ARB 2012a.

3.4.1.1 Greenhouse Gas Emissions

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. These emissions occur from natural processes and human activities. The accumulation of GHGs in the atmosphere influences the long-term range of average atmospheric temperatures. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce negative economic and social consequences across the globe.

Recent observed changes due to global warming include shrinking glaciers, thawing permafrost, a lengthened growing season, and shifts in plant and animal ranges (Intergovernmental Panel on Climate Change 2014, United States Global Change Research Program 2014, and California Energy Commission 2012). Predictions of long-term environmental impacts due to global warming include sea level rise, changing weather patterns with increases in the severity of storms and droughts, changes to local and

regional ecosystems including the potential loss of species, and a significant reduction in winter snow pack. In California, global warming effects are predicted to include exacerbation of air quality problems, a reduction in municipal water supply from the Sierra snowpack, a rise in sea level that would displace coastal businesses and residences, damage to marine and terrestrial ecosystems, and an increase in the incidence of infectious diseases, asthma, and other human health problems (California Energy Commission 2012).

The most common GHGs emitted from natural processes and human activities include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Examples of GHGs created and emitted primarily through human activities include fluorinated gases (hydro fluorocarbons and per fluorocarbons used in refrigerants and propellants among other products) and sulfur hexafluoride. Each GHG is assigned a global warming potential (GWP), which equates to the ability of a gas or aerosol to trap heat in the atmosphere. The GWP rating system is standardized to CO_2, which has a value of one. For example, CH_4 has a GWP of 21, which means that it has a global warming effect 21 times greater than CO_2 on an equal-mass basis. The total GHG emissions from a source are often expressed as a CO_2 equivalent (CO_2e). The CO_2e is calculated by multiplying the emission of each GHG by its GWP and adding the products together to produce a single, combined emission rate representing all GHGs.

On 18 February 2010, the CEQ proposed for the first time draft guidance on how federal agencies should evaluate the effects of climate change and GHG emissions for NEPA documentation (CEQ 2010). The CEQ does not provide a reference point as an indicator of a level of GHG emissions that may significantly affect the quality of the human environment. In the analysis of the direct effects of a proposed action, the CEQ proposes that it would be appropriate to: (1) quantify cumulative emissions over the life of the project; (2) discuss measures to reduce GHG emissions, including consideration of reasonable alternatives; and (3) qualitatively discuss the link between such GHG emissions and climate change. The CEQ is expected to issue its final guidance in the near future.

The potential effects of proposed GHG emissions are by nature global and cumulative impacts because individual sources of GHG emissions are not large enough on their own to have an appreciable effect on climate change. Therefore, the impact of proposed GHG emissions to climate change is discussed in the context of cumulative impacts in Chapter 4. Appendix C-1 presents estimates of GHG emissions generated by each project alternative.

3.4.1.2 Applicable Regulations and Standards

Sources of air pollutant emissions in the SDAB are regulated by the USEPA, ARB, and SDCAPCD.

Federal Regulations

Clean Air Act

The Clean Air Act (CAA) of 1970 and subsequent amendments specify regulations for control of the nation's air quality. The USEPA is responsible for implementing most aspects of the CAA. Basic elements of the act include the NAAQS for criteria air pollutants, hazardous air pollutant standards, attainment plans, motor vehicle emission standards, stationary source emission standards and permits, and enforcement provisions. The CAA regulates emissions of criteria pollutants and air toxics to protect human health and welfare.

The CAA delegates the enforcement of the national standards to the states. In California, the ARB is responsible for enforcing air pollution regulations. In San Diego County, the SDCAPCD has this responsibility.

The CAA establishes air quality planning processes and requires areas in nonattainment of a NAAQS to develop a State Implementation Plan (SIP) that details how the state will attain the standard within mandated timeframes. The requirements and compliance dates for attainment are based on the severity of the nonattainment classification of the area.

Executive Orders

The following EOs regulate air quality.

- EO 12088, *Federal Compliance with Pollution Control Standards*, requires federal agencies to comply with applicable pollution control standards and to cooperate with USEPA, state, and local regulatory agencies.
- EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, sets goals to reduce GHG emissions by reducing energy intensity by 3 percent annually or 30 percent by 2015.
- EO 13432, *Cooperation Among Agencies in Protecting the Environment with Respect to Greenhouse Gas Emissions from Motor Vehicles, Nonroad Vehicles, and Nonroad Engines*, ensures the coordination between federal agencies to protect the environment with respect to GHGs emissions from vehicles, engines, and motor vehicle fuels.
- EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, establishes sustainability goals for federal agencies. This EO requires federal agencies to increase energy efficiency, reduce GHG emissions, conserve water, reduce waste, support sustainable development, reduce petroleum consumption, and promote environmentally responsible products and technologies.

State Regulations

The California CAA of 1988 outlines a program to attain the CAAQS for O_3, NO_2, SO_2, and CO by the earliest practical date. Since the CAAQS are more stringent than the NAAQS, attainment of the CAAQS will require more emission reductions than what will be required to show attainment of the NAAQS. Similar to the federal system, the state requirements and compliance dates are based on the severity of the ambient air quality standard violation within a region. In California, the ARB is designated as the responsible agency for all air quality regulations.

Local Regulations

The SDCAPCD has developed air quality plans to reduce emissions to a level that will bring the SDAB into attainment of the ambient air quality standards (SDCAPCD 2012a). Control measures for stationary sources proposed in the air quality plans and adopted by the SDCAPCD are incorporated into the SDCAPCD Rules and Regulations (SDCAPCD 2012b). SDCAPCD Rule 1501 implements the USEPA General Conformity Rule. Within the SDAB, if proposed annual emissions of VOCs, CO, or NO_x increase by less than 100 tons each, a CAA conformity determination is not required. If emissions of one or more of these compounds exceed a *de minimis* threshold, the USMC must demonstrate conformity under one of the methods prescribed by SDCAPCD Rule 1501.

3.4.2 Environmental Consequences

Air quality impacts were reviewed for significance compared to federal, state, and local air pollution standards and regulations. In the case of a criteria pollutant for which the SDAB is in attainment of

NAAQS, the analysis used the USEPA Prevention of Significant Deterioration (PSD) threshold for new major sources of 250 tons per year as an indicator of significance of projected air quality impacts.

3.4.2.1 Alternative 1: Range 314C with New Access Road/Bridge Alternative

Air quality impacts from the Alternative 1 construction would occur from: (1) combustive emissions due to the use of fossil fuel-powered equipment and (2) fugitive dust emissions (PM_{10} and $PM_{2.5}$) during earth-moving activities and the construction of buildings and infrastructure. Construction activity data associated with Alternative 1 were used to estimate project combustive and fugitive dust emissions (Appendix C-1). Since construction associated with Alternative 1 would occur over approximately a 12-month period, the analysis assumed that all construction emissions would occur within one calendar year.

Factors needed to derive construction source emission rates were obtained from *Compilation of Air Pollution Emission Factors, AP-42, Volume I* (USEPA 1995), *EMFAC2011 Model* for on-road vehicles (ARB 2011), and the *In-Use Off-Road Equipment 2011 Inventory Model* for off-road construction equipment (ARB 2012b). Appendix C-1 includes data and assumptions used to calculate proposed construction emissions.

Table 3.4-2 summarizes the annual and total emissions associated with construction of Alternative 1. These data show that annual VOC, CO, NO_x, SO_2, PM_{10}, and $PM_{2.5}$ emissions generated from this alternative would be well below their applicable NEPA significance thresholds. The SDAB is in attainment for SO_2, PM_{10}, $PM_{2.5}$ and proposed construction emissions of these criteria pollutants are only a small fraction of the PSD threshold of 250 tons per year. Implementation of standard fugitive dust and construction equipment emission control measures (Special Conservation Measures 20 and 21) would further minimize emissions of PM_{10} and $PM_{2.5}$. As a result, Alternative 1 would not produce significant air quality impacts.

Table 3.4-2. Annual and Total Emissions Due to Construction of the Range 314C Training Facility and Access Road/Bridge at MCB Camp Pendleton – Alternative 1

Activity	*Air Pollutant Emissions (Tons)*[1]						
	VOC	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**CO_2e**
Site Preparation/Grading	0.18	0.58	2.99	0.00	4.66	0.51	301.47
Demolition	0.00	0.00	0.02	0.00	0.01	0.00	1.81
Building Construction	0.03	0.31	0.38	0.00	0.06	0.01	50.94
Road Construction	0.00	0.01	0.04	0.00	0.04	0.00	3.65
Bridge Construction	0.05	0.73	0.33	0.01	0.02	0.01	44.76
Paving - Access and Fire Roads	0.06	0.19	0.86	0.00	0.58	0.08	93.54
Total Emissions (Tons/Yr)	**0.33**	**1.83**	**4.61**	**0.01**	**5.36**	**0.61**	**496.16**
NEPA Significance Thresholds	**100**[2]	**100**[2]	**100**[2]	**250**[3]	**250**[3]	**250**[3]	**NA**

Notes:
1. Assumes all emissions would occur within an annual period.
2. Conformity *de minimis* threshold.
3. USEPA Prevention of Significant Deterioration (PSD) threshold.

Proposed construction equipment would emit TACs that could potentially impact public health. The main source of TACs would occur in the form of particulates from the combustion of diesel fuel. Due to the mobile and intermittent operation of proposed diesel-powered construction equipment over a large construction area, there would be minimal ambient impacts of TACs in a localized area. As a result, Alternative 1 would not produce significant impacts to public health.

Alternative 1 would not result in a consequential change in the level of operational activities and number of personnel utilizing Range 314C. As a result, the net change in emissions between proposed and

existing operations would be negligible. However, to minimize proposed emissions operational equipment would comply with applicable federal and state emission standards and requirements (Special Conservation Measure 22). Therefore, Alternative 1 operations would not result in significant air quality impacts and no mitigation is required.

3.4.2.2 Alternative 2: Range 314B with New Access Road/Bridge Alternative

Alternative 2 proposes the same activities as Alternative 1, except that the alternative would be located at Range 314B. Alternative 2 would require more site preparation/grading and a slightly longer access road (0.25 mi [0.4 km]) compared to Alternative 1. To account for these differences, construction equipment usages for site preparation/grading and road construction were increased by 30 and 41 percent, respectively, over their equivalents estimated for the Alternative 1. Similar to Alternative 1, the analysis assumed that all construction emissions from Alternative 2 would occur within one calendar year.

Table 3.4-3 summarizes the annual and total emissions associated with the construction of Alternative 2. Similar to Alternative 1, Alternative 2 emissions would be below applicable NEPA significance thresholds and would not result in a significant impact to air quality or public health. Alternative 2 operations would be the same as Alternative 1. Accordingly, Alternative 2 would not produce adverse air quality impacts. As with Alternative 1, implementation of fugitive dust and equipment emission control measures during construction (Special Conservation Measures 20 and 21) and use of operational equipment that comply with applicable federal and state requirements (Special Conservation Measure 22) would further minimize emissions. As no significant air quality impacts would occur, no mitigation is required.

Table 3.4-3. Annual and Total Emissions Due to Construction of the Range 314B Training Facility and Access Road/Bridge at MCB Camp Pendleton – Alternative 2

Activity	*Air Pollutant Emissions (Tons)*[1]						
	VOC	*CO*	*NO_x*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
Site Preparation/Grading	0.24	0.75	3.87	0.00	6.02	0.65	389.39
Demolition	0.00	0.00	0.02	0.00	0.01	0.00	1.81
Building Construction	0.03	0.31	0.38	0.00	0.06	0.01	50.94
Road Construction	0.00	0.02	0.07	0.00	0.06	0.01	5.64
Bridge Construction	0.05	0.73	0.33	0.01	0.02	0.01	44.76
Paving - Access and Fire Roads	0.07	0.24	1.05	0.00	0.82	0.10	110.01
Total Emissions (Tons/Yr)	**0.40**	**2.05**	**5.70**	**0.01**	**6.98**	**0.79**	**602.56**
NEPA Significance Thresholds	**100**[2]	**100**[2]	**100**[2]	**250**[3]	**250**[3]	**250**[3]	**NA**

Notes:
1. Assumes all emissions would occur within an annual period.
2. Conformity *de minimis* threshold.
3. USEPA Prevention of Significant Deterioration (PSD) threshold.

3.4.2.3 No-Action Alternative

Under the No-Action Alternative, none of the proposed upgrades to the training range and construction of an all-weather access road and bridge would occur and training would continue under current conditions. Therefore, no impacts on air quality would occur and no mitigation is required.

3.5 Cultural Resources

3.5.1 Affected Environment

Cultural resources are historic and traditional cultural properties that are considered important to a culture, a subculture, or a community for scientific, traditional, religious, or other reason. Federal regulations define historic properties to include prehistoric and historic sites, buildings, structures, districts, or objects in or eligible for inclusion on the NRHP, as well as artifacts, records, and remains related to such properties (NHPA, as amended [54 USC §300101 *et seq*.]). Compliance with Section 106 of the NHPA, which directs federal agencies to take into account the effect of a federal undertaking on a historic property, is outlined in the Advisory Council on Historic Preservation's regulations, *Protection of Historic Properties* (36 CFR Part 800). The NHPA and associated Section 106 compliance also provides guidance for Native American consultation regarding cultural significance of potential religious and sacred artifacts.

3.5.1.1 Definition of the Area of Potential Effect

The APE of an undertaking is defined in 36 CFR 800.16(d) as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist." The APE consists of all areas of potential ground disturbance associated with the proposed construction and operational activities. The project APE for Range 314C and Range 314B are shown in Figure 2.1-2 (shown as "Project Boundary"). Although construction is not proposed for the entire APE, this large area allows for flexibility in the placement of buildings and training areas. The current range layout (Figures 2.1-2 and 2.1-3) is conceptual and would be refined by the Design Contractor before construction. The project boundary (APE) was designed to represent the maximum level of disturbance, and all areas potentially disturbed are included within the boundary of the APE.

For historic architectural resources, the APE includes any viewsheds of historic buildings that may be affected by construction. For Native American resources, the APE includes the construction footprint and the viewsheds of any traditional cultural resources that could be affected by construction.

3.5.1.2 Prehistoric and Historic Setting

Current knowledge of the prehistory of MCB Camp Pendleton and its relationship to developments throughout southern California is considered in detail in Reddy and Byrd (1997) and summarized below. The sequence begins in the Paleoindian period (12,000 to 8,000 Before Present [B.P.]), a time in which adaptations were formerly believed to be focused on the hunting of large game, but are now recognized to represent more generalized hunting and gathering, with considerable emphasis on marine resources (Erlandson and Colten 1991; Erlandson 1994; Jones 1991). The following period, the Archaic (8,000 to 2,000 B.P.), is generally considered as encompassing both a coastal and an inland focus, with the coastal Archaic represented by the shell middens of the La Jolla Complex and the inland Archaic represented by the Pauma Complex. Coastal settlement is also seen as having been significantly affected by the stabilization of sea levels around 4,000 years ago that led to siltation of coastal lagoons and a general decline in the productivity of many coastal habitats (Warren *et al*. 1961; Warren and Pavesic 1963; Warren 1968; Gallegos 1987; Masters and Gallegos 1997). Nevertheless, recent research on MCB Camp Pendleton has documented continued occupation along the coast well after this decline was in progress (Byrd 1996, 1998).

The Late Prehistoric period (2,000 to 200 B.P.) is marked by the appearance of small projectile points indicating the use of the bow and arrow, the common use of ceramics, and the replacement of inhumations with cremations, all characteristic of the San Luis Rey Complex as defined by Meighan (1954). Along the coast of northern San Diego County, deposits containing significant amounts

of bean clam shell (*Donax gouldii*) are now widely assigned to the Late Prehistoric Period, based on a well-documented increase in the use of this resource at this time (Byrd 1996). Recent investigations on MCB Camp Pendleton also indicate increasing settlement of upland settings at this time.

When the Spanish arrived in southern California, the area of MCB Camp Pendleton was occupied by the Native American group known as the Luiseño, whose territory is thought to have comprised some 1,500 mi^2 (3,890 km^2) of coastal and interior California. Kroeber (1925) estimated a population of only 5,000 pre-contact Luiseño, while White (1963) and Shipek (1977) estimated a population closer to 10,000. Ethnohistoric studies (Johnson and O'Neill 2001) for the MCB Camp Pendleton vicinity identified several Luiseño communities within MCB Camp Pendleton boundaries, of which some may be within training areas. Identified communities within MCB Camp Pendleton include *Pange* and *Zoucche*, both within leased areas along San Mateo Creek; *Topomai* (or *Topome*), located partially within the grounds of the Ranch House complex and partially within MCAS Camp Pendleton; *Quigaia*, located in the Ysidora Basin area, within or near November training area; *Uchme*, located at the Las Flores ruins; *Chacape* and *Mocuachem*, both possibly within or near Papa One training area; and *Pomameye*, apparently within or near the Zulu Impact Area.

The area of MCB Camp Pendleton entered the historic record in 1769, when several locations now within MCB Camp Pendleton boundaries were described by members of the Portola expedition passing through on its way to Monterey. After Mission San Luis Rey was established in 1798, most of the land that was to become MCB Camp Pendleton was held by the mission, which used it primarily for grazing cattle and limited farming. After secularization, most of the area became part of the Rancho Santa Margarita y Las Flores, held by Pio and Andres Pico and subsequently sold, in part, to Juan Forster and eventually (1883) to James C. Flood and Richard O'Neill, who presided over a number of improvements to the ranch. In addition to ranching, extensive dry land farming took place along the coastal terraces. The Magee family leased land to farm lima beans in the Las Flores/Red Beach area, and this farming continued after the government purchased the land.

Just before the U.S. entry into World War II, the U.S. Army had considered the purchase of the rancho as a training facility. After the U.S. Army decided against it, USMC acquired the 125,000-acre (50,587-hectare) property in 1942, naming the facility after Joseph H. Pendleton, a popular 40-year veteran of the Marines. In 1944, MCB Camp Pendleton was declared a permanent installation with the stated goal to be the center of all West Coast activities and the home of the 1st Marine Division. MCB Camp Pendleton served its role as a training and replacement command through both the Korean War and Vietnam War. The USMC broadened its mission capabilities during the 1980s and 1990s by combining infantry, armor, supply and air power deployment in Grenada, Panama, Persian Gulf, Somalia, and during Operation Desert Shield and Desert Storm.

3.5.1.3 Cultural Resources within the Project Site

Records searches were conducted at the South Coastal Information Center (SCIC) of the California Historical Resources System (CHRIS) in August and September 2010 and in November 2011, to identify previous archaeological investigations and previously recorded cultural resources within a 1 mile (1.6 km) radius of the APE for Range 314C and Range 314B. In addition, electronic databases and GIS layers provided by MCB Camp Pendleton were used to confirm and supplement the data from the SCIC. The following provides a summary of those findings.

Archaeological Survey Coverage. Fifteen archaeological investigations have been conducted within 1 mi (1.6 km) of the APE for Range 314C and 314B. The investigations range from surveys to site testing and NRHP evaluations. These surveys include: Apple and Cleland (1994), Berryman (2008a, 2008b), Carillo and Bull (1979), Cooley (1998), Ezell and Theskin (1987), Hale and Becker (2007), Huey (1995), James

(2009), King (2000), Reddy (2007), SAIC (2007d), Shaver and York (2004), DoN (2006a), and Widell (1998). The majority of the investigations are large aerial surveys of portions of training areas and/or impact areas on MCB Camp Pendleton.

Portions of the Range 314C APE have been surveyed by Apple and Cleland (1994), Cooley (1998), Hale and Becker (2007), Huey (1995), James (2009), King (2000), SAIC (2007d), and Shaver and York (2004). One of the previous investigations (Shaver and York 2004) surveyed the western portions of the APE with negative results (i.e., no archaeological sites were recorded). SAIC (2007d) conducted an intensive pedestrian survey of the APE for Ranges 314B and 314C and identified and recorded four prehistoric archaeological sites within the Range 314C APE and one site within the Range 314B APE.

Archaeological Resources. Twenty-seven recorded archaeological sites are located within 1 mi (1.6 km) of the APE for Ranges 314C and 314B. Of these, one prehistoric archaeological site is located within Range 314B and five are located within Range 314C (Table 3.5-1).

Table 3.5-1. Archaeological Sites Located within Range 314B and Range 314C

Site Identifier	*Site Location*	*Site Type*	*National Register Eligibility*
CA-SDI-18375	Range 314B	Prehistoric Quarry	Unevaluated[1]
CA-SDI-16905	Range 314C	Prehistoric Lithic and Artifact Scatter	Eligible
CA-SDI-16906	Range 314C	Prehistoric Lithic Scatter	Eligible
CA-SDI-18372	Range 314C	Prehistoric Lithic and Artifact Scatter	Eligible
CA-SDI-18373	Range 314C	Prehistoric Lithic Scatter	Eligible
CA-SDI-20180	Range 314C	Prehistoric Lithic and Artifact Scatter	Eligible

Notes:
1. If Alternative 2 is selected the site would be evaluated and the Section 106 process followed as described in Section 3.5.2.2.
Source: Shaver *et al*. 2002a, 2002b; SAIC 2007d; James 2009

Historic Buildings and Structures. There are no historic buildings or structures located in the APE for Range 314C or 314B.

3.5.2 Environmental Consequences

Section 106 of the NHPA requires that federal agencies take into account the effects of their proposed actions on historic properties. Impacts on cultural resources are considered significant if a historic property, as defined under 36 CFR 60.4, would be physically damaged or altered, would be isolated from the context considered significant, or would be affected by project elements that would be out of character with the significant property or its setting.

3.5.2.1 Alternative 1: Range 314C with New Access Road/Bridge

Ground disturbing activities associated with construction and operations of Alternative 1 have the potential to disturb five recorded prehistoric archaeological sites (CA-SDI-16905, CA-SDI-16906, CA-SDI-18372, CA-SDI-18373, and CA-SDI-20180) located within the APE.

The archaeological sites present within the APE were determined by SHPO during Section 106 consultation to be eligible for inclusion in the NRHP. Due to UXO and safety issues on the range, it is not possible to conduct a Phase II testing and evaluation program at the five sites within the APE. The USMC has consulted with the California SHPO, interested federally recognized and non-federally recognized Indian tribes, and other consulting parties regarding potential impacts to these archaeological sites and has entered into a MOA (Special Conservation Measure 23). The MOA provides stipulations to take into account the effects of the undertaking on historic properties and satisfy the USMC's NHPA Section 106 (54 USC §306108) requirement to minimize and mitigate impacts to historic properties for which adverse effects

cannot be avoided. The USMC would prepare or cause to be prepared, and subsequently implement, a Historic Properties Treatment Plan for the five historic properties (CA-SDI-16905, CA-SDI-16906, CA-SDI-18372, CA-SDI-18373, and CA-SDI-20180) located within the APE as well as a monitoring plan and unanticipated discoveries procedure. Implementation of Special Conservation Measure 23 would ensure that no significant impacts to cultural resources would occur.

It is possible that materials of cultural sensitivity and/or archaeological significance may be encountered during construction activities within other areas of the project site. A professional archaeologist and a Native American representative would monitor construction activity to ensure that construction activities would not adversely affect cultural resources that may be discovered during construction (Special Conservation Measure 24). Implementation of Special Conservation Measure 24 would ensure that no significant impacts to cultural resources would occur.

3.5.2.2 Alternative 2: Range 314B with New Access Road/Bridge Alternative

Ground disturbing activities associated with construction and operations of Alternative 2 have the potential to disturb one recorded prehistoric archaeological site (CA-SDI-18375) located within the project site. The site would be avoided to the extent feasible. If avoidance is not possible, then a Phase II testing and evaluation program would be conducted before construction to address NRHP eligibility of the site. If the USMC, in consultation with the SHPO during Section 106 consultation, determines that the site CA-SDI-18375 is eligible for inclusion in the NRHP, the USMC would consult with the SHPO on ways to “avoid, minimize or mitigate the adverse effects” (36 CFR 800.6), which may include conducting a data recovery project to mitigate adverse effects as described in Special Conservation Measure 25 (Section 2.3.1.5).

It is possible that materials of cultural sensitivity and/or archaeological significance may be encountered during construction activities within other areas of the project site. A professional archaeologist and a Native American representative would monitor construction activity to ensure that construction activities would not adversely affect cultural resources that may be discovered during construction (Special Conservation Measure 24). Implementation of Special Conservation Measure 24 would ensure that no significant impacts to cultural resources would occur.

3.5.2.3 No-Action Alternative

There would be no construction, ground disturbing activities, or modification to existing structures associated with the No-Action Alternative. Impacts on cultural resources would, therefore, not occur.

3.6 Utilities

3.6.1 Affected Environment

3.6.1.1 Electricity and Communication Systems

MCB Camp Pendleton purchases electrical power from the regional utility company, San Diego Gas and Electric (SDG&E), which has two major power lines transiting MCB Camp Pendleton. The electrical system consists of mostly aboveground lines, with a limited number of underground lines that serve certain housing areas. The main substation, the Haybarn Substation, is located near the junction of Basilone Road and Vandegrift Boulevard. There is a 12 kilovolt (kV) line that runs in a north-south orientation within the project site adjacent to Range 314 Road. This line connects to a power line west of the project site adjacent to North Range Road. Recent electrical upgrades have been completed to connect existing facilities within the Range 314 Complex to the 12 kV electrical line. Communication lines are located in the utility corridor west of the project site adjacent to North Range Road and in existing developed areas within the project site.

3.6.1.2 Potable Water System

MCB Camp Pendleton derives 95 percent of its water supply from the existing groundwater resources within its boundaries. The water system at MCB Camp Pendleton consists of wells, water mains, booster pumps, and storage reservoirs located in the Lower Santa Margarita, Las Pulgas, San Onofre, and San Mateo groundwater basins. This water system has a total capacity of 21.5 million gallons (81.4 million liters) (DoN 2010a). A backup water supply is also available through two separate water lines that connect the Las Flores system in the southern portion of the Base, and the San Mateo and San Onofre systems in the northern area. The closest potable water infrastructure to the project site consists of an eight inch water line and six water valves at the intersection of North Range Road and Range 314 Road.

A waiver has been obtained to remove the requirement for a fire protection water system from the scope of the proposed action. However, the proposed action includes the fire protection system in the event that it is needed in the future. If the fire protection system is built, it would require the construction and operation of a potable water line used to feed the fire protection system tanks. This line would tie-in to the existing water line in North Range Road. Only minimal increases in existing levels of water supply would be required to support proposed facilities (i.e., fire protection system); therefore, this alternative would have no significant impacts on the potable water system.

3.6.1.3 Sewer System

The wastewater system on MCB Camp Pendleton consists of sewage treatment plants (STPs), pump stations, and conveyance lines. The Base's wastewater system has recently been upgraded to provide tertiary treatment capabilities in the southern portion of the Base. Tertiary treatment is conducted at STP-9, and the tertiary treated water is disposed of via deep well injection. Sewer system requirements are currently met by several portable sanitation units west of the existing facilities. There is no existing sewer line within or adjacent to the project site.

3.6.1.4 Solid Waste Disposal

Solid waste produced on MCB Camp Pendleton is collected by Base personnel and disposed of at the Las Pulgas and San Onofre landfills located on Base. The Las Pulgas landfill accepts eligible biosolids for disposal, while the San Onofre landfill only accepts USMC construction debris. The Las Pulgas landfill currently has a permitted capacity of 12,440,986 cubic yards (9,511,816 cubic meters) and a remaining

capacity of approximately 10,103,937 cubic yards (7.7 million cubic meters) (California Department of Resources Recycling and Recovery 2012a). The San Onofre landfill has a permitted capacity of 1,920,000 cubic yards (1,467,945 cubic meters) and a remaining capacity of 1,244,986 cubic yards (951,860 cubic meters) (California Department of Resources Recycling and Recovery 2012b). The Base currently participates in a recycling program managed by MCB Camp Pendleton ES through the Defense Reutilization and Marketing Office (DRMO) (DoN 2010a).

3.6.1.5 Natural Gas

Gas and petroleum products are supplied on MCB Camp Pendleton from two regional lines: the Southern California Gas Company line and the San Diego Pipeline Company petroleum product line. LNG is purchased from SDG&E, and the gas is distributed throughout MCB Camp Pendleton via various gas mains. There are no natural gas lines within or adjacent to the project area.

3.6.2 Environmental Consequences

3.6.2.1 Alternative 1: Range 314C with New Access Road/Bridge Alternative

Electricity and Communication Systems

Electrical and communication system improvements would include provisions for a main circuit breaker and feeder-breakers, lighting, electrically powered targets, transformers, telephones, a fire alarm system, and public address system. Proposed electrical system upgrades would be designed consistent with SDG&E standards and would be sized to meet the needs of proposed development; therefore, this alternative would have no impacts on the electrical system. Therefore, no significant impacts on the electrical and/or communication systems would occur.

Potable Water System

Implementation of Alternative 1 could include construction of an additional water distribution main to feed the water tanks for the proposed fire protection system. If constructed, the water line would connect directly into the existing potable water line located in North Range Road (Figure 2.1-4). Overall, potable water demands from Alternative 1 would result in a negligible increase in water demands at MCB Camp Pendleton. Therefore, no significant impacts on the potable water system would occur.

Sewer System

Proposed facilities would not connect to the existing sewer system at MCB Camp Pendleton under Alternative 1. Therefore, no impacts to this system would occur. However, a concrete pad to support 14 new portable toilets would be constructed within the project site. As occurs under current conditions, servicing of these facilities would be contracted out to a company that would pick up and dispose of the wastewater at an off-site location. Given the small increase in wastewater that would be disposed of off-site, Alternative 1 would result in a negligible increase in demands to the sewer system. Therefore, no significant impacts on the sewer system would occur.

Solid Waste Disposal

Construction activities associated with implementation of Alternative 1 would generate solid wastes and C&D material. Demolished asphalt would be recycled on site, to the extent feasible. The remaining solid waste that could not be recycled would be disposed of either at the MCB Camp Pendleton San Onofre landfill or an off-Base landfill. Sufficient capacity exists within the San Onofre Landfill to accommodate the small volume of solid waste expected to be generated by Alternative 1. Therefore, significant impacts on solid waste disposal from construction of Alternative 1 would not occur.

There would be no consequential change in the level of operational activities associated with this alternative. Therefore, no impacts on solid waste disposal would occur during operations and no mitigation is required.

3.6.2.2 Alternative 2: Range 314B with New Access Road/Bridge Alternative

Alternative 2 proposes the same activities as Alternative 1, except that the alternative would be located at Range 314B. Alternative 2 would require a slightly longer access road and potable water line (0.25 mi [0.4 km]). Therefore, impacts to solid waste disposal facilities from construction of Alternative 2 would be similar to but slightly greater than those described for Alternative 1. Because Alternative 2 includes the same proposed training facilities and utility system upgrades and modifications as Alternative 1, impacts on utilities would be the same as those described for Alternative 1. Significant impacts on utilities would not occur and no mitigation is required.

3.6.2.3 No-Action Alternative

Under the No-Action Alternative, the proposed upgrades to the training range and construction of an all-weather access road and bridge would not occur and training would continue under current conditions. Therefore, no impacts on utilities would occur and no mitigation is required.

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3.7 Safety and Environmental Health

3.7.1 Affected Environment

3.7.1.1 Hazardous Materials and Waste

The DoN Installation Restoration Program (IRP) is responsible for identifying Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) releases; considering risks and assessing impacts to human health and the environment; and developing and selecting response actions when it is likely a release could result in an unacceptable risk to human health and the environment. NAVFAC SW administers MCB Camp Pendleton's IRP.

There are two active Installation Restoration (IR) sites (Site 62 and 1H) in the vicinity of Range 314C (Figure 3.7-1). IR Site 62, located approximately 0.5 mi (0.8 km) to the west-southwest of Range 314C, is the 62 Area former asphalt batch plant (USMC 2012). IR Site 1H, located approximately 2 mi (3.2 km) to the west of Range 314C, is a former refuse burning area in the 62 Area. Investigations at the site by the DoN, from 1998 to 2001, determined that metals and dioxins/furans were present at levels that pose a potential risk to human health and the environment (DoN 2006b). Groundwater is approximately 200 to 225 ft (61 to 69 m) below the ground surface. Groundwater beneath the site is not used as a source of drinking water (DoN 2006b). Based on the nature of the waste and depth to groundwater, it was determined that the threat to groundwater from chemicals in the soil is negligible (DoN 2006b).

One inactive IR site (Site 2F) is located near the Range 314 Complex. No other petroleum release or hazardous waste storage sites occur within the immediate vicinity of the proposed action site.

Work on MCB Camp Pendleton is conducted in accordance with federal, state, and local laws, regulations, and instructions; USEPA BMPs for Lead at Outdoor Shooting Ranges (EPA-902-B-01-001); RCRA, CWA, 40 CFR 260 (Federal Hazardous Waste Regulations), and CA Title 22 (California Hazardous Waste Regulations).

RCRA Petroleum, Oil, and Lubricants Sites

RCRA sets forth a framework for the management of Petroleum, Oil and Lubricant (POL) sites, which are regulated under the Underground Storage Tank/Aboveground Storage Tank (UST/AST) program at MCB Camp Pendleton. No USTs/ASTs are located on the project site or within 1 mi (1.6 km) of the project site (MCB Camp Pendleton GIS Data 2015).

3.7-1 IR Site Locations

3.7.1.2 UXO

Range 314C is an active range and is known to contain UXO. The range would be cleared of UXO before the start of construction. Range clearance before construction and operations within Range 314C would be conducted in accordance with Standard Operating Procedures for surface and subsurface clearance (Appendix B), which provide procedures for surface and subsurface clearance of materials potentially presenting an explosive hazard, including Range-Related Debris, Munitions Debris, and miscellaneous trash. These standard operating procedures are completed in accordance with Regulation MCO 8027.1D (*Interservice Responsibilities for Explosive Ordnance Disposal of 14 February 1992*), which outlines actions necessary for all service branches for handling explosive ordnance, including detection, identification, field evaluation, rendering-safe, recovery, and final disposal of UXO or similar devices that constitute a hazard to friendly operations, installations, personnel, or material. In the event UXO were discovered at Range 314C, the "Three R" method would be implemented (i.e., Recognize, immediately Retreat, and Report to Longrifle [MCB Camp Pendleton Range Control] first and the Provost Marshall's Office second).

3.7.1.3 Wildfire Protection

Wildfire protection is a requirement for any project, based on structural building codes and the Wildland Urban Interface Fire code. MCB Camp Pendleton addresses wildfire protection through multiple Fire Plans, including the WPP and Wildland Fire Prescription Burn Plans. Firing ranges are not considered Fire Treatment Zones, due to the presence of live fire and potential UXO; however, buffer areas surrounding the range can be used as Fire Treatment Zones (MCB Camp Pendleton GIS Data 2015).

3.7.1.4 Other Federal Health and Safety Requirements

The DoN maintains health and safety programs to protect its personnel and property. Occupational health is an element of the overall Navy Occupational Safety and Health (NAVOSH) program, which includes explosive, nuclear, aviation, industrial, and off-duty safety.

All proposed construction and operation activities would meet the requirements of EO 13423 (*Strengthening Federal Environmental, Energy, and Transportation Management*) 64 FR 30851 (1999). These requirements are intended to ensure, wherever feasible, that pollution would be prevented or reduced at the source; pollution that cannot be prevented or recycled would be treated in an environmentally safe manner; and disposal or other releases to the environment would be employed as a last resort. These requirements would be contained in all contractual documents associated with the proposed action.

3.7.2 Environmental Consequences

3.7.2.1 Alternative 1: Range 314C with New Access Road/Bridge Alternative

Hazardous Materials and Waste

Alternative 1 would require grading of up to approximately 41 acres (17 hectares) for the range, including RETS, support facilities, and site improvements; 11 acres (5 hectares) for the waste material area; and 2 acres (1 hectares) for the new access road and bridge. The active IR sites closest to Range 314C are IR Site 62, located approximately 0.5 mi (0.8 km) to the west-southwest, and IR Site 1H, located approximately 2 mi (3.2 km) to the west (Figure 3.7-1). Thus, Alternative 1 would not disturb an active IR site, expose the environment or humans to a safety or health risk, or interfere with remediation efforts at those sites. No actions associated with the construction or use of the proposed facilities would affect

conditions at these IR sites. Similarly, there are no RCRA POL sites (e.g., USTs/ ASTs) located within 1 mi (1.6 km) of the project site. Therefore, soil and groundwater contamination-related impacts associated with RCRA POL sites would not occur during grading and construction.

Alternative 1 would include demolition of an obsolete range control tower and ammunition breakdown block to support construction of the range upgrades (Figure 2.1-3). As described in Section 2.1.3.1, testing of on-site facilities for lead has been completed. None of the samples collected contained lead in concentrations that exceed the California Division of Occupational Safety and Health or USEPA action limits. Pre-test visual inspections by a licensed inspector deemed asbestos tests unnecessary. Before the start of demolition activities, these structures would be surveyed for polychlorinated biphenyls, lighting ballasts with beryllium, and other hazardous materials as appropriate. These materials, if present, would be contained, tested, handled, and disposed/recycled in accordance with applicable Base, local, state, and federal laws and requirements.

Residual metals concentrations, such as lead, are likely present in soils on site as a result of live-fire training exercises. Grading/excavation activities would be conducted in compliance with 40 CFR Part 260 (*Federal Hazardous Waste Regulations*), CCR, Title 22 (*Minimum Standards for Management of Hazardous and Extremely Hazardous Wastes*), and USEPA BMPs for Lead at Outdoor Shooting Ranges (EPA-902-B-01-001). Work would be accomplished with every effort to prevent the spread of any potential contamination or release of any potential existing contaminants to the environment, in accordance with all federal, state, and local laws, regulations, and instructions.

Range soil would likely remain within the range boundary and shot fall area. In the event soil is removed from the project site, appropriate hazardous constituent sampling and testing would be completed in accordance with the regulations noted above. If soil and/or construction debris is determined to be hazardous waste, it would be packed, stored, and transported in accordance with 40 CFR Part 260 and Title 22 regulations. Any treated wood materials (e.g., power poles) removed during project activities but not recycled would undergo the California Waste Extraction Test, and wastes failing the test would be disposed of as a regulated hazardous waste per the California Health and Safety Code Sections 25150.7 and 25143.1.5. Hazardous waste would be stored in compliance with local, state, and federal regulations and removed from the Base within 60 days of initial generation. All hazardous waste manifests would be signed by MCB Camp Pendleton ES, Hazardous Waste Section personnel before the waste leaving the Base. In the event lead or copper is removed from the project site, it would be recycled in compliance with Base QRP regulations.

Surface clearance has been completed at the range; therefore, removal of nonhazardous trash and construction debris, including asphalt and concrete, would not be required before grading and construction. If petroleum related soil contamination (discolored and/or odorous soil) is discovered during grading and construction, MCB Camp Pendleton ES would be contacted for necessary remedial requirements, as described in Special Conservation Measure 26. No significant hazardous waste/materials impacts would occur with compliance of the aforementioned rules and regulations.

UXO

UXO present within the project site would present a potential health and safety hazard to personnel during proposed construction activities within Range 314C. MCB Camp Pendleton standard operating procedures for surface/subsurface clearance and Special Conservation Measure 28 (UXO Removal) would be implemented to protect health and safety of construction personnel and minimize these impacts. In accordance with these measures, Range 314C would be cleared of UXO before the start of construction. In addition, existing regulations and standard practices would be implemented to further reduce potential impacts. In the event UXO is found during construction and following UXO clearance,

the "Three R's" method would be implemented (i.e., Recognize, immediately Retreat, and Report to Longrifle [MCB Camp Pendleton Range Control] first and the Provost Marshall's Office second). UXO recovered during construction activities would be removed, stored, transported, and disposed of in accordance with the Military Munitions Rule (40 CFR Part 266, Subpart M) and MCB Camp Pendleton standard practices. In addition, UXO removed from the site would be transported in accordance with DoD shipping controls applicable to the transport of military munitions. Therefore, no significant impacts to the health and safety from UXO would occur during construction. In addition, removal of UXO from the range before grading and construction would constitute a beneficial impact.

Under Alternative 1, operation of Range 314C would continue as under existing conditions. Regulations in place for the potential discovery of UXO and described above would minimize potential health and safety impacts to personnel during operation of Range 314C. Therefore, no significant impacts to the health and safety from UXO would occur during project operations.

Wildfire Protection

Alternative 1 would not result in an increase in operations at Range 314C. However, the proposed remote target systems improvements (MILES) could result in an increased risk of wildfires in the project area. Fires within the project vicinity would pose a threat to fire spread off Base. High density residential areas within the city of San Clemente are located approximately 4 mi (6 km) to the west and northwest; and sporadic rural residences within unincorporated Orange County are located approximately 3 mi (5 km) to the north. The closest populated areas to the northeast are approximately 11 mi (18 km) from the project site, within unincorporated areas of San Diego and Riverside counties.

Special Conservation Measure 29 (Wildland Fire Protection) would be implemented to minimize these impacts. In accordance with this measure, MCB Camp Pendleton would update the WPP to incorporate changes to the Range 314 Complex resulting from this alternative and Fuel Treatment Zones would be identified for hazard mitigation. In addition, construction and operation of the upgraded facilities at Range 314C would follow existing Wildland Urban Interface Fire Codes. In the event of a wildfire, the MCB Camp Pendleton brush engines would provide critical support for structural protection at the range. Therefore, no significant impacts to health and safety from wildfire would occur.

Other Federal Health and Safety Requirements

The proposed requirements of EO 13423 (Strengthening Federal Environmental, Energy, and Transportation Management) would be specified in Construction Contractor contracts and implemented with standard BMPs associated with the proposed action. Therefore, significant impacts associated with environmental health risks would not occur during construction.

Alternative 1 would not result in a change in operational activities at Range 314C. The protocols and requirements to protect human health and safety associated with current operational activities would apply to the proposed activities at Range 314C. Therefore, significant impacts related to other federal health and safety requirements would not occur and no mitigation is required.

3.7.2.2 Alternative 2: Range 314B with New Access Road/Bridge Alternative

Hazardous Materials and Waste

No known hazardous materials or IR sites are known to occur within or adjacent to the Range 314B that would be affected by Alternative 2; therefore, no significant impacts would occur. Impacts related

to munitions-contaminated soil and demolition debris would be the same as those described for Alternative 1.

UXO

Similar to Alternative 1, this alternative would remove UXO from the range, which would constitute a beneficial effect.

Wildfire Protection

Wildfires could potentially ignite as a result of live-fire activities at Range 314B. Similar to Alternative 1, implementation of the WPP would minimize the risk of wildfires and ensure MIST are used during fire suppression, thus minimizing environmental impacts. Special Conservation Measure 29 (Wildland Fire Protection) has been developed specifically for this project to help prevent wildfires and minimize environmental impacts during fire suppression. As a result, no significant impacts would occur with respect to wildfire protection.

Other Federal Health and Safety Requirements

Similar to Alternative 1, all proposed requirements of EO 13423 (Strengthening Federal Environmental, Energy, and Transportation Management) would be specified in Construction Contractor contracts and implemented with standard BMPs associated with this alternative. Therefore, significant impacts associated with environmental health risks would not occur and no mitigation is required.

3.7.2.3 No-Action Alternative

Under the No-Action Alternative, upgrades to training range and construction of an all-weather access road and bridge would not occur and training would continue under current conditions. Therefore, no impacts on safety and environmental health would occur and no mitigation is required.

4 CUMULATIVE IMPACTS

CEQ regulations for implementing NEPA require that the cumulative impacts of a proposed action be assessed (40 CFR Parts 1500-1508. A cumulative impact is defined as the following:

> *"the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions." (40 CFR § 1508.7)*

CEQ's guidance for considering cumulative effects states that NEPA documents "should compare the cumulative effects of multiple actions with appropriate national, regional, state, or community goals to determine whether the total effect is significant" (CEQ 1997). The first step in assessing cumulative effects, therefore, involves identifying and defining the scope of other actions and their interrelationship with the proposed action or alternatives. The scope would consider other projects that coincide with the location and timeline of the proposed action and other actions. Section 4.1 identifies the projects considered in the cumulative analysis. Section 4.2 provides an analysis of cumulative impacts for each of the environmental resources discussed in this EA.

4.1 Projects Considered in the Cumulative Analysis

Cumulative impacts may occur when there is a relationship between a proposed action and other actions expected to occur in a similar location or during a similar time. This relationship may or may not be obvious. Actions overlapping, or in close proximity to, the proposed action can have more potential for cumulative impacts on "shared resources" than actions that may be geographically separated. Similarly, actions that coincide temporally may have the higher potential for cumulative impacts. To the extent that details regarding such actions exist and the actions have a potential to interact with the proposed action outlined in this EA, these actions are included in the cumulative analysis (Table 4.1-1). For the purposes of this EA, the timeframe of current and/or reasonably foreseeable projects extends from 2012 to 2018.

4.2 Environmental Analysis

4.2.1 Geological Resources

The geographic scope for cumulative analysis of geology, topography, and soil impacts is the portion of San Mateo Creek adjacent to and downstream of the proposed action. Although other past, present, and reasonably foreseeable future actions within the geographic scope of cumulative analysis for erosion and seismicity would have similar effects, these projects would also comply with applicable DoD and federal regulations and/or requirements, and would have to implement similar types of protection measures. This would minimize long-term impacts from Alternative 1, Alternative 2, and other projects in the regional vicinity. Therefore, the cumulative impacts identified for geological resources would not be cumulatively significant.

Table 4.1-1. Related and Cumulative Projects

Project Title	*Project Description*	*Project Status*	*Relevant Cumulative Environmental Factors*
Grow the Force Initiative	Construction of temporary and permanent facilities and infrastructure at MCB Camp Pendleton to support an increase in the number of Marines stationed at the Base.	Grow the Force Initiative is currently on hold.	Water Resources; Biological Resources; Air Quality; Cultural Resources; Utilities; Public Health & Safety
Basewide Utility Infrastructure Improvements	Construction of new or upgrade of existing utility systems to provide reliable and compliant water, wastewater, natural gas, electrical and communications systems to support military training and operations and delivery of life support and quality of life services. Includes Northern Regional Tertiary Treatment Plan (P-1043/1046); three new replacement electrical substations and a new 69 kV distribution line (P-1048); construction of a new fiber-optic cable and telephone cable system (P-1093); new 12 kV electrical distribution circuits and meter station (P-1094); and 90,000 linear ft of new high-pressure natural gas mains (P-1099).	A Final EIS and ROD were completed in September 2010. Construction is in process. See P-1043, P-1048, P-1093,and P-1094.	Water Resources; Biological Resources; Air Quality; Cultural Resources; Utilities
Repair 24 Access Roads	Repair and stabilize 24 existing unpaved roads throughout MCB Camp Pendleton's training ranges.	Environmental Assessment is in-process.	Water Resources; Biological Resources; Air Quality; Cultural Resources; Utilities
Range 108 Explosive Ordnance Disposal Facility	Construction and operation of a new Explosive Ordnance Disposal training facility that would include an ordnance library, workshop/tool room, classroom, library, office/kitchen area, two duty rooms (including a locker room and showers), restroom, lounge, permanent overhead canopy, support facilities, and site improvements.	The EA was completed in March 2013. Construction has been completed.	Topography, Geology, and Soils; Water Resources; Biological Resources;
Advanced Water Treatment Facility/Utility Corridor Project (P-113)	Construct, operate, and maintain an Advance Water Treatment facility and associated infrastructure. The project included adding treatment processes to the Haybarn Canyon Drinking Water Iron/Manganese Removal Treatment Facility and constructing a pipeline for disposal of brine that will be generated by the facility.	Construction has been completed.	Water Resources; Biological Resources; Cultural Resources; Air Quality; Utilities;
Operations Access Points (P-159) Red Beach	Construction of a bridge, retaining walls, and access roads that would facilitate an increase in capacity and reliability.	The Final Supplemental EA was completed in April 2012. Construction has been completed.	Topography, Geology, and Soils; Water Resources; Biological Resources; Cultural Resources; Air Quality

Table 4.1-1. Related and Cumulative Projects

Project Title	*Project Description*	*Project Status*	*Relevant Cumulative Environmental Factors*
P-614 Special Operations Training Group Battle Course, 41 Area	Construct, operate, and maintain a 270-degree tactical automated reaction range/urban sniper range and related support facilities northwest of Range 130.	The Final Supplemental EA was completed in January 2011. Construction was completed in June 2012.	Biological Resources; Cultural Resources; Air Quality; Water Resources
Basewide Water Infrastructure (P-1044 and P-1045)	Construction, operation, and maintenance of infrastructure upgrades, expansions, and improvements on the Basewide water system and replacement of a critical link in the Base roadway system. Projects include Northern Advanced Water Treatment Plant and associated facilities (P-1044) and connection of the Base's northern and southern water system (P-1045).	Draft Environmental Impact Report was completed in December 2011. Project is currently in the design phase. Construction is in process. See P-1045.	Geology, Topography, and Soils; Water Resources; Biological Resources; Cultural Resources; Air Quality; Public Health and Safety; Utilities
P-1008	Construction of a Single Marine Center, parking lot, and BEQ.	Construction has been completed.	Water Resources; Biological Resources; Air Quality; Utilities.
P-1008	Construction of combat training facilities at 52 Area including Academic Instruction Facility, training tank, and rappelling tower with a viewing stand), utility upgrades, and improvements to an existing stormwater outfall structure.	Construction has been completed.	Water Resources; Biological Resources; Air Quality; Utilities
Northern Region Tertiary Treatment Plant (P-1043)	Converts STP12 to a Tributary Area Pump Station (TAPS12). Construct raw sewer pipeline to convey wastewater from TAPS 12 to the Northern Region Tertiary Treatment Plant (NRTTP). Construct an effluent pipeline to convey 5 million gallons per day of treated wastewater from the NRTTP to both the San Onofre Percolation Ponds and the Sierra One Percolation Ponds. Construct solar farm to generate 5.3 Megawatts (Direct Current) of power. Contract options include eight one-year Operation and Maintenance periods for the NRTTP, major raw wastewater transmission facilities, and effluent disposal facilities.	Construction has been completed.	Water Resources; Biological Resources; Air Quality; Cultural Resources; Utilities

Table 4.1-1. Related and Cumulative Projects

Project Title	*Project Description*	*Project Status*	*Relevant Cumulative Environmental Factors*
Connection of North and South Water Systems (P-1045)	Construct approximately 90,000 linear ft (27,000 m) of approximately 36 inches (91 centimeters) potable waterlines to connect the northern and southern water systems of MCB Camp Pendleton. The project also would include three pump stations to connect Las Pulgas, Las Flores, and the Stuart Mesa areas to the South Water System.	Construction has been completed.	Geology, Topography, and Soils; Water Resources; Biological Resources; Cultural Resources; Air Quality; Public Health and Safety; Utilities
Upgrades to Electrical Systems and Associated Facilities (P-1048)	Construct a 69 kilovolt (kV) electrical transmission system to provide improved efficiency and reliability, system redundancy, and energy cost savings. The fourth substation would convert the proposed 69 kV line to the existing 12 kV system and would provide distribution of electrical power through four different connecting segments integrated into northern and southern loops designed to service the entire Base.	Construction has been completed.	Water Resources; Biological Resources; Air Quality; Cultural Resources; Utilities
Base-wide Communications Upgrades (P-1093) and Electrical Distribution Facility (P-1094)	Located at Case Springs, Roblar Road, this project would expand the existing intercamp Base fiber-optic network with a communications system that provides a minimum of two separate line paths to each area on Base. All communication lines would be underground.	Construction has been completed.	Water Resources; Biological Resources; Cultural Resources; Air Quality; Utilities; Public Health and Safety

Notes: MILCON = military construction, MW=Megawatt BEQ = Bachelor Enlisted Quarters; kV = kilovolt; NAVFAC - Naval Facilities Engineering Command; square foot = ft^2.

4.2.2 Water Resources

The geographic scope of water resources cumulative analysis includes the defined watershed, San Mateo Creek, in which the project site occurs. Implementation of Alternatives 1 and 2 would not result in significant impacts to water resources including water demand/supply, surface water and groundwater quality, construction-induced erosion, or increased flooding potential on or off site. Although other past, present, and reasonably foreseeable future actions on MCB Camp Pendleton would have similar effects, these projects would also comply with applicable DoD and federal regulations and/or requirements and would implement protection measures similar to Special Conservation Measures 2 through 8. This would minimize long-term impacts to water resources. Therefore, the cumulative impacts identified for water resources, in conjunction with other projects on and in the regional vicinity would not be cumulatively significant.

4.2.3 Biological Resources

For the purposes of biological resources, the geographic scope for the assessment of cumulative impacts varies based on the presence of suitable habitat and known occurrences of a specific resource. Projects with potential direct and indirect impacts on biological resources include those that would result in the loss of native plant communities, permanent loss of sensitive plant populations, species losses that affect population viability, and the reduction in adjacent habitat quality from temporary actions including the addition of noise and dust during construction to permanent effects such as the addition of lighting. For native plant and wildlife communities, other significant impacts could include habitat fragmentation or permanent loss of contiguous (interconnecting) native habitats such as migration or movement corridors.

All ground disturbing projects at MCB Camp Pendleton are required to adhere to various protection measures designed to minimize effects to vulnerable species and their habitats, including riparian, wetlands, coastal sage scrub, and estuarine-beach habitats. Furthermore, the potential for cumulative effects on biological resources at MCB Camp Pendleton associated with habitat and wildlife disturbance is much reduced because of on-going monitoring and management activities in place to minimize adverse effects from development and operations. Potential cumulative effects of federal actions on federally listed endangered species are addressed project-by-project through the Section 7 ESA consultation with USFWS. Through this process MCB Camp Pendleton and USFWS jointly assess project-specific effects and develop and implement appropriate measures that reflect current conditions and status of the species. Consultation has resulted in development of conservation programs for federally listed species and their habitats, such as the Riparian BO covering the Riparian and Estuarine/Beach Ecosystem Conservation Plans and programmatic activities. As a result, cumulative impacts on federally listed species are effectively reduced through avoidance, minimization, and or compensation measures as required. Collectively, these requirements ensure that the incremental effects of individual projects do not result in significant cumulative impacts to biological resources.

As discussed in Section 3.3, Alternatives 1 and 2 would result in temporary and permanent impacts to biological resources within the project site. Implementation of Special Conservation Measures 9 through 20 (Section 2.3.1), standard MCB Camp Pendleton BMPs (Section 2.3.2), requirements of project-specific and Riparian BO, and applicable DoD and federal regulations and/or requirements would ensure construction and operational activities associated with Alternatives 1 and 2 would contribute minimally to adverse effects on biological resources. Similarly, the spatial and temporal extent of these impacts to biological resources from other cumulative projects are expected to be limited due to implementation of Special Conservation Measures and permit conditions that are comparable to those associated with Alternatives 1 and 2. As a result, Alternatives 1 and 2, combined with other cumulative projects, would not result in significant cumulative impacts on biological resources.

4.2.4 Air Quality

4.2.4.1 Criteria Pollutants

The geographic scope of the criteria air pollutant cumulative analysis is primarily the SDAB. As described in Section 3.4, construction activities associated with the project alternatives would produce emissions that would remain substantially below all emission significance thresholds. Emissions from cumulative projects would potentially contribute to the ambient pollutant impacts generated from proposed construction activities. However, these emissions would occur far enough away from proposed construction such that they would produce low ambient pollutant impacts in proximity to the project site. Therefore, air quality impacts from the minor amounts of project emissions, in combination with emissions from cumulative projects, would not be substantial enough to contribute to an exceedance of an ambient air quality standard. Implementation of standard fugitive dust and construction equipment emission control measures (Special Conservation Measures 20 and 21; Section 2.3.1) would ensure that air emissions from proposed construction activities would produce less than significant impacts. Consequently, proposed construction activities would produce less than significant cumulative impacts to criteria pollutant levels.

4.2.4.2 Greenhouse Gases

The potential effects of proposed GHG emissions are by nature global and cumulative impacts, as individual sources of GHG emissions are not large enough to have an appreciable effect on climate change. Therefore, an appreciable impact on global climate change would only occur when proposed GHG emissions combine with GHG emissions from other man-made activities on a global scale.

Currently, there are no formally adopted or published NEPA thresholds of significance for GHG emissions. Therefore, in the absence of an adopted or science-based NEPA significance threshold for GHGs, this EA compares GHG emissions from Alternative 2 to the U.S. net GHG emissions inventory of 2012 (USEPA 2014) to determine the relative increase in proposed GHG emissions. This alternative was chosen for analysis, as it is predicted to generate the largest amount of GHGs of any project alternative. Appendix C-1 presents estimates of GHG emissions generated by the project alternatives.

Table 4.2-1 summarizes the maximum annual GHG emissions generated by Alternatives 1 and 2. These data show that the ratio of CO_2e emissions from Alternative 2 to the CO_2e emissions associated with the net U.S. sources in 2012 is approximately 0.0006/5,547 million metric tons, or about 0.00001 percent of the U.S. CO_2e emissions inventory. Since GHG emissions from Alternative 2 or any other project alternative would equate to minimal amounts of the U.S inventory, they would not substantially contribute to global climate change. Therefore, GHG emissions from the project alternatives would produce less than significant cumulative impacts to global climate change.

Table 4.2-1. Maximum Annual GHG Emissions from Alternatives 1 and 2

Scenario/Activity	*Metric Tons per Year*[1]			
	CO_2	**CH_4**	**N_2O**	**CO_2e**
Construction Emissions	-	-	-	603
U.S. 2012 Net Emissions (10^6 metric tons)[2]	-	-	-	5,547
Emissions as a percent of U.S. Emissions	-	-	-	0.00001

Notes:
1. $CO_2e = (CO_2 * 1) + (CH_4 * 21) + (N_2O * 296)$.
2. Source: USEPA 2014

Although the alternatives would produce minimal cumulative impacts to global climate change, the USMC and DoN implement broad-based programs to reduce energy consumption and shift to renewable and alternative fuels, thereby reducing overall emissions of GHGs. Some of these programs include the following:

- EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, adopted in October 2009, directs federal agencies to increase renewable energy use to achieve general GHG emission reductions. EO 13514 requires federal agencies to develop a 2008 GHG emissions baseline and to develop a percentage reduction target for agency-wide GHG reductions by FY 2020. As part of this effort, federal agencies will evaluate sources of GHG emissions and develop, implement, and annually update an integrated Strategic Sustainability Performance Plan that will prioritize agency actions based on lifecycle analyses. The DoD is currently developing its Strategic Sustainability Performance Plan that will guide USMC initiatives to reduce GHG emissions.
- The Commandant of the Marine Corps' *"Bases-to-Battlefield" Expeditionary Energy Strategy and Implementation Plan* (2011) declares the intent to implement measures to conserve energy and to reduce a dependence on foreign oil. The Campaign Plan identifies long-term goals to reduce energy intensity and increase the amount of renewable electrical energy usage. This plan requires base commanders to evaluate the effectiveness of incorporating emerging technologies that would reduce GHGs.
- MCI West has undertaken a study to evaluate and address GHG emissions, as documented in the draft *Greenhouse Gas Assessment for Marine Corps Installations West* (MCI West 2009). The study provides the basis for recommended GHG management policies at MCI West.
- On 16 October 2009, the Secretary of the Navy announced five energy targets for DoN and USMC, as summarized below.
    - When awarding contracts, appropriately consider energy efficiency and energy footprints as additional factors in acquisition decisions.
    - By 2012, demonstrate a Green Strike Group composed of nuclear vessels and ships powered by biofuels. By 2016, sail the Strike Group as a Great Green Fleet composed of nuclear ships, surface combatants equipped with hybrid electric alternative power systems running on biofuels, and aircraft running on biofuels.
    - By 2015, cut petroleum use in its 50,000 non-tactical commercial fleet in half, by phasing in hybrid, flex fuel, and electric vehicles.
    - By 2020, produce at least half of the shore-based installations energy requirements from alternative sources. Also, convert 50 percent of all shore installations to net zero energy consumers.
    - By 2020, half of the DoN's total energy consumption for ships, aircraft, tanks, vehicles and shore installations will come from alternative sources.
- As part of its efforts to encourage the development of alternative fuels, on 22 January 2010 the DoN and the USDA signed a Memorandum of Understanding to encourage the development of advanced biofuels and other renewable energy systems.

Renewable energy projects currently implemented and planned within the jurisdiction of MCI West would reduce emissions of GHGs by about 250,000 metric tons from current operations over a 25-year life cycle (DoN 2010b). These projects include thermal and photovoltaic solar systems, geothermal

power plants, and wind generators. These renewable energy initiatives are not proposed as emission reductions to directly offset GHG emissions produced by either alternative, but rather demonstrate initial responses for DoN compliance with EO 13514 and to factor GHG management into DoN proposals and impact analyses.

Climate Change Adaptation

In addition to assessing whether any of the alternatives would impact climate change, the following considers how climate change could impact these actions and what adaptation strategies, if any, would be required to respond to these future conditions. For projects within southern California, the main effect of climate change to consider is increased temperatures, droughts, and wildfires, as documented in *Our Changing Climate 2012 – Vulnerability & Adaptation to the Increasing Risks from Climate Change in California* (California Energy Commission 2012). Current operations at MCB Camp Pendleton have adapted to the relatively arid conditions in the area, as well as the prevalence of wildfires. Exacerbation of these conditions in the future could impede proposed construction and operational activities during extreme events or could cause smoke obscurations from wildfires. No other substantial effects from future climate change would impact proposed construction and operational activities.

4.2.5 Cultural Resources

The geographic region of analysis for cumulative impacts on cultural resources consists of MCB Camp Pendleton and adjacent communities. Impacts on cultural resources are considered significant if a historic property, including archaeological resources, historic architectural resources, or traditional cultural resources, would be physically damaged or altered, would be isolated from the context considered significant, or would be affected by project elements that would be out of character with the significant property or its setting.

Archaeological sites are a limited resource and, therefore, any impact on an archaeological site that is eligible or potentially eligible for listing in the National Register and/or is of concern to the Native American community may contribute to a cumulative impact. The USMC has consulted with the SHPO under Section 106 of the NHPA, interested federally recognized and non-federally recognized Indian tribes, and other interested parties regarding five archaeological sites within the APE. Other present and future projects with the potential for significant impacts on cultural resources would also undergo Section 106 review under NHPA. If a site is determined by SHPO during Section 106 consultation to be eligible for inclusion in the NRHP, the project proponent would consult with the SHPO on ways to "avoid, minimize or mitigate the adverse effects" (36 CFR 800.6). Therefore, the cumulative impacts identified for cultural resources from the proposed action, in conjunction with other projects on and in the regional vicinity, would not be cumulatively significant.

4.2.6 Utilities

The geographic region of analysis for utility cumulative impacts is centered on the utility supply at MCB Camp Pendleton. Alternatives 1 and 2 would involve no significant net change in utilities usage. Operations would result in minimal changes in the amount of water, electricity and waste water demand and wastewater produced under existing conditions. Planned electrical system upgrades for the proposed facilities would be designed consistent with SDG&E standards. Sufficient capacity exists within the landfills at MCB Camp Pendleton and off-Base to accommodate the increase in solid waste generated from construction and there would be no consequential change in the level of operational activities associated with the alternatives. The demands on electricity, potable water, natural gas, sewage treatment, and solid waste disposal of the other relevant projects, in combination with the demands from Alternatives 1 and 2, would be accommodated by existing supplies and capacities and planned upgrades.

Therefore, the cumulative utility impacts from Alternatives 1 and 2, in conjunction with other projects on and in the regional vicinity, would not result in significant cumulative impacts to utilities.

4.2.7 Safety and Environmental Health

The geographic region of analysis for hazardous materials and waste is the area encompassing nearby hazardous waste sites that may impact the proposed action, or conversely, where the proposed action may impact remediation of the hazardous waste sites. The proposed action would not disturb an active IR site, expose the environment or humans to a safety or health risk, or interfere with remediation efforts at those sites. Similarly, there are no RCRA POL sites (e.g., USTs/ASTs) located within 1 mi (1.6 km) of the project site. Residual metals concentrations in soils on site are generally confined to the project site and would therefore not create a cumulative impact with other nearby contaminated sites. Range soil would likely remain within the range boundary and shot fall area and would continue to be used for the same purpose. In the event soil is removed from the project site, appropriate hazardous constituent sampling and testing would be completed in accordance with applicable federal laws and USEPA BMPs for Outdoor Shooting Ranges. Other past, present, and reasonably foreseeable future actions on MCB Camp Pendleton would have similar effects. These projects would also implement similar types of protection measures and would comply with applicable DoD and federal regulations, and/or requirements. This would minimize long-term impacts from Alternative 1, Alternative 2, and other projects in the regional vicinity. Therefore, the cumulative impacts identified for hazardous materials from Alternatives 1 and 2, in conjunction with other projects on and in the regional vicinity, would not be cumulatively significant.

The geographic region of analysis for UXO safety is generally confined to the project site boundary, as potential explosions of small arms munitions would not impact off-site areas. As a result, cumulative UXO related impacts would not occur. The geographic region of analysis with respect to wildfire protection is MCB Camp Pendleton and surrounding areas. Alternatives 1 and 2 could result in an increased risk of wildfires in the project area that could pose a threat to fire spread off-Base. Implementation of Special Conservation Measure 29 (Section 2.3.1) and standard MCB Camp Pendleton BMPs (Section 2.3.2) would minimize potential effects. Other past, present, and reasonably foreseeable future actions on MCB Camp Pendleton would incrementally increase the potential for wildfires to occur. However these projects would also implement similar types of protection measures. Therefore, the cumulative impacts identified for safety and environmental health from Alternatives 1 and 2, in conjunction with other projects on and in the regional vicinity, would not be cumulatively significant.

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5 OTHER NEPA CONSIDERATIONS

5.1 Energy Requirements and Conservation Potential of Alternatives Including the Proposed Action and All Mitigation Measures Being Considered

The alternatives would result in a negligible increase in energy use at MCB Camp Pendleton. However, energy (electricity) and water consumption, as well as demand for services, would not increase significantly as a result of the implementation of Alternatives 1 and 2 (refer to Section 3.6, Utilities).

5.2 Irreversible or Irretrievable Commitment of Natural or Depletable Resources

NEPA requires an analysis of significant, irreversible effects resulting from implementation of a proposed action. Resources that are irreversibly or irretrievable committed to a project are those that are typically used on a long-term or permanent basis; however, those used on a short-term basis that cannot be recovered (e.g., non-renewable resources such as metal, wood, fuel, paper, and other natural or cultural resources) also are irretrievable. Human labor also is considered an irretrievable resource. All such resources are irretrievable in that they are used for one project and thus become unavailable for other purposes. An impact that falls under the category of the irreversible or irretrievable commitment of resources is the destruction of natural resources that could limit the range of potential uses of that resource.

Implementation of the alternatives would result in an irreversible commitment of building materials; fuel for construction equipment, and vehicles used during construction activities; and human labor. These commitments of resources are neither unusual nor unexpected, given the nature of the action.

The alternatives would not result in the destruction of environmental resources such that the range of potential uses of the environment would be limited, or affect the biodiversity of the region.

5.3 Relationship Between Local Short-Term Use of the Human Environment and Maintenance and Enhancement of Long-Term Biological Productivity

NEPA requires consideration of the relationship between short-term use of the environment and the impacts that such use could have on the maintenance and enhancement of long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. Such impacts include the possibility that choosing one alternative could reduce future flexibility to pursue other alternatives, or that choosing a certain use could eliminate the possibility of other uses at the site.

The proposed action consists primarily of upgrading an existing live-fire range. Implementation of the alternatives would not result in any such environmental impacts because it would not pose long-term risks to health, safety, or the general welfare of the communities surrounding the project site that would significantly narrow the range of future beneficial uses as the use of the project site would be the same as current conditions. In addition, biological productivity would not be affected as implementation of the alternatives would not result in significant direct, indirect, or cumulative impacts to any biological resources.

5.4 Any Probable Adverse Environmental Effects that Cannot be Avoided and are not Amenable to Mitigation

This EA has determined that the alternatives would not result in any significant unmitigable impacts; therefore, there are no probable adverse environmental effects that cannot be avoided or are not amenable to mitigation.

6 LIST OF PREPARERS

6.1 Lead Agency

United States Marine Corps
MCB Camp Pendleton
Camp Pendleton, California
Mark Anderson, Project Manager

This EA was prepared for the USMC, under the direction of the DoN, by Leidos. Members of Leidos's professional staff who contributed to the preparation of this document are listed below.

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December 1, 2015

Refer to NMFS No:
2015-3785

Bartholomew Battista
Environmental Planning, Head
United States Marine Corps
Marine Corps Installations West-Marine Corps Base
Box 555008
Camp Pendleton, California 92055

Re: Endangered Species Act Section 7(a)(2) Concurrence Letter for the Marine Corps Base Camp Pendleton's P-637 Infantry Squad Battle Course Range and Bridge Project at San Mateo Creek, San Diego County

Dear Mr. Battista:

On November 10, 2015, NOAA's National Marine Fisheries Service (NMFS) received the Marine Corps Base Camp Pendleton's (Base) request for concurrence under Section 7 of the U.S. Endangered Species Act (ESA). The request concerns the Base's P-637 Infantry Squad Battle Course Range and Bridge Project (proposed action) at San Mateo Creek in San Diego County and potential effects on the endangered Southern California Coast (SCC) Distinct Population Segment of steelhead (*Oncorhynchus mykiss*). This response to your request was prepared by NMFS pursuant to Section 7(a)(2) of the ESA, implementing regulations at 50 CFR 402, and agency guidance for preparation of letters of concurrence.

This letter underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The concurrence letter will be available through NMFS' Public Consultation Tracking System https://pcts.nmfs.noaa.gov/pcts-web/homepage.pcts. A complete record of this consultation is on file at NMFS' Southern California Coastal Office in Long Beach, California.

Action Area

The proposed action will occur in San Mateo Creek, which provides habitat for endangered SCC steelhead (71 FR 834[1]). Within the action area there is no designated critical habitat because the

[1] Endangered and Threatened Species: Final Listing Determinations for 10 Distinct Population Segments of West Coast Steelhead. Federal Register, Vol. 71, No. 3. January 5, 2006.

Base is subject to an integrated natural resources management plan prepared under section 101 of the Sikes Act (16 U.S.C 670a)[2].

The action area is about 500-feet long and includes the linear extent of the proposed bridge over San Mateo Creek and encompasses the riparian corridor to the top of bank. Longitudinally within the creek channel, the action area extends approximately 50-feet upstream and 450-feet downstream from the proposed bridge centerline.

Given NMFS' familiarity with the characteristics of the creek in this specific action area, rearing habitat immediately upstream and downstream of the existing unimproved stream crossing is absent and juvenile steelhead are not expected to be present. Therefore, the action area, within the boundaries identified here, is projected to function primarily as a freshwater migration area for steelhead. The proposed work window is within a time period when juvenile or adult SCC steelhead are not expected to be migrating through this section of San Mateo Creek.

Proposed Action

Under the proposed action, the Base would replace the existing unimproved stream crossing with a bridge over San Mateo Creek. A five-span concrete box girder bridge (approximately 16-feet wide x 560-feet long) will be placed on cast-in-drilled-hole pile abutments and four piles outside of the low flow channel. If water is present, construction activities will require the work area to be dewatered and installation of a temporary access path into the channel. Once the proposed water diversion is installed, drill rigs will be used in the channel to begin installation of the bridge piers. Following construction, the Base proposes to implement a restoration plan to mitigate for permanent and temporary impacts to riparian vegetation. There is no known action that is interrelated or interdependent with the proposed action.

The Base proposes to implement the following avoidance and minimization measures as part of the proposed action:

1. Dewatering activities will occur between May 15 and November 1 to avoid the steelhead migration window and therefore presence of steelhead. A qualified biologist will be present during construction and demolition activities to inspect the dewatered area daily to ensure the diversion remains intact. The dewatering plan will be submitted to NMFS at least 30 days prior to construction for review and approval.

2. To further reduce the likelihood of direct effects to steelhead, pump intakes will be screened with wire mesh no larger than 0.2 inches to prevent steelhead from entering the pump system.

3. Best management practices (BMPs) will be implemented during dewatering, drilling, and construction activities to minimize the likelihood that water-quality alterations within and downstream of the action area would be observed.

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[2] Endangered and Threatened Species: Designated Critical Habitat for Seven Evolutionary Significant Units of Pacific Salmon and Steelhead in California. Federal Register, Vol. 70, No. 170. September 2, 2005.

4. Alteration of the streambed will be minimized to the maximum extent possible. Disturbed areas of the streambed will be returned to pre-existing conditions before streamflow is restored.

Action Agency's Effects Determination

The Base determined the proposed action "may affect, but is not likely to adversely affect SCC steelhead." This determination is based on the implementation of avoidance and minimization measures, in particular restricting the proposed activities to when steelhead presence within the action area is unlikely and isolating the work area from flowing water.

Consultation History

On April 27, 2015, NMFS received the Base's letter and information package requesting initiation of Section 7 consultation under the ESA for the proposed action.

On May 21, 2015, NMFS issued a letter that (1) requested more information concerning the proposed methods of construction and whether the bridge would affect steelhead passage conditions, and (2) recommended measures to incorporate into the proposed action for purpose of avoiding or minimizing adverse effects on endangered steelhead and designated critical habitat.

On July 22, 2015, NMFS received the requested information from the Base. The Base's responses did not provide sufficient detail required to initiate consultation.

On September 22, 2015, NMFS met with Base staff to discuss and clarify the requested information needed to initiate consultation and recommended avoidance and minimization measures to be incorporated into the proposed action. The Base clarified that the proposed bridge piers would not be located in the low flow channel and the bridge abutments would be outside of the channel.

On November 10, 2015, NMFS received the Base's letter requesting initiation of consultation under Section 7 of the ESA. The letter included a list of proposed measures to minimize or avoid adverse effects on endangered steelhead and designated critical habitat. Based on receipt of this information, consultation was initiated on the same day.

Effects of the Action

Under the ESA, "effects of the action" means the direct and indirect effects of an action on the listed species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action (50 CFR 402.02). The applicable standard to find that a proposed action is not likely to adversely affect listed species or critical habitat is that all of the effects of the action are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species or critical habitat. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur.

Because suitable rearing habitat in the immediate vicinity of the existing bridge appears absent, juvenile steelhead are not expected to be present in the dewatered area. NMFS does not expect adult or juvenile steelhead migrating through the action area, given the timing of the proposed construction period. To increase the likelihood that adverse effects to the species would be avoided, temporary instream barriers will be installed to prevent steelhead from entering the work area from the downstream and upstream direction. As a result, direct effects to steelhead owing to the proposed action are discountable.

While effects of the proposed action on SCC steelhead and their aquatic habitat include the potential for substantial turbidity increases associated with dewatering and disturbance of the creek banks within a confined area, such increases are not probable owing to the wet season BMPs that are incorporated into the proposed action. Short-term increases in turbidity, if observed when the creek is re-watered or during the first rain event of the year, are anticipated to be insignificant relative to background turbidity concentration.

Although the proposed action has the potential for temporary chemical contamination of San Mateo Creek from drilling mud, such contamination is discountable due to the BMP. The BMP require implementation of a contingency plan to guard against the accidental release of drilling mud to the creek in the unlikely event a spill is observed.

The proposed bridge location is mainly devoid of shade providing vegetation, and the vegetation that will be removed along the creek banks as part of the proposed action does not shade aquatic habitat. As a result, the proposed action is not expected to diminish the functional value of beneficial vegetation along the creek banks. Additionally, implementation of a restoration plan would restore temporary and permanent impacts to riparian vegetation. The restoration plan will achieve the overall goal of enhancing biodiversity and habitat value within San Mateo Creek. Thus, the impacts to riparian vegetation within the action area are expected to be discountable.

The information made available to NMFS as part of this consultation indicates the proposed bridge would not permanently alter or influence the channel configuration or hydrology within this section of San Mateo Creek. The new bridge will be placed on a single row of piles that are parallel to the direction of creek flow and away from the low flow channel. Thus, the proposed action is not expected to reduce the functional value of the action area as a migratory corridor for adult and juvenile steelhead.

Conclusion

Based on this analysis, NMFS concurs with the Base that the proposed action is not likely to adversely affect endangered SCC steelhead within the action area of San Mateo Creek.

Reinitiation of Consultation

Reinitiation of consultation is required and shall be requested by the Base or by NMFS, where discretionary Federal involvement or control over the action has been retained or is authorized by law and (1) new information reveals effects of the action that may affect listed species in a

manner or to an extent not previously considered; (2) the identified action is subsequently modified in a manner that causes an effect to the listed species that was not considered in this concurrence letter; or if (3) a new species is listed or critical habitat designated that may be affected by the identified action (50 CFR §402.16). This concludes the ESA portion of this consultation.

Please direct questions regarding this letter to Jay Ogawa, Southern California Coastal Office (562) 980-4061.

Sincerely,

for William W. Stelle, Jr.
Regional Administrator

cc: Mary Larson, CDFW, Los Alamitos
Administrative File: 151422WCR2015CC00159

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

In Reply Refer To:
FWS-MCBCP-08B0581-08F0696-R002

FEB 16 2016

Bart Battista
Head, Environmental Planning
Environmental Security
MCIWEST-Marine Corps Base Camp Pendleton
P.O. Box 555008
Camp Pendleton, California 92055-5008

Subject: Reinitiation of Section 7 Consultation for Infantry Squad Battle Course Range P-637, Marine Corps Base Camp Pendleton, San Diego County, California

Dear Mr. Battista:

This document responds to your letter, dated March 27, 2015, requesting reinitiation of formal consultation for the Infantry Squad Battle Course Range P-637 Project (P-637 project) on Marine Corps Base Camp Pendleton (MCBCP), San Diego County, California, and its effects on the federally endangered arroyo toad [*Anaxyrus californicus* (*Bufo microscaphus c.*)], least Bell's vireo (*Vireo bellii pusillus*, vireo), and southwestern willow flycatcher (*Empidonax traillii extimus*, flycatcher) and the federally threatened thread-leaved brodiaea (*Brodiaea filifolia*, brodiaea), in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et. seq.*). A biological opinion addressing project-related impacts to the federally endangered arroyo toad was issued by our agency to the U.S. Marine Corps (Marine Corps or USMC) on September 29, 2008, (FWS-MCBCP-08B0581-08F0696) and reinitiated on March 9, 2012, to address potential project-related impacts from geotechnical investigations (FWS-MCBCP-08B0581-08F0696-R001). The 2008 biological opinion and the 2012 amendment are collectively referred to as the amended biological opinion.

The proposed action is located within the boundaries of MCBCP, which is exempt from critical habitat designation under section 4(a)(3) of the Act for listed species because the Service found that MCBCP's Integrated Natural Resources Management Plan (INRMP) provides a benefit for the listed species (USMC 2012). Therefore no critical habitat for any listed species is designated in the project area (Service 2005).

The modified P-637 project includes permanent impacts to occupied arroyo toad breeding and upland aestivation habitats as a result of the addition of a permanent access road and bridge crossing San Mateo Creek. In addition, the modified project may result in the permanent loss of about 0.05 acre of occupied thread-leaved brodiaea habitat that was previously anticipated to be

avoided. Therefore, in the Marine Corps' March 27, 2015, reinitiation request, the Marine Corps determined that the P-637 project will adversely affect the federally endangered arroyo toad and the federally threatened thread-leaved brodiaea.

The analysis and conclusions provided in this document are based on information provided in the Marine Corps' March 27, 2015, reinitiation request; March 2015 Biological Assessment (USMC 2015); and correspondence and information compiled during the course of our consultation with the Marine Corps on the subject project. The information and other references cited in this document constitute the best available scientific information on the status and biology of the species considered. The complete project file for this consultation is maintained at the Carlsbad Fish and Wildlife Office (CFWO).

In our amended biological opinion, we concurred with the Marine Corps that the project is not likely to adversely affect (NLAA) the federally endangered least Bell's vireo, southwestern willow flycatcher, and tidewater goby (*Eucyclogobius newberryi*, goby) or the federally threatened coastal California gnatcatcher (*Polioptila californica californica*, gnatcatcher). The analysis of potential effects to goby and gnatcatcher in the amended biological opinion and our NLAA determination for these species remain unchanged.

Based on conservation measures committed to by the Marine Corps, we concur with your determination that the proposed project is not likely to adversely affect the federally endangered vireo or flycatcher, as analyzed in Appendix A.

CONSULTATION HISTORY

We issued the biological opinion for the proposed project on September 29, 2008, and issued an amended biological opinion on May 24, 2012, to address potential effects of geotechnical investigations. On March 27, 2015, we received a second request to reinitiate consultation to address additional project modifications that may adversely impact arroyo toads and brodiaea resulting from the addition of a permanent access road and bridge crossing San Mateo Creek.

On February 1, 2016, a draft Biological Opinion was submitted to the Marine Corps. Comments were received on February 9, 2016, with clarification on February 10, 2016 (USMC 2016). At that time, we were notified that the project was redesigned so that there will be no excess earthwork because there is a balance between cut and fill on the range; therefore, the waste material site was removed from the project description.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed action will be implemented on Marine Corps Base Camp Pendleton (MCBCP) (Figure 1). The specific project area is located in the northern portion of the Base, Range 314C is in the Quebec Impact Area, and the bridge will be located in the Bravo One Training Area adjacent to Range 314C (Figure 2).

This amendment addresses the construction, operation, and maintenance of a live-fire Infantry Squad Battle Range with targets, supporting facilities, and utilities on an approximately 116-acre site at the existing Range 314C multipurpose training facility (Figure 3). In addition, the proposed action includes construction of a new access road and bridge crossing San Mateo Creek to provide year-round, all-weather access to Range 314C (Figure 4). This amendment updates all project-related impacts to arroyo toad from the proposed action rather than addressing only the new impacts from the access road and bridge crossing.

The project components include: 1) demolition of the existing Range Control Tower, ammunition breakdown block, and asphalt around the proposed General Instruction Building; 2) construction of Remoted Target Systems (RETS) and support facilities (including Range Control Tower, Operations Storage Facility, Enclosed Bleacher Facility, General Instruction Building, and Ammunition Breakdown Building); and 3) construction of a bridge across San Mateo Creek and improvements to the existing access road to the range. Additional supporting improvements include drainage improvements and utility infrastructure upgrades (i.e., mechanical systems, fire protection system,[1] communications, concrete pad for up to 14 portable toilets, electricity, and a range control system).

Construction of the range will occur over about an 18-month period and require up to 25 workers per day. Construction of the bridge will occur over about a 7-month period and will require up to 10 workers per day. Unexploded Ordnance (UXO) clearance and grading of the range is expected to take about 5 months. Construction will involve grading the project area, excavating for utility lines, pouring building/facility pad foundations, erecting structures, and installing other ancillary facilities. Construction staging and laydown areas will be located within the project area.

An obsolete Range Control Tower and ammunition breakdown block will be removed and the demolition debris hauled to an approved disposal location either on or off MCBCP. Demolished asphalt will be reused/recycled or transported to an approved landfill.

Site development will require grading of about 41 acres. The range elevations will be raised from existing levels to maintain a balance of earthwork. The access road and bridge will require additional grading of about 2 acres. Cut and fill around the 1,968-foot long range will be balanced so that there is no excess earthwork. All of the material will remain onsite and used for grading throughout the project. Slopes will be contoured to the extent possible to provide smooth transitions between the proposed grading and the adjacent landforms. Following grading, the cut slopes will be stabilized through revegetation to their original condition, or better, using local, native drought-tolerant vegetation.

[1] MCBCP obtained a waiver to remove the requirement for a fire protection water system from the scope of the proposed action. However, the proposed action includes the fire protection system in the event that it is needed in the future.

Onsite drainage improvements will include construction of ditches, vegetated swales, an alluvial channel, and bio-retention basins that will provide stormwater control of run-on and runoff flows and sheetflow from the range (Figure 3).

Removal of UXO is required to accommodate proposed site improvements. The range will be cleared prior to the start of construction, in accordance with standard operating procedures, a Work Plan, and a Health and Safety Plan.

The existing access road will be improved with asphalt and embedded riprap gabion side edges. The improved road will follow the existing grade and alignment to the extent feasible. The new bridge across San Mateo Creek will be about 16 feet wide and 560 feet long and will include one 13-foot wide lane for vehicular traffic and a 1.5-foot wide barrier on each side of the bridge. The bridge will be constructed to clear the 100-year flood level. The bridge will include four 9-foot diameter piers and two abutments. Culverts will be placed along the road and bridge approaches as necessary, to allow arroyo toad and stormwater passage and to reduce stream impediment. The new bridge will be constructed with concrete. The posted speed on the road will remain 15 miles per hour following construction. During construction, a temporary, unimproved creek crossing located downstream of the existing crossing will be used to access Range 314C (Figure 4). This crossing will be used by both the range users and the construction contractor during construction of the access road and bridge. The existing creek crossing and temporary site access will be removed and the areas restored to natural conditions following construction of the bridge.

A 24-foot wide, asphalt driveway will be constructed to provide vehicular access between Range 314 Range Road and Range 314C. The road will be gated to restrict access to authorized vehicles only. In addition, a staircase for direct pedestrian access to the range will be constructed.

A 12-foot wide, gravel maintenance road will be constructed from the proposed parking lot along the northern boundary of the range adjacent to the vegetated swale to provide access to the range and behind each grouping of targets. Turnarounds will be provided at the end of each access road. A gate will be installed at the base of the range access road to restrict access to authorized vehicles only.

A waiver was obtained by MCBCP to remove the requirement for a fire protection water system from the scope of the proposed action. However, it is included here in the event that it is needed in the future. Therefore, the project could include construction of a fire protection system comprised of two 83,000-gallon water tanks, a non-potable well (about 100 feet deep) that would feed the tanks, and a booster pump station, fire hydrants, and water distribution lines from the tanks to the fire hydrants. One hydrant would be located on top of the range, and the other would be located near the new General Instruction Building. The tanks could also provide water for onsite irrigation if necessary. In lieu of a well, a potable water line could be used to feed the water tanks. This water line would be installed along the Range 314 access road, mounted on or in the proposed bridge, and would tie-in to the existing water line in North Range Road.

Electrical power service lines will connect to an existing overhead transmission line that runs adjacent to the project site (Figures 3 and 4). Electrical and power lines will be buried within the

boundaries of Range 314C. The Ammunition Breakdown Building and General Instruction Building will include roofs facing south to allow for the option of mounting solar or photovoltaic panels. Three new wooden poles with cross-arms and insulators will be installed outside of the range.

Exterior lighting will be installed for safety purposes and to illuminate range areas, including night training lights at the initial positions fire line and lighted lateral limits signs. Light fixtures mounted on building exteriors and poles will provide emergency lighting. Lighting for the range will be placed on poles behind the shooting locations to avoid damage from shooting operations. Exterior and interior lighting in the immediate vicinity of the range will have alternate red-lighting for normal night-time operations. Lighting will be directed away from sensitive riparian habitat to the maximum extent practicable. Pedestrian-style fixtures will be used to light the bridge.

The staging area for bridge and road construction will be about 200 feet by 200 feet and located adjacent to North Range Road and north of the proposed access road located in the Bravo One Training Area (Figure 4). The staging areas for the range construction and upgrades will be located either south or northeast of the K-spans (Figure 3).

A complete project description is located in Section II.a of the Final Biological Assessment (USMC 2015).

Conservation Measures

The proposed action incorporates a number of project-specific measures to avoid, minimize, and/or offset adverse effects of the project on federally listed species. In addition, standard construction measures (CM) generally required by MCBCP [Appendix A of the Biological Assessment (BA)] will also apply to the proposed action.

In addition to the measures described below, impacts on riparian habitat will be further offset according to formulas that are part of the Riparian BO (Service 1995), resulting in no net loss of habitat or the functions it provides for listed species and wildlife in general.

General Impact Avoidance, Minimization, and Other Conservation Measures

CM 1. **Final construction designs**. Final designs for construction will minimize the removal of riparian habitat that could support federally listed species.

CM 2. **Limit project work areas**. The project work areas will be limited to the sites specified in the BA. Access to the project site will use the current existing road or temporary access road. Parking, driving, lay-down, stockpiling, and vehicle and equipment storage will be limited to previously compacted, developed areas, and non-native grassland, and no off-road vehicle use will be permitted beyond the project site and designated access routes. Disturbances to the adjacent native vegetation will be minimized.

CM 3. **Biological Monitor**. A biological monitor will oversee avoidance and minimization measures specified within these conservation measures. Different biological monitors may be designated for specific measures listed based on the qualifications necessary to satisfy the specific measure. If multiple biological monitors are required, their activities will be coordinated through one primary biological monitor. The biological monitor(s) will have experience and training necessary to conduct tasks described in this biological opinion. A resume of experience and training for each designated biological monitor will be submitted for review and approval to MCBCP Environmental Security.

CM 4. **Minimize impacts at San Mateo Creek crossing**. All traffic accessing Range 314C will reduce speeds to less than 5 miles per hour when using the current access road or temporary access road during construction. In addition, construction activities will be avoided within or near San Mateo Creek when flow is present. Erosion and sedimentation control measures (CM 8 to CM 10) adjacent to San Mateo Creek will be established and maintained if construction activities have the potential to increase sedimentation into San Mateo Creek.

CM 5. **Avoid impacts on nesting birds**. To the maximum extent feasible, vegetation removal will occur from September 1 to February 14, which is outside the bird breeding season for federally listed and other bird species. Trimming or removal of vegetation during the peak breeding season (February 15 to August 31) will require a pre-activity survey by a wildlife biologist, hired by the project proponent and approved by MCBCP Environmental Security, to confirm that active nests will not be affected. The wildlife biologist must conduct the survey within 3 days of the start of vegetation removal.

CM 6. **Avoid and minimize disturbance to upland native plant communities; develop a Revegetation Plan to compensate for disturbance to native plant communities**. The final project will be designed to minimize impacts by reducing disturbance footprints to native grassland and areas densely vegetated with native vegetation to the maximum extent practicable. In addition, staging areas or other temporary construction-related requirements will be located on previously disturbed areas to the maximum extent feasible. For native plant community impacts that will not be avoided by the project design, the Construction Contractor will develop a Revegetation Plan that will be approved by MCBCP Environmental Security before the start of construction. MCBCP Environmental Security will provide a copy of the Revegetation Plan to the Service for comment, review, and approval. The Revegetation Plan will be submitted to the Service before initiating project activities that will impact federally listed species. The Revegetation Plan will:

a. Include the proposed restoration location, existing conditions of the restoration site, methodology for creating/restoring habitat, monitoring requirements and time periods, success criteria, and follow-up measures if needed.

b. Require restoration for temporary impacts to federally listed species occupied habitat to be initiated within 6 months of completion of construction.

c. Require areas temporarily disturbed by construction activities be treated for a minimum of 5 years post-construction to control the establishment of exotic vegetation within the cleared or otherwise disturbed area. However, if success criteria have been met at year 3, additional treatment and monitoring will not be required.

1. Biological monitoring and reporting will be implemented during construction activities occurring in or adjacent to riparian areas.

2. Signs will be placed to indicate the necessity for all activities to be strictly confined to the project area.

3. Construction site boundaries will be clearly delineated on the ground by flagging, survey lath, or wooden stakes. All project-related activities will occur within the project boundary.

d. Require temporary disturbance to riparian habitat be restored in accordance to the Riparian BO (Service 1995).

e. Address all revegetation efforts associated with the proposed action and include specific erosion control measures, irrigation requirements, species composition, seed mix origins and ratios, weed control, water regimes, maintenance activities, success criteria, and monitoring requirements. Weed treatment addressed in the Revegetation Plan will include all erosion control areas and permanent non-vegetated areas such as gravel associated with erosion control features.

f. Consider replacing disturbed native vegetation. Restoration of temporarily impacted coastal sage scrub will be in a manner consistent with the Final Conceptual Coastal Sage Scrub Restoration Plan for MCBCP, Southwest Division, Naval Facilities Engineering Command, December 2001 (or any other updated standardized coastal sage scrub restoration plan approved by the Land Management Section of Environmental Security for use on MCBCP or a project-specific coastal sage scrub restoration plan approve by the Land Management Section of Environmental Security).

g. Outline a monitoring program for the revegetated areas, including success criteria and the duration and frequency of monitoring. Non-native invasive species should be treated with Base-approved herbicides for a minimum of 3 years following application of the first treatment. Areas impacted by construction will be inspected by MCBCP Environmental Security within 1 year of completion of construction to determine whether any remedial measures are

required. Remedial measures may include re-seeding/re-planting, weed control, watering, and/or erosion control. The results of the monitoring program will be summarized in an Annual Monitoring Report and will indicate if success criteria have been met. The Construction Contractor will obtain approval of the monitoring methods proposed for use in revegetation. The Annual Monitoring Report will be submitted to MCBCP Environmental Security annually until the success criteria are met.

h. Require a Post-Project Report be prepared that details the exact acreage of all vegetation communities, including riparian, that were impacted by the project.

CM 7. **Revegetate cut slopes with drought-tolerant local native vegetation**. As stated in the Section II.a.1.2 of the Biological Assessment (USMC 2015), cut slopes, staging, and laydown areas not planned for development will be restored and revegetated to their original condition, or better, using local, native, drought-tolerant vegetation in accordance with the Revegetation Plan (CM 5). The affected areas will be stabilized to prevent erosion during and following construction per standard construction BMPs (see Appendix A of the BA). To the extent feasible, topsoil will be collected in areas of native vegetation to conserve natural seed banks and stockpiled for replacement where cut slopes are to be revegetated. To the extent practicable, soil layers excavated from the site will be returned in the same order they were removed (i.e., the topsoil is to be returned to the topmost level). In accordance with Standard Construction Measure 15 in Appendix A of the BA, topsoil will be stockpiled in a manner that will facilitate survival of mycorrhizal organisms.

CM 8. **Permanent Erosion Control Practices**. Permanent erosion control practices will be applied to the project in the form of riprap energy dissipaters at all proposed channel discharge locations. The alluvial channel will be lined with high performance turf reinforcement matting (which is pervious and allows vegetation to grow) and vegetated with native grasses and native trees. An effective slope of 6 percent will be achieved through evenly spaced grade control near the upstream portion of the alluvial channel. An effective slope of 0.5 percent will be achieved through evenly spaced grade control where the alluvial channel parallels the range.

CM 9. **Temporary Erosion Control Measures**. Temporary erosion control measures will consist of bonded fiber matrix with local native hydroseed, in accordance with an approved Revegetation Plan (see CM-6). All disturbed slopes will require the application of a bonded fiber matrix with a native hydroseed mixture. Any disturbed portion of the project area left unattended for more than 14 days will be covered to prevent erosion during construction. When hydroseed cannot be established in advance of forecasted rain, another equally effective erosion control method (e.g., coir erosion blanket) will be applied in accordance with the General Construction Permit obtained from the State Water Resources Control Board and installed to manufacturer’s specifications. Photodegradable double-nylon straw blankets will not be used. All erosion control materials will be weed-free.

CM 10. **Temporary Sediment Control Measures**. A Storm Water Pollution Prevention Plan will be prepared and will incorporate Best Management Practices (BMPs), such as fiber roll and/or silt fence perimeter protection, fiber roll slope protection, gravel bag, check dam protection, and a minimum of one stabilized construction entrance. Erosion and sediment control devices used for the proposed project, including fiber rolls, will be made from biodegradable materials such as jute, with no plastic mesh, to avoid creating a wildlife entanglement hazard. A proposed basin, located adjacent to the access road that leads up to the firing range, will serve as a sediment basin during construction activities.

CM 11. **Construction, Operation, and Maintenance of an Onsite Drainage System**. A drainage system will be constructed at the facility to minimize impacts to water resources. The system will be designed and located to provide onsite stormwater retardation of runoff flows, trap eroded soils, and filter out surface water contaminants. The drainage system will implement Low Impact Development (LID)[2] in accordance with the Energy Independence and Security Act (2007) and official USMC, Department of the Navy, and Department of Defense LID policies. The system will include various stormwater management features, which may include, but are not limited to, vegetated swale(s), an alluvial channel, and bio-retention basins. The bio-retention basins will be of sufficient size to manage anticipated water flows and volumes. A Maintenance Plan for the onsite drainage system will be prepared by the project design contractor and approved by MCBCP before the start of construction.

This plan will include measures to address the following maintenance issues:

a. Management of trash, debris, and excessive sediment.

b. Vegetation trimming to maintain a clear flow path.

c. Visual inspection of conveyances before and after storm events to be sure the systems are clear of trash, sediment, and debris.

d. Hydro-jetting, as necessary, to clear blocked storm drain pipes or culverts.

e. Clearing riprap areas of sediment. Clearing activities include removing the riprap, clearing excessive sediment and debris, checking filter fabric, and placing riprap back as it was designed.

f. Removal and replacement of the engineered media in the bio-retention areas to remove clogging from fine sediment.

[2] LID is an approach to managing stormwater through engineering and planning in a manner that replicates natural processes such as infiltration, filtration, and storage of stormwater.

CM 12. **Armoring of Bridge Piers, Abutments, and Embankments to Prevent Scour**. Recommendations provided in the Draft Hydraulics and Scour Report (RBF 2013) will be adhered to during access road/bridge final design and construction to prevent scour adjacent to piers and embankments, if required. Scour mitigation could include placement of riprap, sheet piles, and other scour-resistant materials, and/or implementation of other structural scour countermeasures.

CM 13. **Stockpile Containment**. Stockpiles of soil will be properly contained and covered to eliminate or reduce sediment transport from the site to streets, drainage facilities, or adjoining properties via runoff, vehicles, tracking, or dispersal by wind and to minimize impacts to water quality and arroyo toads.

CM 14. **Onsite Equipment and Vehicle Washing.** Runoff from onsite equipment and vehicle washing will be contained at the construction site and will not be discharged to receiving waters or the local storm drain system.

CM 15. **Onsite Equipment Fueling.** Fueling of equipment will not occur within 100 feet of any drainage or creek and will be allowed only in designated areas.

CM 16. **Dust Control.** Impacts from fugitive dust will be avoided and minimized through watering and other appropriate BMPs.

CM 17. **Fire Prevention**. To ensure fire does not commence due to project activities, construction trucks will carry water and shovels or fire extinguishers in the field. Shields, protective mats, or other fire prevention equipment will be used during grinding and welding, and vehicles will not be driven or parked in areas where catalytic converters could ignite dry vegetation. No smoking or disposal of cigarette butts will take place within vegetated areas.

CM 18. **Contractor education program.** A contractor education program will be conducted by the biological monitor with oversight by Environmental Security personnel. It will be conducted during all project phases and will cover the potential presence of listed species; the requirements and boundaries of the project; the importance of complying with avoidance, minimization, and compensation measures; and problem reporting and resolution methods.

CM 19. **Exotic Plant Species Control**. All equipment and/or vehicles will be power-washed before entering MCBCP property and the project area. While washing wheeled vehicles, the front wheels will be turned lock-to-lock to allow for exposure of surfaces that may hold weed seeds. This is to control the spread of invasive (non-native) weeds and is in support of Executive Order 13112, National Invasive Species Act, Federal Noxious Weed Act, the Noxious Plant Control Act, and Marine Corps Order P5090.2A, 11200.7 that requires installations to restrict the introduction of exotic species into natural ecosystems.

CM 20. **Investigative Measures**. MCBCP Environmental Security will be notified at least 15 days in advance of ground-disturbing activities associated with investigative activities (e.g., geotechnical borings, potholing), with MCBCP Environmental Security authorization required prior to these activities. All impacts associated with these surveys will remain within the project footprint described in this biological opinion and the Biological Assessment (USMC 2015). A biological monitor will be present during investigative surveys and will work with the geotechnical crews to avoid and minimize impacts to natural resources to the maximum extent practicable. Due to the limited scope and short duration of investigations, neither arroyo toad fencing nor species-specific surveys will be implemented.

Species-Specific Impact Avoidance, Minimization, and Other Conservation Measures

In addition to locating the proposed action in previously disturbed areas, such as roads and graded and paved areas, and the incorporation of the above-mentioned general avoidance and minimization measures, the proposed action incorporates a number of species-specific measures to ensure the avoidance of take and minimization of environmental impacts to listed species. These conservation measures are described below and will be required of the Construction Contractor.

Arroyo Toad

CM 21. **Biological monitor**. A biological monitor[3] familiar with the arroyo toad will be responsible for overseeing construction to ensure compliance with the conservation measures and for preventing unanticipated impacts to federally listed species. The biological monitor will be on site during vegetation removal, pre-project flagging, and other construction activities with the potential to impact arroyo toad. The biological monitor will be empowered to halt work activity to avoid impacts to arroyo toad, if necessary. Before commencement of the proposed project, the project proponent will submit the resume from the biologist to MCBCP Environmental Security for review and approval.

CM 22. **Nighttime construction**. Nighttime construction is not anticipated as a requirement of the proposed project. However, if night work and lighting is required, a biological monitor will be required for the duration of any nighttime construction activities. In addition, any proposed work at night will require nighttime-specific measures approved by MCBCP Environmental Security, and in compliance with the Riparian BO.

CM 23. **Fencing for range construction**. For range improvements and construction, arroyo toad exclusionary fencing will be installed along the range side of San Mateo Creek at least 2 weeks before construction and will be monitored by the biological monitor for

[3] The designated biological monitor for this measure will have at least 2 years and 30 hours of documented experience with location and observation of arroyo toads and a minimum of 20 hours of field experience involving capture and handling of arroyo toads.

arroyo toad for the entire construction period within the arroyo toad activity period (1 February – 30 September). Where movement of arroyo toads into the construction area is possible, a toad flap or other approved device will be installed at access points to prevent movement of arroyo toads into the enclosed area. Toad flaps will be inspected by the biological monitor every morning for arroyo toads. The linear extent and location of fencing necessary to reasonably limit access to the range and impacts to arroyo toads will be determined by the biological monitor and MCBCP Environmental Security.

CM 24. **Fencing for bridge construction**. For bridge construction, temporary silt fencing will be installed at least 2 weeks before construction activities around the perimeter of work areas including laydown areas, to the maximum extent feasible, and will remain in place for the duration of bridge construction. Where construction will occur in the creek, design of the exclusionary fencing will be developed by the biological monitor and MCBCP Environmental Security to exclude arroyo toads from entering work areas, to the maximum extent feasible.

CM 25. **Fencing design**. Fencing will extend below ground to a depth of about 6 inches to prevent arroyo toads from burrowing beneath the fence. If it is not possible to extend fencing below ground, sand bags will be placed over the bottom lip of the fence to hold it in place. Fencing will be removed immediately after work is completed.

CM 26. **Pre-construction surveys**. Before construction activities within the project footprint for the bridge, but after exclusionary fencing has been installed, at least 2 nights of surveys for arroyo toads will be conducted within the fenced areas by the biological monitor. The total number of surveys necessary will be determined based on the findings from the minimum 2 nights of surveys. These surveys will be conducted during appropriate climatic conditions and during the appropriate time of day or night to maximize the likelihood of encountering arroyo toads.

CM 27. **Artificial watering**. If the project biological monitor, in coordination with the MCBCP Environmental Security, believes artificial watering is warranted of all or a portion of the site to illicit a response from arroyo toads, such efforts will be enacted. This generally is done when climatic conditions are not appropriate for arroyo toad movement during clearance surveys and is done during nights (i.e., at least 1 hour after sunset) with temperatures above 50 degrees Fahrenheit, by spraying the project area with water to simulate a rain event.

CM 28. **Translocation**. If arroyo toads are found within the project site, they will be captured and translocated by the biological monitor to the closest area of suitable habitat along San Mateo Creek. The date, time of capture, specific location of capture (using GPS), approximate size, age, and health of the individual will be recorded. Immediately following removal and translocation, the biological monitor will notify Environmental Security personnel. Within 2 weeks of the translocation, Environmental Security will provide the Service with the above information.

CM 29. **Monitoring by biological monitor**. After the initiation of construction, the biological monitor will be present each morning before construction activities begin and during removal of excavation unit covers and soil stockpile tarps. The biological monitor will check the integrity of the arroyo toad fence and locate and remove any arroyo toads that may have entered the area.

The biological monitor will be present at the end of the day to ensure that the excavations are properly covered to prevent arroyo toads from entering any open pits and to check the integrity of the arroyo toad fence. The biological monitor will be on call and available as needed at other times in the event that an arroyo toad is encountered during the activities. The biological monitor will be present on site full-time for the 3 days following any measurable rainfall event (i.e., 0.05 inch or greater) or other appropriate climatic conditions (e.g., high relative humidity and moderate temperatures) that are likely to elicit above-ground arroyo toad movement.

The biological monitor will be present during any maintenance activities at the bridge or range in arroyo toad habitat (riparian and upland areas) that require ground disturbing activities such as, but not limited to, removal of sediment behind the check dams within the diversions or detention basins, cleaning of culverts/piers, minor repairs of eroded, undermined, or scoured areas, and replacement of jute netting. An annual post-maintenance report will be submitted to the CFWO summarizing maintenance activities and documenting any arroyo toads killed, encountered, or relocated from within the bridge and range areas during maintenance activities.

CM 30. **Reporting to MCBCP Environmental Security**. The biological monitor will contact MCBCP Environmental Security regarding any arroyo toad sighting within the project area and will immediately notify Environmental Security personnel regarding any incidental excavation, injury, or death of arroyo toads in association with project activities. In the event of excavation, injury, or death, the date, time of incident, specific location of incident (using GPS), approximate size, age, and health of the individual will be recorded, and Environmental Security will provide the Service with this information within 72 hours of the incident occurring.

CM 31. **Site access**. Access to project construction sites will occur via the temporary access road. Project-related vehicle travel will be limited, to the extent practicable, to daylight hours, as arroyo toad movement across roadways occurs primarily during night-time hours, and ingress and egress of construction equipment and personnel will be kept to a minimum. Dirt/sand piles left overnight will be covered with tarps or plastic sheeting with the edges sealed with sandbags, bricks, or boards to prevent arroyo toads from burrowing into the dirt. Holes or trenches will be covered with material such as plywood or solid metal plates with the edges sealed with sandbags, bricks, or boards to prevent arroyo toads from falling into holes or trenches. All holes and trenches within potential arroyo toad habitat will be inspected each morning by the biological monitor.

CM 32. **Trash storage and removal**. The project area will be kept as clean as possible to avoid attracting arroyo toad predators or small insects (i.e., arroyo toad prey items). All food-related trash will be placed in sealed bins or removed from the site regularly.

CM 33. **Dust Control**. Dust control measures (i.e., water truck spraying) will be conducted in a manner that does not attract arroyo toads into the project activity areas (e.g., avoid over-spraying of water; near occupied habitat, spraying will occur only when an arroyo toad exclusion fence has been installed).

CM 34. **Offset riparian impacts**. All impacts to riparian habitat, regardless of listed species presence, will be offset in accordance with the Riparian BO. Compensation is not additive for individual impacts to habitat occupied by arroyo toad, vireo, and flycatcher, as some areas may be occupied by more than one species. Compensation is based on the total amount of riparian habitat impacted.

CM 35. **Restoration of Arroyo Toad Upland Aestivation Habitat**. Permanent impacts to occupied arroyo toad upland aestivation habitat (all habitats within the 82-foot relative contour from occupied riparian habitat or within 4,921 feet from the channel if the 82-foot elevation limit has not yet been reached at that point) will be offset by restoring riparian habitat that has been invaded by non-native plant species on MCBCP at a ratio of 0.5:1 (restored:impacted). The permanent loss of an estimated 1.50 acre of arroyo toad upland aestivation habitat will be offset by compensation/restoration of riparian habitat following the Riparian BO. Alternatively, upland habitat on MCBCP that is mutually agreed to by MCBCP Environmental Security and the Service could be restored at a ratio of 2:1.

Thread-leaved Brodiaea

CM 36. **Removal of thread-leaved brodiaea populations**. Boundaries of sensitive plant communities located in the vicinity of Range 314C were mapped in support of the project and identified in a Rare Plant Report [Science Applications International Corporation (SAIC) 2007]. One occurrence of thread-leaved brodiaea (represented by 0.05 acre and 26 flowering individuals that survey year) was mapped on the north edge of Range 314C. To avoid effects to the species, the known occurrence will be specified on construction plans. As determined necessary by MCBCP Environmental Security or the biological monitor, and in coordination with the Range Safety Officer, populations will be clearly marked in the field with markers or exclusion fencing. Known populations and restricted areas will be monitored by the biological monitor (familiar with the ecology and appearance of thread-leaved brodiaea) during construction phases, as determined necessary by MCBCP Environmental Security. Avoidance within 200 feet of known thread-leaved brodiaea locations will occur to the maximum extent feasible. Where avoidance is not feasible, MCBCP will compensate for the permanent loss of about 0.05 acre of occupied thread-leaved brodiaea at a 2:1 ratio at the Lima thread-leaved brodiaea Mitigation Area at MCBCP. Any reduction of impacts to thread-leaved brodiaea-occupied grassland achieved as a

result of further minimizing the project footprint will proportionately reduce the amount of restoration implemented.

Action Area

According to 50 CFR § 402.02 pursuant to section 7 of the Act, the "action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. Subsequent analyses of the environmental baseline, effects of the action, and levels of incidental take are based upon the action area. The action area for the P-637 project is being amended to include the entire modified P-637 footprint as discussed in the Final Biological Assessment (USMC 2015).

STATUS OF THE SPECIES

The status of brodiaea and arroyo toad have been described in recovery plans and recently completed 5-year reviews for each of these species (Service 1999, 2009a, and 2009b). Please refer to these documents for detailed information on the life history requirements of these species, threats to the species, and conservation needs of the species. For convenience, we have included a brief a summary of the status and distribution of these species rangewide and on MCBCP.

Summary of Species' Distribution and Numbers Rangewide and on MCBCP

Arroyo Toad

An estimated 23 populations of arroyo toad are distributed from Monterey County south to Baja California, Mexico (Service 2009a). These populations persist primarily in the headwaters of streams as small, isolated populations. MCBCP supports arroyo toad populations in the Santa Margarita, San Onofre, and San Mateo drainages. These populations are unique in that their breeding habitat extends to the coast, and they are robust populations that are geographically close to one another and connected by undeveloped open space (Service 1999). A recent review of the status of the arroyo toad (Service 2015) determined that although conservation efforts are being implemented in most populations to help manage and reduce impacts to arroyo toads from threats, the species has not yet responded to an extent that would allow a change in listing status.

Thread-leaved Brodiaea

Brodiaea is known to occur within 68 extant (or presumed extant) locations within cismontane Los Angeles, San Bernardino, Riverside, Orange, and San Diego counties (Service 2009b). Although we are not aware of any methodology to accurately estimate the overall abundance of brodiaea across its entire range, a minimum estimate based on all information available since its listing in 1998 indicate that several million brodiaea individuals are distributed across the 68 identified locations (Service 2009b). There are 22 general locations containing brodiaea on MCBCP with at least 16,957 individual brodiaea within 5,405 acres [Regional Environmental Consultants (RECON) 2007]. At least 8,340 acres on MCBCP have a high potential to support brodiaea (RECON 2007). A recent review of the status of brodiaea (Service 2009b) determined

that the distribution of and threats to brodiaea have not changed since the original listing; based on this determination, the Service has recommended that the threatened listing status of brodiaea not be changed.

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR § 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation, and the impacts of State and private actions that are contemporaneous with the consultation in progress.

As discussed in the amended biological opinion, the original P-637 project footprint is in upland habitat adjacent to San Mateo Creek, which is known to support a robust population of arroyo toads, although little arroyo toad breeding has been documented within San Mateo Creek within the past 4 years due to drought (Brehme 2015). This amendment addresses the revised footprint for the construction and operation of a live-fire Infantry Squad Battle Range with targets, supporting facilities, and utilities, on an approximately 116-acre site at the existing Range 314C multipurpose training facility (Figure 3). In addition, the proposed action includes construction of a new access road and bridge crossing San Mateo Creek to provide year-round, all-weather access to Range 314C (Figure 4).

The P-637 project footprint supports seven plant communities: valley needlegrass grasslands, Diegan coastal sage scrub, coast live oak woodlands, southern riparian woodland, alluvial fan scrub, non-native grasslands, and developed and disturbed. Figure 5 depicts plant communities identified within the project area, and Table 1 provides acreages of each plant community.

Arroyo toads use both upland and riparian habitat for dispersal and foraging. Brodiaea was found along the northern boundary of Range 314C (Figure 6). Table 2 quantifies potential impacts to arroyo toads and brodiaea.

Table 1. Plant Communities Potentially Removed

Plant Community	*Habitat Available in the Project Area (acre)*	*Permanent Removal for Upgraded Range (acre)*	*Temporary Removal in Cut, Fill, Slopes, and Laydown Areas (acre)*	*Permanent Removal for Bridge and Access Road (acre)*	*Temporary Removal for Bridge and Access Road Laydown Areas (acre)*
Valley Needlegrass Grasslands	10.80	3.07	4.67	-	-
Diegan Coastal Sage Scrub	70.50	12.34	19.12	0.18	1.36
Coast Live Oak Woodlands	8.60	1.11	2.41	0.30	0.65
Southern Riparian Woodlands	3.30	-	-	0.28	0.58
Alluvial Fan Scrub*	1.30	-	-	-	0.38
Non-native Grasslands	11.70	2.58	3.65	0.12	1.13
Non-vegetated Channels or Floodplains*	0.50	-	-	-	0.17
Disturbed	2.10	1.35	0.63	0.10	-
Developed	6.90	0.29	0.23	1.11	0.45
Total	**115.90**	**20.74**	**30.71**	**2.09**	**4.72**

Notes: Estimates based on project design data provided by RBF (September 2014).
* Project will result in a net increase of 0.05 acre of non-vegetated channel habitat and 0.14 acre of alluvial fan scrub following removal of the existing low-flow crossing and restoration.

Table 2. Summary of Impacts to Habitat for Arroyo Toad and Brodiaea

Species	**Thread-leaved Brodiaea**	**Arroyo Toad**			
	Permanent (acre)	**Permanent (acre)**	**Temporary (acre)**	**Total (acre)**	**Restored* (acre)**
Riparian habitats	--	0.28	1.10	1.38	0.19
Upland habitats	0.05	1.50	5.99	7.49	--
TOTAL	0.05	1.78	7.09	8.87	0.19

* Project will result a net increase of 0.05 acre of non-vegetated channel habitat and 0.14 acre of alluvial fan scrub following removal of the existing low-flow crossing and restoration.

Arroyo Toad

Arroyo toads populate three of MCBCP's major watersheds: 1) Santa Margarita, 2) San Onofre, and 3) San Mateo. These watersheds support the only known remaining coastal populations of the arroyo toad in the United States. Basewide surveys from 1996 recorded arroyo toads within the streambed of San Mateo Creek at various locations within the project area (MCBCP GIS Data 2012 and 2014). In addition, recent surveys conducted by Brehme *et al*. (2012) documented arroyo toads in the project vicinity.

Arroyo toads occur in the channel, as well as in uplands on the western bank of San Mateo Creek (Figure 6). Arroyo toads may use upper floodplain terraces, as well as non-riparian uplands throughout the project area for dispersal and aestivation. For the purpose of this consultation, occupied upland aestivation habitat includes native and non-native communities (not including developed or highly disturbed) within the 82-foot elevational contour from breeding habitat. Due to the compacted soils in the area, existing use of the area for heavy equipment training, and the lack of suitable burrowing habitat, the arroyo toads are not expected to occur within existing facilities in the project area. Arroyo toads have been documented as far as 0.7 mile from the nearest arroyo toad breeding habitat, but the majority of occurrences are within 1,640 feet (Holland and Sisk 2001). Arroyo toad presence was determined using basewide data, and no project-specific surveys were conducted for the arroyo toad.

The P-637 project is located within the San Mateo Creek watershed on MCBCP, which contains known breeding habitat and upland habitats for foraging, burrowing, and dispersal. We estimate that the P-637 project will impact a total of 8.87 acres of arroyo toad-occupied habitat (permanent and temporary), including 1.38 acres of riparian habitat and 7.49 acres of upland habitat (Table 2).

We used the same methodology to calculate the estimated number of arroyo toads in the construction footprint that we used in the biological opinion for the Basewide Utilities Infrastructure (BUI)(FWS-MCBCP-10B0201-10F0410) project and the amended biological opinion for the P-637 project. This approach uses data from an extensive pitfall trapping study that attempted to determine arroyo toad distribution in the upland and riparian environment on MCBCP (Holland and Sisk 2001).

Based on the estimated density of arroyo toads in the riparian environment near San Mateo creek of 21 arroyo toads/acre, we estimate there are about 29 arroyo toads (1.38 acres x 21 toads/acre) in riparian habitat in the modified P-637 project footprint. Based on the estimated density of arroyo toads in upland habitat near San Mateo Creek of 0.47 arroyo toad/acre, we estimate that there are about 4 arroyo toads in upland habitat in the modified P-637 project footprint. Thus, we estimate that there are a total of about 33 arroyo toads within the estimated impact area.

Thread-Leaved Brodiaea

At this time, 337 populations of thread-leaved brodiaea have been mapped on MCBCP (USMC 2015). In 2007, one occurrence (total of 26 flowering individuals) of thread-leaved brodiaea was found within the project area on the northern boundary of Range 314C within native grassland (Figure 6)(SAIC 2007). An additional survey in 2011 focusing on the access road/bridge area did not identify any flowering thread-leaved brodiaea (ICF 2012).

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species, together with the effects of other activities that are interrelated and interdependent with that action, which will be added to the environmental baseline. Interrelated actions are those that are part of a larger

action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action, are later in time, and still reasonably certain to occur.

Arroyo Toad

Habitat Loss and Construction-Related Death and Injury

Any arroyo toads in the project footprint at the beginning of project construction are likely to be killed or injured as a result of being crushed during earth-disturbing activities, such as geotechnical investigations, trenching, grading, placement of project fencing, and use of heavy equipment. Based on the analysis provided in the Environmental Baseline section, we estimate that about 33 arroyo toads are present within the habitats that will be impacted by the P-637 project. However, as described below, we anticipate that avoidance and minimization measures will substantially reduce the number of arroyo toads that are killed or injured.

Access to the site will be via the temporary access road and project-related vehicle travel will be limited to daylight hours to minimize the potential for unanticipated impacts to arroyo toads and their habitat. For range improvements and construction, arroyo toad exclusionary fencing will be installed along the range side of San Mateo Creek at least 2 weeks before construction and will be monitored by the biological monitor for the entire construction period. For bridge construction, temporary silt fencing will be installed around the perimeter of work areas, including laydown areas, at least 2 weeks before construction activities. Arroyo toads found in the project footprint by the biological monitor will be captured and released into the nearest suitable habitat along San Mateo Creek. As described in the Conservation Measures of this biological opinion, if there is no natural rainfall during the removal period, the biological monitor may water the areas that will be impacted to cause arroyo toads in the project footprint to surface. Dust control measures will be conducted in a manner that does not attract arroyo toads into the project activity areas. We anticipate that implementation of these measures will prevent a substantial portion of the arroyo toads in the project footprint from being killed or injured, but some individuals are likely to escape detection and be killed or injured by construction activities.

We have little data on the proportion of arroyo toads that will captured during pre-project trapping; a pitfall trapping study of arroyo toads on MCBCP documented few adults and subadults during the period from August through December, when there is generally little precipitation, but noted that the only times that arroyo toads were captured during this interval was when there were rainfall events (Holland and Sisk 2001). With natural rainfall and/or repeated watering, we believe it is likely a majority of arroyo toads (roughly 50 to 75 percent or up to 25 arroyo toads) in the impact area will surface and be relocated. However, arroyo toads could be killed, injured, or stressed if they become entangled or trapped within exclusionary fencing or during capture and relocation efforts. Fence placement and trapping and relocation efforts will be conducted by individuals familiar with arroyo toad biology and ecology, whose qualifications will be subject to review by the Service. Therefore, based on our best professional judgment, we anticipate that very few arroyo toads (i.e., no more than 1) will be killed or injured during capture and relocation efforts.

If 75 percent of the estimated 33 arroyo toads in the project footprint are successfully removed, an estimated 8 arroyo toads within the impact area could still be impacted. We assume that all arroyo toads remaining in the impact area will be killed or injured, but because these individuals are likely to be aestivating and will be crushed by heavy equipment, few, if any, will be seen. We estimate that no more than 1 arroyo toad (10 percent of the estimated remaining individuals) will be observed killed or injured during project monitoring.

Similar measures were implemented successfully during the construction of the Rincon Harrah's Casino in 2001. About 144 arroyo toads were removed from the casino footprint prior to construction. Of the 144 toads removed, 50 were implanted with Passive Integrated Transponders (PIT tags) and translocated to adjacent, suitable habitat on the Rincon Reservation. Follow-up surveys conducted in 2006 (5 years post-translocation) located 3 of the PIT-tagged toads (6 percent of the total number of marked toads) within the vicinity of the translocation site. Because few toads survive past 5 years in the wild, it is possible that many of the PIT-tagged toads died prior to the 2006 follow-up surveys. However, the 2006 identification of 3 of the PIT-tagged arroyo toads shows that some proportion of the marked toads were able to survive the pre-construction relocation efforts, thereby minimizing project-related impacts to arroyo toads.

About 0.28 acre of arroyo toad-occupied riparian habitat and 1.50 acres of arroyo toad-occupied upland habitat will be permanently removed by the P-637 project. Additionally, about 1.10 acres of arroyo toad-occupied riparian habitat and 5.99 acres of arroyo toad-occupied upland habitat will be temporarily impacted by the P-637 project. The temporarily impacted habitat will be restored upon project completion, and because arroyo toads are not dependent on mature vegetation in either the riparian or upland environment, we expect temporarily impacted areas to be re-occupied shortly following project completion. In addition, the removal of the temporary access road and the existing low-flow crossing (to be replaced by the proposed bridge) will include restoration of 0.05 acre of non-vegetated channel habitat and 0.14 acre of alluvial fan scrub habitat resulting in a net permanent impact to riparian habitat occupied by arroyo toads of 0.09 acre.

The project will result in the incremental loss of riparian and upland habitat along San Mateo Creek. Although the total amount of upland and riparian habitat remaining along San Mateo Creek has not been quantified, the great majority of upland and riparian habitat along San Mateo Creek will remain undeveloped despite the project impacts, and sufficient habitat will remain to support essential breeding, feeding, and sheltering for the arroyo toads in San Mateo Creek. Thus, despite the effects of the recent drought, we anticipate that impacts to an estimated 33 arroyo toads, including the potential death or injury of 9 individuals (8 in the project footprint and 1 as a result of capture and relocation), will not result in an appreciable reduction in the numbers, reproduction, or distribution of arroyo toads in San Mateo Creek or rangewide.

Permanent impacts to 0.28 acre of riparian habitat will be offset as specified in the Riparian BO (i.e., through restoration of native riparian vegetation on MCBCP), and the permanent loss of 1.50 acres of upland arroyo toad habitat will be offset by restoration of 0.75 acre of riparian vegetation or by restoring 3.0 acres of upland habitat on MCBCP that is mutually agreed to by MCBCP Environmental Security and the Service. Less riparian restoration is proposed relative to

upland restoration because riparian habitat serves as arroyo toad breeding habitat and provides a greater benefit to arroyo toads.

Both of these potential conservation actions (restoration of riparian and upland habitat) will benefit the arroyo toad because restoration of riparian habitat has substantially increased the amount and quality of arroyo toad breeding habitat on MCBCP, and upland habitat restoration will increase the available habitat for arroyo toad foraging and aestivation. Because we do not know the precise location of the proposed restoration or whether it will involve restoration of upland or riparian habitat, it is possible that the affected population will experience a small net reduction in the amount of available upland habitat. However, the loss will be small in relation to the overall amount of upland habitat available, and the proposed restoration will result in either a net increase in the amount and quality of upland habitat available on MCBCP as a whole or will increase the amount and quality of arroyo toad breeding habitat on MCBCP.

Habitat Restoration

Potential effects to arroyo toad associated with restoration of riparian vegetation are addressed programmatically by the Riparian BO. Potential effects to arroyo toad associated with restoration of upland habitat include occasional displacement or disturbance of foraging and aestivating arroyo toads. Workers could crush aestivating arroyo toads as they walk through the upland habitat. However, based on the relatively low density of arroyo toads in the upland environment, the likelihood of this occurring is discountable.

Hydrology

The project includes the construction of a bridge spanning San Mateo Creek, which will replace an existing at-grade crossing (i.e., Arizona crossing). The bridge will be 560 feet wide and will extend from bank to bank of San Mateo Creek, so it is unlikely to constrain flows under the great majority of hydrological conditions. In addition, creation of a bridge will remove a source of disturbance to arroyo toads and their habitat (e.g., crushing of individuals, downstream siltation) that are likely resulting from ongoing use and periodic repair of the at-grade crossing.

Erosion and Water Quality

Changes to water quality in adjacent arroyo toad breeding habitat could result due to construction-related sedimentation and pollution. Changes in sedimentation dynamics can reduce the suitability of arroyo toad habitat. Siltation can asphyxiate eggs and larvae (Service 1999). Changes to the water quality (temperature and chemical composition) can lead to reduced oxygen uptake, reduced feeding, and a general decline in species health, which can lead to disease, decreased growth and reproduction, or death.

To minimize the potential for water quality impacts to San Mateo Creek from the proposed P-637 project, measures will be implemented to prevent construction-related siltation and runoff from entering San Mateo Creek. Permanent erosion control measures will be applied in the form of riprap energy dissipaters at all proposed channel discharge locations and the alluvial channel

will be lined with high performance turf reinforcement matting (which is pervious and allows vegetation to grow) and vegetated with native grasses and trees. Temporary erosion control measures such as silt fencing, sand bags, and straw matting will be installed during all phases of construction activities. These BMPs will avoid and minimize soil erosion, sedimentation, run-off pollutants, and material and waste management, reducing potential for degradation of the adjacent breeding habitat. A drainage system will be constructed to minimize impacts to water resources. The system will be designed and located to provide onsite stormwater retardation of runoff flows, trap eroded soils, and filter out surface water contaminants. With the proposed measures in place, we anticipate that effects to erosion and water quality will be reduced to the point where they are insignificant.

Lighting

Increased ambient lighting levels can increase predation risks and disrupt normal behaviors of arroyo toads in adjacent breeding, foraging, burrowing, and dispersal habitat. Construction activities within arroyo toad-occupied habitat will not occur at night, thus eliminating adverse effects from construction-related lighting impacts to arroyo toads, which are active at night. Lighting for the new facilities will be shielded and directed away from adjacent natural areas. These actions will minimize the impact of lighting on arroyo toad behavior in adjacent habitat, and we anticipate that arroyo toad habitat that is currently occupied will continue to be used by arroyo toads. Therefore, potential effects to arroyo toads resulting from light are likely to be insignificant.

Effect on Recovery

The primary goal described in the arroyo toad recovery plan (Service 1999) is the protection of existing populations; a secondary goal includes the restoration and management of habitat. The project will impact arroyo toads and their habitat. Implementation of the proposed conservation measures will avoid and minimize project-related impacts, and unavoidable impacts will be offset through habitat restoration. Most of the project-related impacts to arroyo toad habitat will be temporary. Because arroyo toads are not dependent on mature vegetation in either the riparian or upland environment, the affected habitat will immediately be available to these animals once the project is completed, and we expect temporarily impacted areas to be re-occupied shortly following project completion.

Additionally, because the majority of arroyo toads in the project footprint will be relocated nearby, we anticipate that individuals removed from the population as a result of the P-637 project will likely be replaced by breeding in subsequent years. Therefore, the project is not anticipated to increase the risk of extirpation of the affected population on MCBCP.

The Marine Corps will offset permanent impacts to arroyo toad habitat through restoration of breeding habitat or possibly upland habitat, which will help sustain the robust populations of arroyo toads on MCBCP in overall support of recovery for this species. Therefore, with the implementation of the proposed conservation measures, we conclude that the P-637 project will not impede recovery of the arroyo toad.

Thread-Leaved Brodiaea

Habitat Loss and Destruction of Plants

In 2007, one occurrence of brodiaea (0.05 acre of habitat[4] and 26 flowering individuals) was identified within the P-637 project area on the northern boundary of Range 314C within native grassland (Figure 5)(SAIC 2007). An additional survey of the access road/bridge area in 2011 did not identify any flowering thread-leaved brodiaea (ICF 2012a). Construction disturbance on graded slopes may include some of the occupied thread-leaved brodiaea habitat. Direct impacts from grading or fill could include loss of 0.05 acre of occupied habitat and associated individuals, and any individuals not removed by construction could be impacted by dust generation, erosion, and redirection of water flows. The biological monitor, in coordination with the Range Safety Officer, will mark the population with markers or exclusion fencing and will monitor the population and buffer during construction. Avoidance within 200 feet of the known thread-leaved brodiaea population will occur to the maximum extent feasible, but because avoidance cannot be ensured, this analysis assumes that construction activities will result in the destruction of this occurrence. The small area of occupied brodiaea habitat is less than 0.001 percent of the 5,405 acres of occupied brodiaea habitat known to occur on MCBCP.

The Marine Corps will offset the permanent loss of about 0.05 acre of occupied brodiaea habitat through restoration of 0.10 acre of occupied thread-leaved brodiaea habitat at the Lima thread-leaved brodiaea Mitigation Area at MCBCP. Degradation of habitat by non-native invasive plants (i.e., through competition and other factors) has been identified as one of the primary threats to brodiaea recovery (Service 2009a). In particular, sweet fennel (*Foeniculum vulgare*) is a widespread invasive plant on MCBCP that may be reducing brodiaea survival and reproductive success through resource competition and habitat alteration (Tierra Data Systems 2000). Although there will be a small net loss of occupied brodiaea habitat on MCBCP in association with the P-637 project, the proposed habitat enhancement has the potential to improve degraded brodiaea habitat and improve the long-term survival (and possibly population expansion) of brodiaea within enhanced locations.

We do not expect this relatively small loss of occupied brodiaea habitat and individuals (i.e., less than 0.001 percent of that known on MCBCP) associated with the P-637 project to reduce the long-term survival of brodiaea populations on MCBCP or appreciably reduce the number of individuals, reproduction, or distribution of brodiaea on MCBCP or across its entire range.

Restoration

The Marine Corps will offset the permanent loss of about 0.05 acre of occupied brodiaea habitat through enhancement (e.g., through the reduction of non-native invasive plants) of 0.10 acre of occupied brodiaea habitat at the Lima Thread-leaved Brodiaea Mitigation Area on MCBCP. The enhancement could have minor effects on individual brodiaea (e.g., as a result of trampling), but over all this enhancement is likely to improve habitat quality and brodiaea survival in those

[4] Occupied brodiaea habitat is defined as all habitat within 7 meters (23 feet) of observed individuals.

enhanced locations by locally reducing one of the primary threats to brodiaea recovery, which is resource competition and habitat alteration caused by non-native invasive plant species (Service 2009a). As a result of enhancement actions, the treated brodiaea population is likely to have healthier corms that are likely to live longer, flower more regularly and vigorously, and reproduce more successfully.

Effect on Recovery

We do not anticipate that the loss of less than 0.001 percent of the occupied thread-leaved brodiaea habitat on MCBCP will impede recovery of the species, and the impacts will be offset through the proposed restoration.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. We are unaware of any non-Federal actions in the area of the proposed project that may affect the species considered in this biological opinion.

CONCLUSION

After reviewing the current status of the arroyo toad and thread-leaved brodiaea, the environmental baseline for the action area, effects of the proposed action, and the cumulative effects, it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of arroyo toad and brodiaea. We reached these conclusions by considering the following:

All Species

1. Adverse effects to all federally listed species will be reduced by implementation of the general and species-specific avoidance and minimization measures identified in the "Project Description" of this biological opinion.

Arroyo Toad

1. The permanent loss of 0.28 acre of arroyo toad-occupied riparian habitat (a net permanent loss of 0.09 acre following removal and restoration of the at-grade crossing) and 1.50 acres of arroyo toad-occupied upland habitat represents only a small amount of this type of habitat relative to the thousands of acres of occupied arroyo toad habitat on MCBCP and rangewide.

2. The P-637 project will temporarily impact about 1.10 acre of arroyo toad-occupied riparian habitat and 5.99 acres of arroyo toad-occupied upland habitat. Temporary

impacts will be restored upon project completion and should be suitable for arroyo toads shortly following project completion.

3. The P-637 project will construct a bridge spanning San Mateo Creek, which will replace an existing at-grade crossing. The bridge is unlikely to constrain flows under the great majority of hydrological conditions. In addition, construction of a bridge will remove a source of disturbance to arroyo toads and their habitat (e.g., crushing of individuals, downstream siltation) that are likely resulting from ongoing use and periodic repair of the at-grade crossing.

4. The P-637 project may impact up to 33 arroyo toads, but many of these arroyo toads are anticipated to be removed from the project footprint and are not expected to be killed or injured by construction activities; therefore, we anticipate that no more than 9 arroyo toads will be killed or injured during the P-637 project. In addition, a much larger number of arroyo toads will remain outside the project footprint and will be able to recolonize the project footprint soon after completion of the construction activities. Thus, overall impacts are not expected to have a long-term effect on the species or its habitat on MCBCP or rangewide.

5. Permanent impacts to riparian arroyo toad habitat will be offset as specified in the Riparian BO (i.e., restoration of native riparian vegetation on MCBCP). Actions to enhance riparian breeding habitat for arroyo toads through implementation of the Riparian BO supports recovery of the species.

6. Permanent impacts to upland arroyo toad habitat will be offset by restoring riparian vegetation or by restoring upland habitat for arroyo toads. Selection of either of these actions will support recovery of the arroyo toad.

7. With the proposed conservation measures, the P-637 project will not appreciably reduce the number of individuals, reproduction, or distribution of arroyo toads on MCBCP or across its entire range and will not impede recovery of the species.

Thread-leaved Brodiaea

1. The permanent loss of one occurrence (26 flowering individuals and 0.05 acre of occupied brodiaea habitat) represents only a small portion of the brodiaea populations and habitat at the MCBCP and rangewide.

2. Impacts to occupied brodiaea habitat will be offset through enhancement of 0.10 acre of occupied brodiaea habitat at the Lima Thread-leaved Brodiaea Mitigation Area on MCBCP which will improve the survival of brodiaea within enhanced habitat and support recovery of the species.

3. With the proposed conservation measures, the P-637 project will not appreciably reduce the long-term survival of brodiaea populations on MCBCP or appreciably

reduce the number of individuals, reproduction, or distribution of brodiaea on MCBCP or across its entire range and will not impede recovery of the species.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Harm is further defined by us to include significant habitat modification or degradation that actually kills or injures a listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by us as an action that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and 7(o)(2) of the Act, such incidental take is not considered a prohibited taking under the Act, provided that such taking is in compliance with this incidental take statement.

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of federally listed endangered plants or the malicious damage of such plants on areas under Federal jurisdiction, or the destruction of endangered plants on non-Federal areas in violation of State law or regulation or in the course of any violation of a State criminal trespass law. Thread-leaved brodiaea is listed as endangered under the California Endangered Species Act. This biological opinion does not relieve the need for compliance with any other Federal, State, or local permitting requirement.

The measures described below are non-discretionary and must be implemented by the Marine Corps and its contractors, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Marine Corps has a continuing duty to regulate the activity that is covered by this incidental take statement. If the Marine Corps (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

AMOUNT OR EXTENT OF TAKE

The exact distribution and population size of arroyo toads is difficult to determine due to the dynamic conditions associated with their habitat and biology and because detection of arroyo toads outside of the breeding season is very difficult. Moreover, finding dead or injured arroyo toads within the construction area is unlikely as the individuals may be underground during construction activities, and the species is cryptic making them difficult to recognize or detect.

However, as described in the environmental baseline, we estimate that up to 33 arroyo toads occur within the upland and riparian habitats of the P-637 project. We anticipate that all 33 toads

will be subject to some form of take from loss of their foraging and breeding habitats, during construction activities, or through the capture and relocation efforts.

We estimate that during natural rainfall events or supplemental watering, about 50 to 75 percent of the arroyo toads will be captured and released to adjacent habitat. However, some animals may be missed and subsequently die as a result of project clearing and grading activities. Some arroyo toads may also be injured or killed as a result of the capture and relocation efforts. Thus, we have established the following incidental take (IT) exemptions for the arroyo toad:

Take of arroyo toad is exempted as follows at the P-637 project site:

IT 1. Capture and release of up to 25 arroyo toads (75 percent of the estimated 33 arroyo toads); the amount or extent of incidental take will be exceeded if more than 25 arroyo toads are captured or observed within the boundaries of the exclusionary fencing.

IT 2. Accidental death or injury of up to 1 arroyo toad as a direct result of exclusionary fencing, capture, and release efforts; the amount or extent of incidental take will be exceeded if more than 1 arroyo toad is killed or injured as a direct result of these activities.

IT 3. Death or injury of up to 8 arroyo toads in association with construction-related activities within 8.87 acres of arroyo toad habitat within the action area (i.e., 1.78 acres of riparian habitat including 0.28 acre of permanent and 1.5 acres of temporary impact and 7.09 acres of upland habitat including 1.10 acres of permanent and 5.99 acres of temporary impact). Because it is likely that few, if any, of these arroyo toads will be observed, the amount or extent of incidental take will be exceeded if more than 1 arroyo toad is observed dead or injured within the construction footprint or if more than the specified amount of habitat is impacted.

If the amount or extent of exempted incidental take is exceeded, it will trigger reinitiation of consultation.

EFFECT OF TAKE

In the accompanying biological opinion, we determined that the level of anticipated take is not likely to result in jeopardy to the arroyo toad.

REASONABLE AND PRUDENT MEASURE

The Marine Corps will implement conservation measures as part of the proposed action to minimize the incidental take of arroyo toad. In addition to these conservation measures, the following reasonable and prudent measures are necessary to monitor and report the effects of the incidental take on arroyo toad:

1. Because the designs for the P-637 project are not yet finalized, the Marine Corps will submit final project designs to the Service prior to project implementation to ensure that impacts have been avoided and minimized to the maximum extent practicable and that anticipated impacts will be consistent with those analyzed in this biological opinion.

2. The Marine Corps will monitor and report on consistency with the exempted amount or extent of take for arroyo toad associated with the proposed action.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the Marine Corps must comply with the following terms and conditions (TC) which implement the reasonable and prudent measures described above.

All Species

TC 1.1 At least 14 days prior to initiation of the P-637 project that will directly impact habitat that supports listed species or has a high potential to support listed species, the Marine Corps will submit to the CFWO a figure showing the impact area of the project based on final project designs relative to the impact area depicted in the BA (USMC 2015). The figure will include vegetation mapping and all federally listed species observations from basewide and project-specific surveys and a table showing the final permanent and temporary impacts by habitat type.

Arroyo Toad

TC 2.1 Prior to initiating the P-637 project, the Marine Corps will provide the results of the pre-construction arroyo toad surveys and capture/relocation efforts to the CFWO.

TC 2.2 For the P-637 project, the Marine Corps will notify the CFWO within 30 days of completing removal of arroyo toad habitat resulting from the project. The purpose of this notification is to ensure that the impacts to arroyo toad habitat from the P-637 project do not exceed the exempted amount or extent of take based on impacts to arroyo toad habitat.

TC 2.3 Within 30 days of completing construction activities at P-637, the Marine Corps will notify the CFWO of any arroyo toads that were captured and translocated during construction activities. This notification will include the number of arroyo toads captured and translocated as a result of the completed P-637 project. If the exempted amount or extent of take for capture and translocation of arroyo toads is reached (i.e., if a cumulative total of 25 arroyo toads are captured and translocated as a result of the P-637 project), the Marine Corps will cease construction activities and notify the CFWO within 1 business day.

TC 2.4 If death or injury of any arroyo toads is observed in association with capture and translocation activities or construction activities, the Marine Corps will notify the CFWO within 1 business day and submit a written report describing the incident within 2 business days so that the activities resulting in take can be reviewed to determine if additional protective measures are required.

DISPOSITION OF SICK, INJURED, OR DEAD SPECIMENS

Upon locating dead, injured, or sick individuals of threatened or endangered species, initial notification must be made to our Division of Law Enforcement in either San Diego, California, at 619-557-5063 or in Torrance, California, at 310-328-6307 within 3 working days. Notification should also be sent by telephone and writing to this office in Carlsbad, California, at 2177 Salk Avenue, Suite 250, Carlsbad, California 92008, 760-431-9440. Written notification must be made within 5 calendar days and include the collection date and time, the location of the animal, and any other pertinent information. Care must be taken in handling sick or injured animals to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible state. The remains of intact specimens will be placed with educational or research institutions holding the appropriate State and Federal permits. Remains will be placed with the San Diego Natural History Museum, San Diego. Arrangements regarding proper disposition of potential museum specimens will be made with the institution by the authorized biologist prior to implementation of the action.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. We have not identified any additional conservation recommendations to further minimize or avoid adverse effects of the proposed action on the arroyo toad or brodiaea.

REINITIATION NOTICE

This concludes formal consultation on the P-637 project as outlined in materials submitted to us. As provided in 50 CFR §402.16 reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; and (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions regarding this consultation, please contact Fish and Wildlife Biologist Janet Stuckrath at 760-431-9440, extension 270.

Sincerely,

for Karen A. Goebel
Assistant Field Supervisor

LITERATURE CITED

Brehme, C., S. Schuster, C. Rochester, S. Hathaway, and R. Fisher. 2006. MCBCP arroyo toad monitoring program: 3-year trend analyses for 2003-2005. U.S. Geological Survey data summary prepared for Marine Corps Base Camp Pendleton. 98 pp.

Brehme, C. S., T. A. Matsuda and R. N. Fisher. 2012. MCBCP arroyo toad monitoring results for 2011. U.S. Geological Survey Western Ecological Research Center. Draft Data Summary prepared for AC/S Environmental Security, Marine Corps Base Camp Pendleton.

Brehme, C. S. 2015. ARTO 2015 Monitoring Update. Preliminary report of arroyo toad monitoring on Marine Corps Base Camp Pendleton. October 22, 2015.

Holland, D. and N. Sisk. 2001. Habitat use and population demographics for the arroyo toad (*Bufo californicus*) on MCB Camp Pendleton, San Diego County, California 1998-2000. Prepared for AC/S Environmental Security, Resource Management Division, Marine Corps Base Camp Pendleton. Contract # M00681-97-C-0034. 32 pp. + append.

ICF. 2012. Final report *Brodiaea filifolia* surveys, P-637 Infantry Squad Battle Course project, Marine Corps Base Camp Pendleton, California. Prepared for Naval Facilities Engineering Command Southwest, San Diego. California. March.

RBF. 2013. Geotechnical report for the P-637 Infantry Squad Defense Range, Range 314. Marine Corps Base Camp Pendleton, Oceanside, California. Prepared September 6. Revised September 20.

[RECON] Regional Environmental Consultants. 2007. Results of 2005 surveys and status of Thread-leaved Brodiaea on MCB Camp Pendleton, San Diego, California. Unpublished report prepared for Environmental Security, Marine Corps Base Camp Pendleton. RECON Number 4100B, May 4, 2007. 38 pp. + Attachments.

[SAIC] Science Applications International Corporation. 2007. Draft rare plant survey and mapping report, P-637 Infantry Squad Battle Course at Marine Corps Base, Camp Pendleton. June.

[Service] U.S. Fish and Wildlife Service. 1995. Biological opinion (1-6-95-F-02), programmatic activities and conservation plans in riparian and estuarine/beach ecosystems on MCB Camp Pendleton. Prepared by USFWS, Carlsbad Field Office. October 30.

[Service] U.S. Fish and Wildlife Service. 1999. Recovery plan for the arroyo southwestern toad (*Bufo microscaphus californicus*). U.S. Fish and Wildlife Service, Portland, Oregon. 119 pp.

[Service] U.S. Fish and Wildlife Service. 2005. Endangered and threatened wildlife and plants; proposed designation of critical habitat for the arroyo toad (*Bufo californicus*); Final Rule. Federal Register 70: 19561-19633. April 13.

[Service] U.S. Fish and Wildlife Service. 2009a. Arroyo Toad (*Bufo californicus* (=*microscaphus*)) 5-year Review: Summary and Evaluation. Prepared by the Ventura Fish and Wildlife Office, Ventura, California. 53 pp.

[Service] U.S. Fish and Wildlife Service. 2009b. *Brodiaea filifolia* 5-year Review: Summary and Evaluation. Prepared by the Carlsbad Fish and Wildlife Office, Carlsbad, California. 46 pp.

[Service] U.S. Fish and Wildlife Service. 2010. Biological Opinion (FWS-MCBCP-10B0201-10F0410) for the basewide utilities infrastructure project, Marine Corps Base Camp Pendleton, San Diego County, California

[Service] U.S. Fish and Wildlife Service. 2015. Endangered and threatened wildlife and plants; withdrawal of proposed rule to reclassify the arroyo toad as threatened. Federal Register 80:79805 -79816.

[USMC] U.S. Marine Corps. 2012. MCB Camp Pendleton integrated natural resources management plan.

[USMC] U.S. Marine Corps. 2015. Final biological assessment for the P-637 infantry squad battle course range, Marine Corps Base Camp Pendleton, California. March.

[USMC] U.S. Marine Corps. 2016. P-637 draft BO comments, electronic messages from Matt Lorne to Janet Stuckrath. February 9 and 10, 2016.

Regional Map

FIGURE 1

I-2

P-637 Infantry Squad Battle Course at MCB Camp Pendleton
Final Biological Assessment

Source: USMC. 2015. Final biological assessment for the P-637 infantry squad battle course range, Marine Corps Base Camp Pendleton, California. March.

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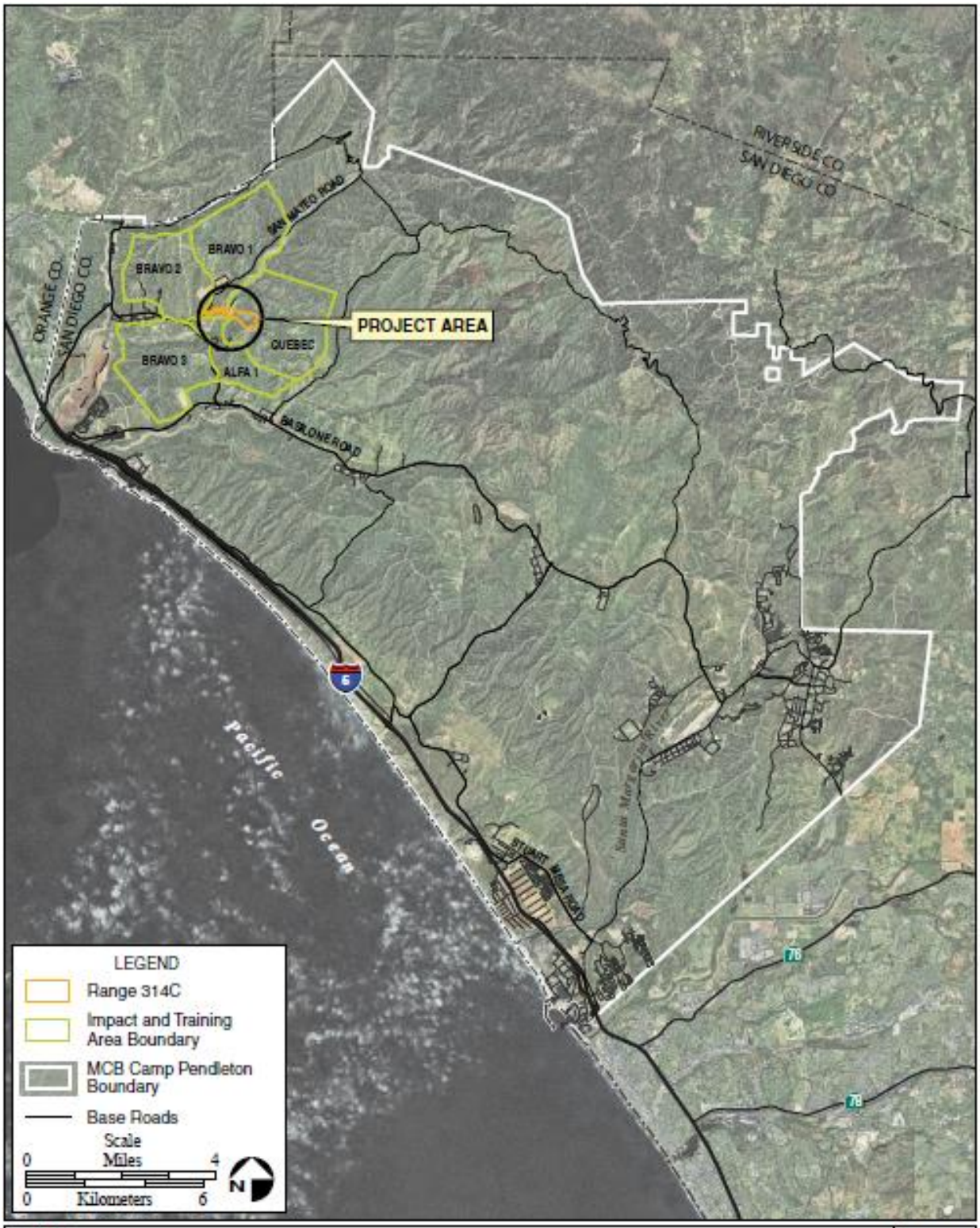

Project Area Vicinity | **FIGURE 2**

Source: USMC. 2015. Final biological assessment for the P-637 infantry squad battle course range, Marine Corps Base Camp Pendleton, California. March.

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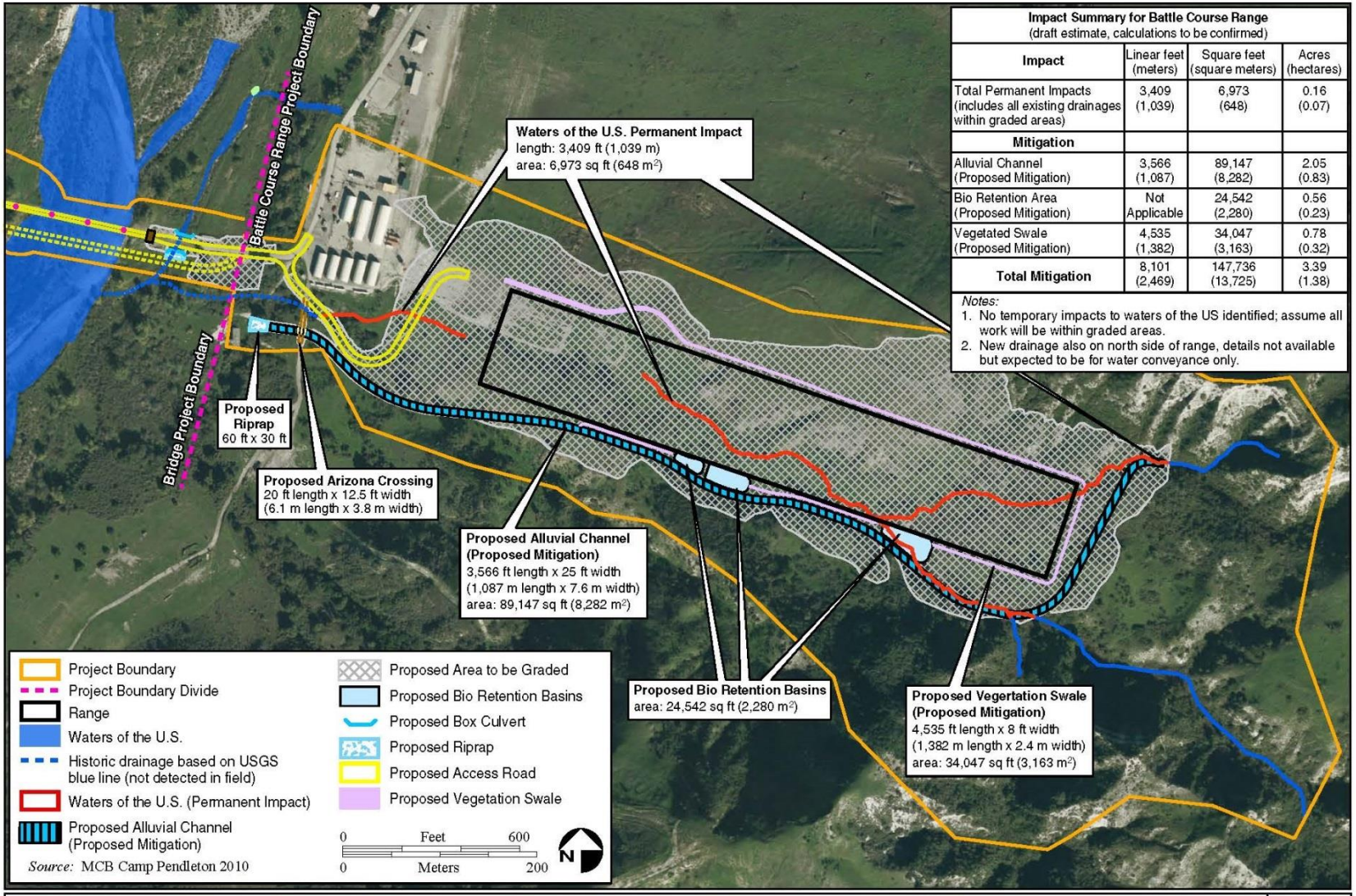

Impact Summary for Battle Course Range
(draft estimate, calculations to be confirmed)

Impact	Linear feet (meters)	Square feet (square meters)	Acres (hectares)
Total Permanent Impacts (includes all existing drainages within graded areas)	3,409 (1,039)	6,973 (648)	0.16 (0.07)
Mitigation			
Alluvial Channel (Proposed Mitigation)	3,566 (1,087)	89,147 (8,282)	2.05 (0.83)
Bio Retention Area (Proposed Mitigation)	Not Applicable	24,542 (2,280)	0.56 (0.23)
Vegetated Swale (Proposed Mitigation)	4,535 (1,382)	34,047 (3,163)	0.78 (0.32)
Total Mitigation	8,101 (2,469)	147,736 (13,725)	3.39 (1.38)

Notes:
1. No temporary impacts to waters of the US identified; assume all work will be within graded areas.
2. New drainage also on north side of range, details not available but expected to be for water conveyance only.

DRAFT
Estimate of Impacts to Waters of the U.S. within the Proposed P-637 Battle Course Range Improvements Project

FIGURE 3

Source: USMC. 2016. P-637 draft BO comments, electronic message from Matt Lorne to Janet Stuckrath. February 10.

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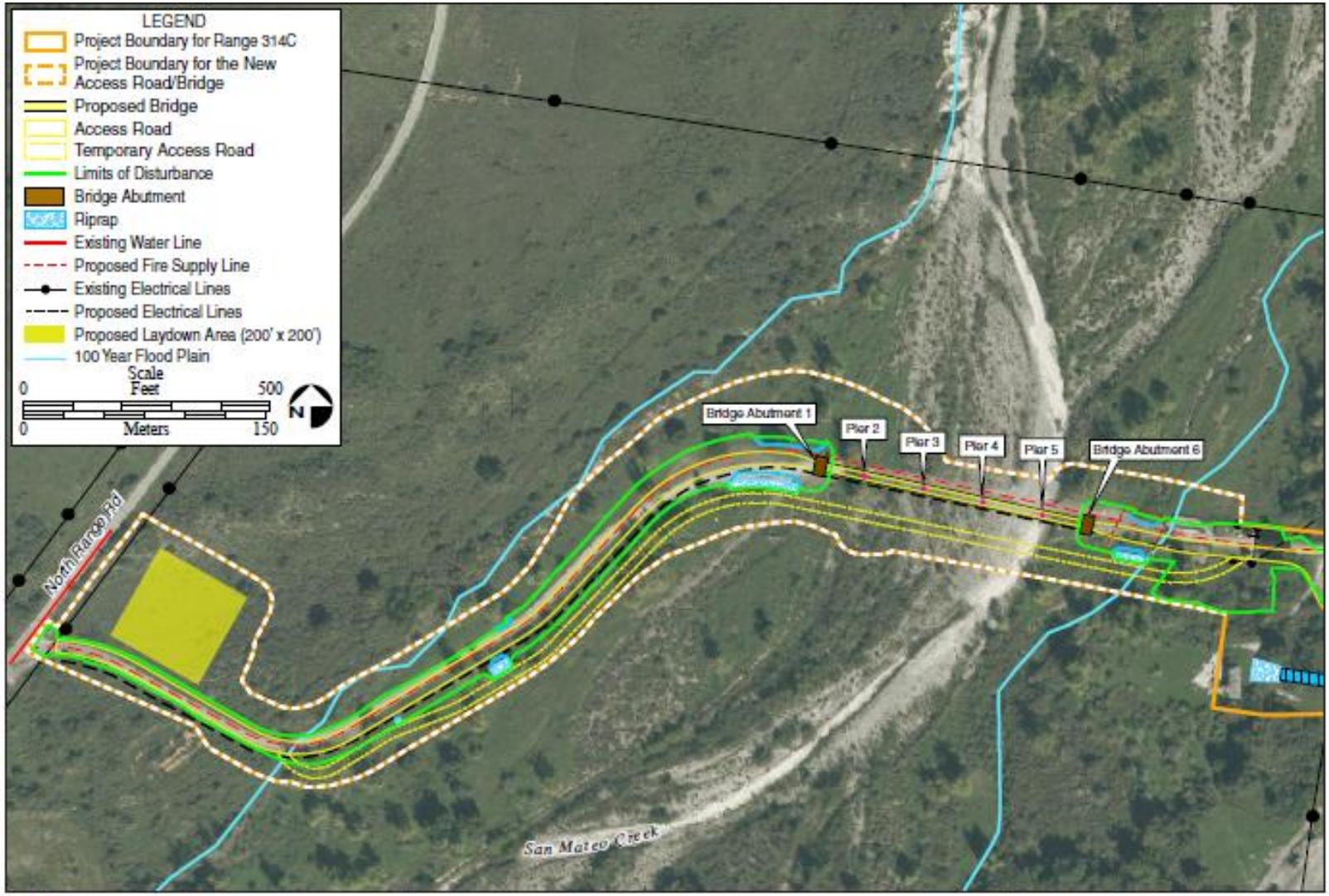

P-637 Infantry Squad Battle Course Range:
Conceptual Design for the New Access Road/Bridge Alignment

FIGURE 4

Source: USMC. 2015. Final biological assessment for the P-637 infantry squad battle course range, Marine Corps Base Camp Pendleton, California. March.

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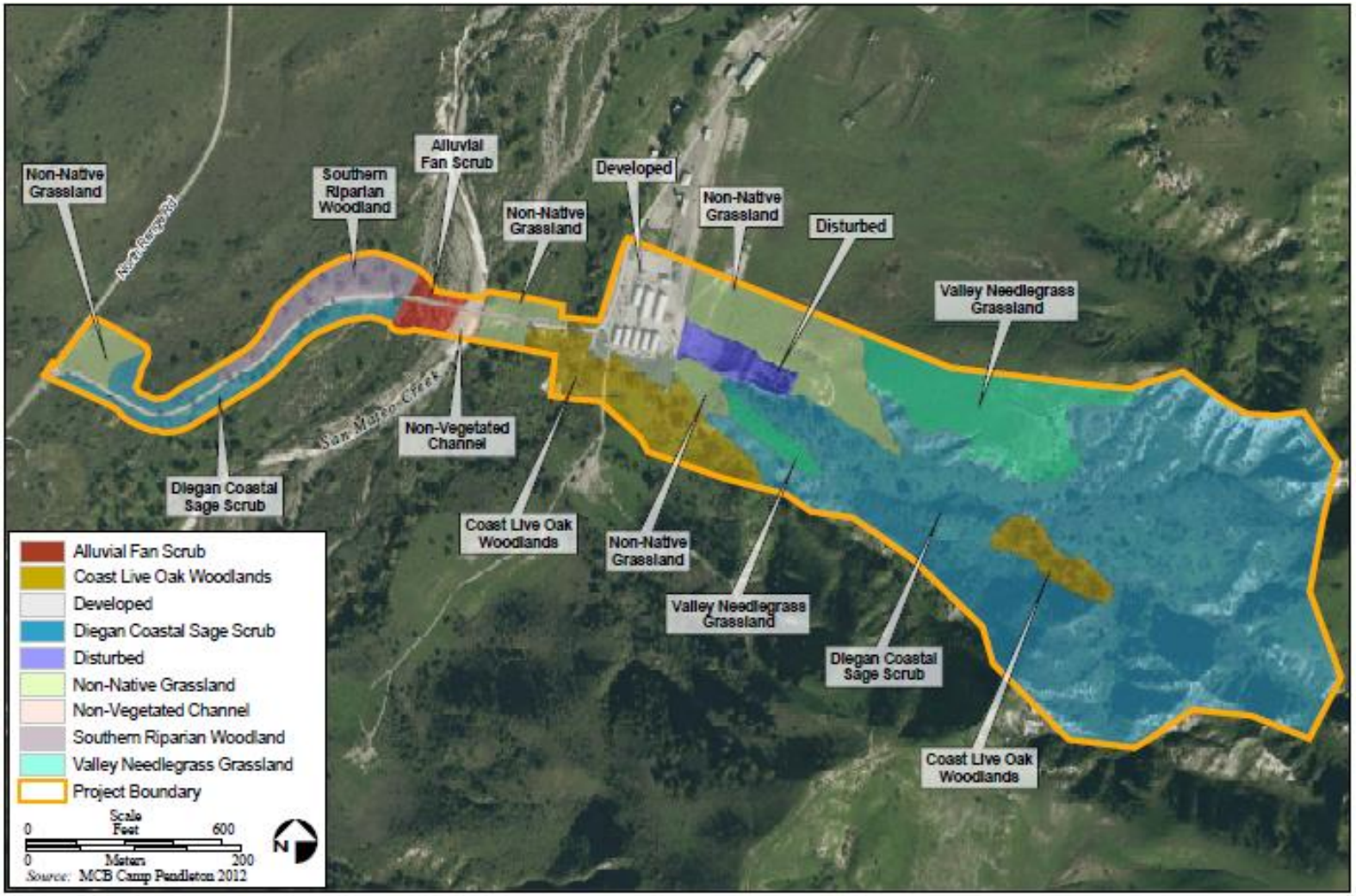

Vegetation at Range 314C and Access Road

FIGURE 5

P-637 Infantry Squad Battle Course at MCB Camp Pendleton
Final Biological Assessment

III-3

Source: USMC. 2015. Final biological assessment for the P-637 infantry squad battle course range, Marine Corps Base Camp Pendleton, California. March.

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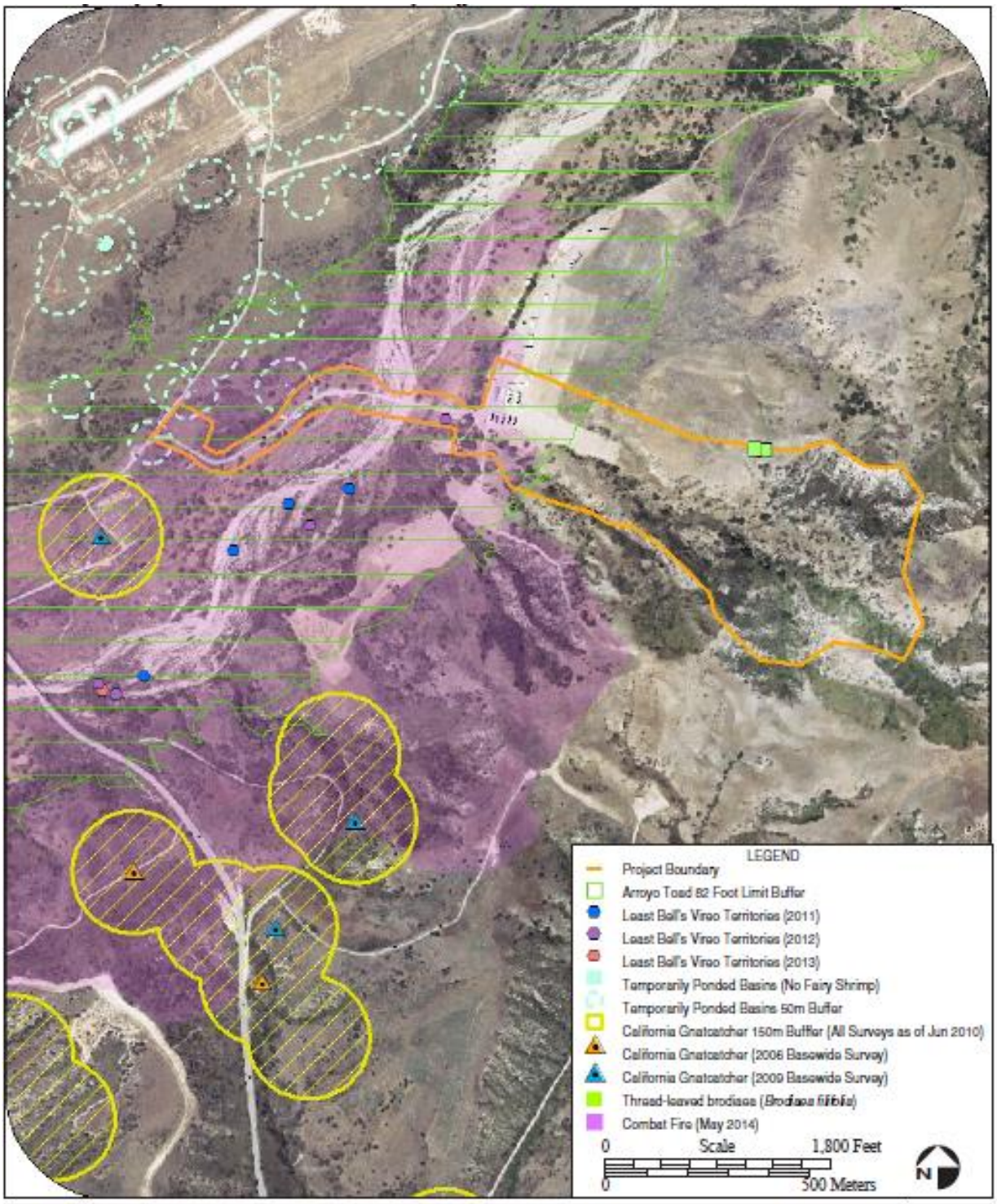

Sensitive Species at Range 314C and Proposed Access Road/Bridge Alignment

FIGURE 6

Source: USMC. 2015. Final biological assessment for the P-637 infantry squad battle course range, Marine Corps Base Camp Pendleton, California. March.

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Appendix A

Section 7 Consultation
Infantry Squad Battle Course Range P-637
Marine Corps Base Camp Pendleton
FWS-MCBCP-08B0581-08F0696-R002

The following is the U.S. Fish and Wildlife Service's (Service) analysis of the Marine Corps' not likely to adversely affect determination for the federally endangered southwestern willow flycatcher (*Empidonax traillii extimus*; flycatcher) and least Bell's vireo (*Vireo bellii pusillus*; vireo), in accordance with section 7 of the Endangered Species Act of 1973, as amended (at U.S.C. 1531 *et seq*.), for the Infantry Squad Battle Range P-637 (P-637 project), Marine Corps Base Camp Pendleton (MCBCP), San Diego County, California.

Species-specific Impact Avoidance, Minimization, and Other Conservation Measures for Flycatcher and Vireo

In addition to locating the proposed action in previously disturbed areas, such as roads and graded and paved areas, and the incorporation of the above-mentioned general avoidance and minimization measures (CM 1 through CM 20), the proposed action incorporates species-specific measures to ensure the avoidance of take and minimization of environmental impacts to vireos and flycatchers. These measures are described below and will be required of the Construction Contractor. The numbering below is a continuation of the numbering of the conservation measures in the associated biological opinion.

CM 37. Biological monitor. A biologist (biological monitor) familiar with vireo and flycatcher will be responsible for overseeing construction adjacent to the San Mateo Creek riparian corridor during the breeding season to ensure compliance with the conservation measures and for preventing unanticipated impacts to federally listed species. The biologist will be a trained ornithologist with a minimum of 40 hours of documented experience conducting vireo and flycatcher surveys. The biologist will also be capable of visual and auditory identification of typical southern California riparian bird species. Qualifications for this biologist will be reviewed and approved by MCBCP Environmental Security before initiation of this action. If deemed appropriately qualified, a single person may act as both the arroyo toad and bird biologist. The biological monitor will be on site during construction activities with the potential to impact federally listed species.

CM 38. Pre-project review of previous year's survey data. Prior to initiating construction on the project, MCBCP Environmental Security will review the previous year's basewide survey results for vireo and flycatcher, which are conducted an annual basis pursuant to the Riparian BO. This information will be provided to the Carlsbad Fish and Wildlife Office (CFWO) prior to initiating construction. If vireos or flycatchers are observed within the project footprint in the prior year, MCBCP Environmental Security and CFWO will coordinate to determine if the project will impact vireos or flycatchers in a

manner not addressed by this biological opinion (i.e., if additional consultation is necessary).

CM 39. Construction Seasonal Limits. Due to the known proximity of federally listed species, any removal of surface vegetation occurring within 1,600 feet of San Mateo Creek will not be scheduled between March 15 and August 31, to the maximum extent feasible, to avoid potential impacts to nesting. If surface vegetation removal cannot be completed outside of the breeding season, a nest survey will be completed within 500 feet of proposed vegetation removal by an MCBCP Environmental Security-approved biologist immediately before construction to ensure that no nests will be affected. If active nests are observed, the biologist, in coordination with MCBCP Environmental Security and the CFWO, will determine adequate setbacks from nests to prevent nest disturbance.

a. Grading and removal of riparian vegetation will be minimized. Subsequent construction in woody riparian habitat will occur outside the majority of the flycatcher/vireo breeding season (March 15 to August 31) whenever feasible.

b. If seasonal avoidance is not feasible, at least three protocol-level pre-construction surveys will be conducted by the approved biologist for the vireo and flycatcher and their active nests in all suitable habitat within 500 feet of the proposed construction area and weekly thereafter throughout the breeding season. The biologist will not be authorized to use recorded vocalizations to locate or attract vireos or flycatchers. If an active flycatcher or vireo nest occurs within 250 feet of the proposed construction corridor, the biologist will coordinate with MCBCP Environmental Security to determine whether project activities need to be temporarily modified or halted to avoid impacts to these species. MCBCP Environmental Security will coordinate with the CFWO directly to discuss potential additional avoidance measures, such as sound attenuation devices. An approved biologist will monitor nest progress and construction activities in and adjacent to the riparian habitats to ensure compliance and will keep the project engineer informed of construction activities that may threaten significant biological resources.

CM 40. Offset riparian impacts. The net permanent loss of about 0.09 acre (following removal and restoration of the at-grade crossing) of riparian habitat will be offset in accordance with the Riparian BO (Service 1995).

MCBCP proposes two alternatives to offset impacts to riparian habitat: (1) on-Base at the Santa Margarita River in the form of native riparian habitat, with cost identified in the Riparian BO adjusted for inflation; and (2) using MCBCP's future mitigation requirements to be fulfilled by conservation actions elsewhere within the ecoregion that promote recovery efforts of endangered and threatened species or their habitats (up to 20 percent annual total as described in the Riparian BO). Any reduction of impacts to

riparian habitat achieved as a result of further minimizing the project footprint will proportionally reduce the amount of restoration implemented.

Southwestern Willow Flycatcher

Transient flycatchers[5] have historically been recorded in San Mateo Creek within 150 feet south of the project area. However, basewide surveys conducted since about 2000 have not documented breeding flycatchers within the project footprint.

Although no breeding flycatchers have been documented in habitat in the project impact footprint during surveys, suitable dispersal habitat is present along San Mateo Creek. A biologist (biological monitor) familiar[6] with flycatcher will be responsible for overseeing construction adjacent to the San Mateo Creek riparian corridor during the breeding season to ensure compliance with the conservation measures and to prevent unanticipated impacts to federally listed species in accordance with CM 37. Although breeding flycatchers are unlikely to occur in or adjacent to the project footprint, removal of surface vegetation occurring within 1,600 feet of San Mateo Creek will not be scheduled between March 15 and August 31 to the maximum extent feasible. If seasonal avoidance is not feasible, flycatcher surveys will be conducted to ensure that breeding flycatchers do not establish territories within or adjacent to the construction footprint prior to or during project construction (CM 38, CM 39b). With the proposed conservation measures, the potential for the proposed project to kill or injure flycatchers or destroy active nests or to reduce flycatcher survival or reproduction as a result of habitat loss or disruption of breeding activities is discountable (i.e., extremely unlikely to occur).

The modified P-637 project addressed by this consultation includes permanent impacts to 0.28 acre southern riparian woodland and less than 0.01 acre non-vegetated channel and temporary impacts to 0.58 acre southern riparian woodland, 0.38 acre alluvial scrub, and 0.17 acre non-vegetated channel that provides suitable habitat for flycatcher dispersal. Permanent direct impacts to flycatcher habitat will be offset in accordance with MCBCP's Riparian BO (Service 1995; CM 34 and CM 40); temporary impacts will be restored consistent with CM 5 and CM 6. At project completion, removal of the existing low-flow crossing (to be replaced by the proposed bridge) will include restoration of 0.05 acre of non-vegetated channel and 0.14 acre of alluvial fan scrub.

Least Bell's Vireo

In May 2012, one vireo was recorded within the project boundary; however, the 2013 survey detected no vireo territories within 0.25 mile of the project boundary. In addition, the May 2014 Combat Fire burned the majority of riparian habitat surrounding the project footprint. Thus, it is unlikely that the project will be occupied by vireo when construction is initiated. However, if

[5] Transient flycatchers are assumed not to be the listed subspecies

[6] The designated biological monitor for this measure will be a trained ornithologist with a minimum of 40 hours of documented experience conducting vireo and flycatcher surveys and nest monitoring experience. The biologist will also be capable of visual and auditory identification of typical southern California riparian bird species.

construction is delayed, the project footprint may be occupied by vireo again before it is initiated. Therefore, prior to construction, MCBCP Environmental Security will review the previous year's annual vireo survey to ensure that the project is not anticipated to impact a substantial portion of any documented vireo territories. If these surveys document vireo in the project footprint, MCBCP Environmental Security will coordinate with the CFWO to determine if additional consultation or avoidance and minimization measures are necessary. In addition, if project construction occurs during the vireo breeding season, vireo surveys will be conducted to ensure that vireos and their nests are not directly impacted. Because it is unlikely that vireo will be present in the project footprint prior to project construction and with the proposed monitoring during construction, the potential for the project to remove a substantial portion of a vireo territory or kill or destroy vireos or their nests is discountable.

The modified P-637 project addressed by this consultation includes permanent impacts to 0.28 acre southern riparian woodland and less than 0.01 acre non-vegetated channel and temporary impacts to 0.58 acre southern riparian woodland, 0.38 acre alluvial scrub, and 0.17 acre non-vegetated channel that may provide vireo habitat. At project completion, removal of the existing low-flow crossing (to be replaced by the proposed bridge) will include restoration of 0.05 acre of non-vegetated channel and 0.14 acre of alluvial fan scrub, representing a net increase in these two communities. Permanent direct impacts to vireo habitat will be offset in accordance with MCBCP's Riparian BO (Service 1995; see CM 20 and CM 28); temporary impacts will be restored following CM 6 and CM 7.

If vireo occupy habitat adjacent to the project footprint prior to construction, they may be affected by indirect effects such as an increase in dust, noise, or other construction-related circumstances. Temporary disturbances due to noise associated with the operation of the construction equipment, as well as an increase in the general activity and human presence, could mask bird vocalizations. In particular, 'masking' may be detrimental to small perching birds, like the vireo. According to Miller (1974), "excess sound can interfere with the perception of important, relevant auditory signals." Whether a vireo receives potentially vital auditory information depends on such noise parameters as environmental attenuation, signal to noise ratios, and discrimination of the receiver given the background noise. The pertinent biological literature suggests that birds use their sense of hearing to locate their young and mates, to establish and defend territories, and to locate and evade predators (Scherzinger 1970, Shen 1983).

Noise may also affect the breeding behaviors of affected birds. Dooling (1980) concluded that if "noise masks vireo song for the human (at some given distance) then it probably also significantly masks vireo song for the vireo." Dooling continued that "the human almost certainly does better than the vireo in hearing a signal in noise around 2 to 4 kilohertz (probably about twice as good)." Given Dooling's remarks concerning the relative acuities of human and vireo hearing and the aforementioned dependence of the vireo on their sense of hearing, unabated masking noise could adversely affect vireo pairs or individuals that are present within the action area.

SANDAG and RECON (1988) estimated that noise levels above 60 dBA Leq from March 15 to September 15 may impact vireo reproductive success. While vireos often continue to occupy areas subject to noise levels above 60 dBA, one study documented significantly reduced reproductive success due to noise impacts (Service 1995). Studies also observed movement away from construction activities and delayed pairing and initial nest establishment suggesting that excessive noise from construction activities may have resulted in the avoidance of suitable habitat and may have interfered with mating behavior (BonTerra 2000a, b, c, and d).

It is expected that above some yet unknown noise threshold, vireos abandon an otherwise suitable habitat area. Greaves (1989) hypothesized that the lack of breeding vireos in apparently suitable habitat is due to human disturbances (e.g., bulldozers, off-highway vehicles, and hiker travel). We have used 60 dBA Leq hourly as a practical threshold above which significant impacts to the vireo might occur as described above. Therefore, unabated noise resulting from project construction and use of the San Mateo Creek Bridge may interfere with the reception of auditory signals by vireo potentially resulting in increased predation, lowered reproductive success and/or abandonment of otherwise suitable habitat. Implementation of CM 1 will limit work areas to the project footprint, and no off-road vehicle use will be allowed. In addition, CM 39 will ensure that construction activities within or adjacent to vireo habitat are conducted outside the majority of the vireo breeding season, or vireo surveys will be conducted to ensure that nesting vireo are at least 250 feet from construction activities. With implementation of this measure, the potential effects of noise on vireo breeding and survival are anticipated to be insignificant (i.e., cannot be meaningfully measured, detected, or evaluated).

Other potential effects of the project include dust generation and invasion by non-native invasive plants. Dust generated from construction activities could decrease plant vigor within vireo habitat, and non-native plants used in project landscaping or that colonize the construction footprint following ground disturbing activities could invade the adjacent vireo habitat in San Marcos Creek. Dust will be minimized through implementation of dust control measures (CM 16), and power-washing of construction equipment along with restoration of areas impacted by construction activity (CM 6, CM 7, and CM 19) will minimize the potential for the introduction of exotic invasive plants. With implementation of these measures, potential effects of dust and non-native plants on vireo survival and reproduction are anticipated to be insignificant.

Based on the above analysis, incorporating the Marine Corps' commitment to implement avoidance and minimization measures during the project, we concur with MCBCP's determination that the P-637 project is not likely to adversely affect vireo and flycatcher.

LITERATURE CITED

BonTerra Consulting. 2000a. Breeding season 2000 weekly monitoring report of least Bell's vireo and coastal California gnatcatcher for the Crown Valley Parkway Bridge project, Orange County, California. 2 pp. (week of April 24 to April 28, 2000). Unpublished report prepared for the U.S. Fish and Wildlife Service.

BonTerra Consulting. 2000b. Breeding season 2000 weekly monitoring report of least Bell's vireo and coastal California gnatcatcher for the Crown Valley Parkway Bridge project, Orange County, California. 3 pp. (week of May 1 to May 5, 2000). Unpublished report prepared for the U.S. Fish and Wildlife Service.

BonTerra Consulting. 2000c. Breeding season 2000 weekly monitoring report of least Bell's vireo and coastal California gnatcatcher for the Crown Valley Parkway Bridge project, Orange County, California. 2pp. (week of May 29 to June 2, 2000). Unpublished report prepared for the U.S. Fish and Wildlife Service.

BonTerra Consulting. 2000d. Breeding season 2000 weekly monitoring report of least Bell's vireo and coastal California gnatcatcher for the Crown Valley Parkway Bridge project, Orange County, California. 2pp. (week of August 7 to August 11, 2000). Unpublished report prepared for the U.S. Fish and Wildlife Service.

Dooling, R. J. 1980. Behavior and Psychophysics of Hearing in Birds. Pp. 261-288 in (A. N. Popper and R. R. Fay, eds.), Comparative Studies of Hearing in Vertebrates. New York: Springer-Verlag.

Greaves, J. 1989. Maintaining site integrity for breeding least Bell's vireos. Pages 293-298 *in* D.L. Abell (ed.), Proceedings of the California Riparian Systems Conference: protection, management, and restoration for the 1990's [University of California, Davis, September 22-24, 1988]. Gen. Tech. Report PSW 110. Pacific SW Forest and Range Experiment Station, U.S. Forest Service, USDA.

Miller, J. 1974. Effects of noise on people. J. Acoust. Soc. Amer. 56(3):729-764.

[SANDAG and RECON] San Diego Association of Governments and Regional Environmental Consultants. 1990. Draft comprehensive species management plan for the least Bell's vireo. 37 pp

Scherzinger, W. 1979. On the relations of predators of Hazel Grouse (*Bonasa bonasa*). Vogelwelt 100(6):325-217. English translation of abstract.

Shen, J. 1983. A behavioral study of vibrational sensitivity in the pigeon (*Columba livia*). Journ. Comp. Physiology 152:251-255.

[Service] U.S. Fish and Wildlife Service. 1995. Biological Opinion (1-6-95-F-02). Programmatic activities and conservation plans in riparian and estuarine/beach ecosystems on Marine Corps Base, Camp Pendleton. Carlsbad Fish and Wildlife Office, Carlsbad, California. 61 pp.

MEMORANDUM OF AGREEMENT
BETWEEN THE
UNITED STATES MARINE CORPS AND
THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER
REGARDING THE UNDERTAKING FOR UPGRADES
TO RANGE 314C AND CONSTRUCTION OF AN INFANTRY SQUAD BATTLE COURSE RANGE (MILCON P-637)
ON MARINE CORPS BASE CAMP JOSEPH H. PENDLETON
SAN DIEGO COUNTY, CALIFORNIA

WHEREAS, the United States Marine Corps (USMC) proposes an undertaking involving improvements to be made at Range 314C within the Quebec Impact Area of Marine Corp Base (MCB) Camp Pendleton that will consist of the upgrade of an existing live-fire range, including Unexploded Ordnance (UXO) clearance and removal, construction of a live-fire Infantry Squad Battle Course Range, installation of Remote Target Systems (RETS), the construction/modification of support facilities (including a Range Control Tower, Operations Storage Facility, Enclosed Bleacher Facility, General Instruction Building, and Ammunition Breakdown Building), and construction of a new access road and bridge over San Mateo Creek to provide all-weather access to the range ((Project) (Military Construction (MILCON) Project (P)-637)); and

WHEREAS, the USMC plans to carry out MILCON Project P-637 pursuant to the National Defense Authorization Act (NDAA) for Fiscal Year 2012, enacted into Public Law 112-81 on December 31, 2011 by the Senate and House of Representatives of the United States of America during the 112th Congress thereby making MILCON Project P-637 an undertaking subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f, and its implementing regulations, 36 CFR Part 800; and

WHEREAS, USMC has defined the undertaking's area of potential effect (APE) as approximately 116 acres (67 hectares) (Attachment A); and

WHEREAS, the USMC, in consultation with the California State Historic Preservation Officer (SHPO), has found that this undertaking will adversely affect five archaeological sites (Attachments B and C) that are assumed eligible for inclusion in the National Register of Historic Places (NRHP) and has consulted the SHPO pursuant to 36 CFR Part 800; and

WHEREAS, subsurface UXO clearance within the APE is necessary due to human health and safety concerns, and this includes subsurface clearance within and around five prehistoric archaeological sites located within the undertaking's APE. Due to the presence of UXO, it is not possible to conduct a pre-UXO clearance Phase II testing and evaluation program at the five sites within the APE: CA-SDI-16905, CA-SDI-16906, CA-SDI-18372, CA-SDI-18373, and CA-SDI-20180.

WHEREAS, the USMC has consulted with the federally recognized tribal governments (Tribes) of the Luiseño (Pauma Band of Mission Indians, Pechanga Band of Luiseño Indians, Rincon Band of Luiseño Indians, La Jolla Band of Mission Indians, and Soboba Band of Mission Indians) regarding the proposed undertaking and its effect on historic properties, will continue to consult with the Tribes, will afford the Tribes, should the Tribes so desire, with the opportunity to participate in the implementation of this MOA and has invited the Tribes to sign this MOA as Invited Signatories (the Tribes that sign this MOA shall be referred to hereafter as the "Invited Signatories"); and

WHEREAS, the USMC has consulted with the non-federally recognized tribes of the San Luis Rey Band of Mission Indians and the Juaneño Band of Mission Indians on the proposed undertaking, its effect on historic properties, and has invited them to participate and concur with this MOA; and

WHEREAS, the USMC has consulted with the San Diego County Archaeological Society (SDCAS) on the proposed undertaking, its effect on historic properties, and has invited SDCAS to participate and concur with this MOA; and

WHEREAS, the USMC has involved the public through the National Environmental Policy Act (NEPA) process in accordance with 36 CFR § 800.8 through the preparation of an Environmental Assessment (EA), as required by USMC guidance;

WHEREAS, in accordance with 36 CFR § 800.6(a)(1), USMC has notified the Advisory Council on Historic Preservation (ACHP) of its adverse effect determination providing the specified documentation, and the ACHP has chosen not to participate in the consultation pursuant to 36 CFR § 800.6(a)(1)(iii) in a letter dated October 21, 2014; and

NOW THEREFORE, the USMC and SHPO agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties.

STIPULATIONS

The USMC shall ensure that the following stipulations are implemented:

I. PROPOSED UNDERTAKING

Removal of Unexploded Ordnance (UXO) is required within the boundary of Range 314C for MILCON Project P-637 prior to any construction activities and includes approximately 101 acres within the APE (Attachment A). Subsurface UXO clearance to 2 feet (0.6 meters) below ground surface would be completed, followed by removal of soil at 1 foot intervals until removal of all UXO has been completed. Portions of Range 314C have been cleared to a depth of 2 ft. (0.6 m) below ground surface (bgs). The remaining portions of the range proposed for grading and disturbance would be cleared before construction begins. Surface and subsurface UXO clearance would be completed in accordance with standard operating procedures and a Work Plan and Health and Safety

Plan. Surface clearance operations in sensitive areas (environmental and/or archeological) would be conducted in accordance with an Environmental Protection Plan, Monitoring and Discovery Plan, and all federal, state, USMC, and MCB Camp Pendleton regulations and orders. In areas where ground disturbance would extend below the 2 ft. (0.6 m) bgs, additional UXO clearance would be completed. UXO accumulated during removal activities would be blown in place or consolidated at a collection point and transported off-site. UXO would be removed, stored, transported, and disposed of in accordance with the Military Munitions Rule (40 CFR Part 266, Subpart M) and MCB Camp Pendleton standard practices. In addition, UXO removed from the site would be transported in accordance with DoD shipping controls applicable to the transport of military munitions. In the event UXO is found during construction activities, the "Three R's" method would be used. Recognize, immediately Retreat, and Report to the Provost Marshall's Office or dial 911 immediately.

The construction of the undertaking is design/bid/build and the USMC will provide 100 percent design plans for SHPO to review and comment. Anti-Terrorism/Force Protection and Defense Critical Infrastructure security restrictions prohibit distribution of these facility and infrastructure plans. When the 100 percent design plans are provided to the SHPO, Invited Signatories will also be notified, and upon the request from an Invited Signatory, they will be made available for review, on Base, within this same 30-day period. If SHPO and/or Invited Signatories fail to provide comments within 30 calendar days of receipt of availability of the plans, the USMC may deem it appropriate to proceed to implement the plans, as prepared, unless a request for time extension is received within this same period. If SHPO has comments the USMC will address those comments by providing a comments matrix and/or by revised design plans.

II. AMENDMENTS TO THE AREA OF POTENTIAL EFFECTS

The signatories of this MOA acknowledge that unforeseen circumstances or other conditions may require the APE to be modified following the execution of this MOA. The signatories agree that the Infantry Squad Battle Course Range (P-637) project APE can be amended without amending the MOA. Any such modification shall proceed in accordance with 36 CFR §§ 800.4(a) and 800.4(b).

The signatories of this MOA also agree that without amendment to this MOA, should modifications to the undertaking APE be required, following the execution of this MOA, identification of additional historic properties that could potentially be affected by the APE modifications can proceed according to 36 CFR §§ 800.4(a) and 800.4(b), and if the results of these identification efforts indicate the presence of potential historic properties, evaluation for NRHP eligibility can be conducted of these potential properties according to 36 CFR § 800.4(c). For additional historic properties identified as a result of APE modifications, the USMC will submit their historic property determinations and supporting documentation to SHPO for agreement in accordance with 36 CFR § 800.4(c)(2). In accordance with 36 CFR § 800.3(c)(4), SHPO will have 30 days of receipt of these determinations for review. If SHPO fails to respond, the USMC will implement the requirements of Stipulations III and IV as appropriate. If SHPO and USMC are

unable to come to agreement on eligibility of any property, USMC shall forward the determination of eligibility to the Keeper of the National Register.

III. TREATMENT OF HISTORIC PROPERTIES

A. Adverse Effects from Subsurface Unexploded Ordinance Clearance

The principal goal in the Section 106 process is to take into account effects of the undertaking on historic properties. The USMC will prepare or cause to be prepared, and will subsequently implement, Monitoring and Discovery Plan (MDP) and Historic Properties Treatment Plan (HPTP) to assure minimization of adverse effects on historic properties during the undertaking.

For the undertaking, subsurface clearance of UXO will be required prior to any construction of the upgrades to Range 314C in the area shown in Attachment A. Due to the health and safety concerns associated with subsurface clearance, only UXO personnel will be allowed on site during all clearance activities. Once subsurface UXO clearance has been completed, a post-reconnaissance survey will be conducted as part of the MDP as described in Stipulation III.B to determine: (1) the extent of visible disturbance at each site; and (2) whether data recovery is feasible. As impacts to the five prehistoric archaeological sites would occur during the subsurface clearance of UXO, it is necessary to complete and approve a MDP before the onset of the post-UXO clearance reconnaissance survey and HPTP before the onset of construction phases of the undertaking.

Since this undertaking is design/bid/build, the design phase precedes the construction phase, and earth-disturbing investigation activities such as geotechnical borings and utilities probing (potholing) can occur as part of the design phase. Construction plan information is insufficient to complete an HPTP before the completion of the 100 percent designs. As impacts to historic properties could occur during the design phase, it is necessary to complete and approve a Monitoring and Discovery Plan (MDP) before the onset of the design phase. This MDP will then be implemented during design phase as well as for the construction phase but not during UXO clearance/disturbance phase as shown on Attachment A due to safety issues. The MDP will then address the post-UXO clearance reconnaissance survey (Stipulation III.B.1.a), and construction monitoring/unexpected discoveries (Stipulation III.B.1.a[i-v]). An HPTP (Stipulation III.C) will be developed, assisted by the results of the design phase, and after 100 percent (draft) design plans. Amendments to the APE, or post-review discoveries of eligible sites, or other needs, may trigger a need to amend the HPTP.

B. Preparation and Implementation of a Monitoring and Discovery Plan

1. For historic properties within the APE that cannot be avoided during subsurface UXO clearance, the MDP plan will specify the requirements for a post-UXO clearance reconnaissance survey to determine: (1) the extent of visible disturbance at each site; and (2) if the site is considered eligible for the NRHP; and 3) whether data recovery is a reasonable mitigation measure based on the presence of archaeological deposits. Specific

methods to determine whether data recovery is required will be based on the visual inspection of any archeological materials and soils present in order to assess the remaining potential eligibility of the site. The presence of intact archaeological features, midden soils, or diagnostic archaeological materials would suggest that the site may contain archaeological data potential and should be subjected to data recovery in order to mitigate the adverse effects to the Criterion D eligibility of the site resulting from the undertaking. The survey will be conducted by an archaeologist who meets the Professional Qualifications Standards (see Stipulation VIII.A.1 below) and Native American monitor, should the Tribes choose to participate.

a. The Monitoring and Discovery Plan herein prescribed shall at a minimum include the following:

i. The MDP (including a schedule for reporting completed results) addresses, as specified in Stipulation III.B.1, monitoring for post-UXO clearance ground-disturbing, construction-related activities in archaeologically sensitive areas. The presence of one or more of the following circumstances indicate the archaeological sensitivity of an area and a need for monitoring: (1) the presence in the APE of an eligible prehistoric resource or resources; (2) the presence in the APE of ineligible prehistoric resources; (3) the presence in natural (undeveloped) areas surrounding the APE of several other recorded prehistoric sites; (4) the presence of large or small drainages in the natural (undeveloped) areas within or adjacent to the APE and the consequent potential for buried cultural deposits beneath alluvium deposited by these drainages, as referred to in geological studies; and (5) the presence of vegetation in these natural (undeveloped) areas in the APE that obscured the ground surface at times during the inventory field surveys. Based on these criteria and as indicated on the attached APE map (Attachment A), monitoring during post-UXO clearance ground-disturbing and construction-related activities by Native American and archaeological monitors will occur in these portions within the APE.

ii. Monitoring will be conducted by qualified archaeologist(s) and Native American monitor(s). Native American monitors will be from the Invited Signatories that choose to participate in monitoring per the MCB Camp Pendleton's monitoring procedures.

iii. In accordance with Stipulation V, the MDP will provide methods to avoid or minimize adverse effects to historic properties resulting from post-review discoveries associated with the implementation of an undertaking. The MDP shall conform to 36 CFR §§ 800.13(a)(2) and 800.13(c) and will specify how previously unidentified archaeological deposits that are discovered during ground disturbing and construction related activities conducted subsequent to subsurface UXO clearance will be addressed. The MDP will include specific pre-approved resource treatment based on the type of archaeological resource or historic property discovered. The MDP will also include the procedures to be followed at the time of a discovery and the criteria to be used for an initial assumption of NRHP eligibility of the archaeological resource discovered.

iv. The MDP will include a requirement for a monitoring meeting, to be held at least monthly, between the archaeological monitors, Native American monitors who are

actively participating in the construction monitoring efforts for this undertaking, and MCB Camp Pendleton's Cultural Resources Section to check the status of the monitoring, address any issues or concerns, and ensure compliance with this MOA and HPTP. The MDP will be referenced in the HPTP.

v. The MDP will ensure that the collections are curated/treated in accordance with 36 CFR Part 79 and shall be consistent with the MCB CamPen NAGPRA Comprehensive Agreement.

C. Preparation of and Implementation of Historic Properties Treatment Plan

1. To minimize and mitigate impacts to historic properties for which adverse effects cannot be avoided, the USMC will prepare or cause to be prepared, and will subsequently implement, a HPTP for the historic properties located within the undertaking's APE: CA-SDI-16905, CA-SDI-16906, CA-SDI-18372, CA-SDI-18373, and CA-SDI-20180. If direct mitigation to these sites is not feasible, then an alternate mitigation plan will be developed in consultation with the signatories that provides culturally meaningful and commensurate resolution of adverse effects.

2. Consistent with the requirements specified in Stipulation IV.A, the HPTP would consist of the contents as described below, and would be required to proceed through the approval and reporting process as described in Stipulation IV.A.

a. An HPTP will address the mitigation of adverse effects to historic properties within the APE (directly affected) and historic properties within the APE (indirectly affected);

b. For items not subject to Native American Graves Protection and Repatriation Act (NAGPRA) and where data recovery is recommended based on the results of the post-UXO clearance reconnaissance survey, the data recovery section of the HPTP herein prescribed shall at a minimum include the following:

i. Research questions that are directly pertinent to those data sets that may qualify the property for inclusion in the NRHP and eligibility criteria for which it may qualify.

ii. Research questions that are directly pertinent to the interests and concerns of the Tribes as identified through government to government consultation.

iii. A discussion that explains why it is in the public and professional interest to pursue answers to these research questions. The discussion should indicate whether, why, and how the public and professionals in the field of archaeology may benefit from the scope and nature of the information developed through data recovery, and demonstrates that the costs of proceeding with the data recovery are prudent and reasonable;

iv. Results of previous research relevant to the archaeological sites and how they have informed the current research questions and interpretation of the data recovered from the sites;

v. Field methods and techniques that will address the property's structure and content in the context of the defined research questions and the property's stratigraphic and geomorphic context;

vi. Laboratory processing and analyses and their relevance to each property and its research values and tribal input including tribal and traditional cultural values through Stipulation IV.B;

vii. Methods and techniques used in artifact, data, and other records management;

viii. Provisions for ongoing Native American consultation and coordination;

ix. Qualifications of key personnel;

x. Disposition of all recovered materials not subject to NAGPRA, including curation, of recovered materials and records results from the implementation of the data recovery plan; any materials recovered will be in accordance with 36 CFR Part 79;

xi. Report preparation schedule, including the names of parties that will receive copies of reports upon completion;

xii. Explicit provisions for disseminating research findings to the SHPO, professional peers and Tribal consulting parties who have signed this agreement (i.e., Invited Signatories and Concurring Parties) in a timely manner; and

xiii. A synopsis of the *MCB Camp Pendleton NAGPRA Comprehensive Plan (2001)*, including detailed steps taken, should there be an inadvertent discovery subject to NAGPRA.

3. The USMC will not authorize any undertaking-related activity within the identified location of a historic property or within the buffered area around the property (25 meters) to proceed if it finds that it could result in an adverse effect to historic properties covered by this MOA until the fieldwork portion of the actions in Stipulations III.B and III.C, inclusive, have been completed. Undertaking-related activity within a historic property will only start/resume with concurrence from Environmental Security's Cultural Resources Section Head.

4. Amendment of the HPTP by the USMC, in consultation with the SHPO and Tribal consulting parties who have signed this agreement (i.e., Invited Signatories Concurring Parties), will not require an amendment of this MOA.

IV. REPORTING REQUIREMENTS

A. Review of the MDP and HPTP

1. The USMC will upon completion, submit, both an electronic submittal and a hard copy by mail, the MDP and HPTP prescribed by Stipulations III.B and III.C in draft form to the SHPO, Invited Signatories and concurring parties, for review and comment. The reviewing parties shall have 30 calendar days from the receipt of the draft MDP and 45 calendar days from the receipt of the draft HPTP to comment in writing to the USMC. The USMC may extend the review period at the request of the reviewing party. Absent such request, or upon decision by the USMC not to extend the review period, failure of the reviewing parties to respond within the stipulated time frame shall not preclude the USMC from finalizing a draft MDP and HPTP. The USMC will provide the SHPO, Invited Signatories and concurring parties, and the SDCAS with written documentation indicating whether and how a draft MDP or HPTP will be modified in accordance with any reviewing party comments. The SHPO shall have 30 calendar days to review revised draft pre-final. If there is no response from SHPO, then the USMC will finalize the document. If a dispute occurs then the dispute resolution process in Stipulation VIII.C will be followed. Unless the SHPO, the Invited Signatories, or concurring parties object to this documentation in writing to the USMC within 30 calendar days following receipt, the USMC may finalize a draft pre-final MDP or HPTP as it may deem appropriate and proceed to implement a final MDP or HPTP.

2. If the USMC proposes to modify a final MDP or HPTP, it will notify the reviewing parties concurrently in writing about the proposed modifications. The reviewing parties will have 30 calendar days for a MDP and 30 calendar days for an HPTP, from receipt of notification, to comment in writing to the USMC. Failure of the reviewing parties to respond within these time frames shall not preclude the USMC from modifying a final MDP or HPTP as it may deem appropriate. Before modifying a final MDP or HPTP, the USMC will provide the reviewing parties with written documentation indicating whether and how a final MDP or HPTP will be modified in accordance with any reviewing party comments. Unless the reviewing parties object to this documentation in writing to the USMC within 15 calendar days following receipt, the USMC may modify a final MDP or HPTP as it may deem appropriate and proceed to implement a modified final MDP or HPTP.

B. Reporting the Results of a MDP and HPTP Implementation

1. Within 6 months of the completion of the Infantry Squad Battle Course Range Project (P-637) undertaking, the USMC shall submit to the signatories, in both an electronic submittal and a hard copy by mail, an interim report (nontechnical) summarizing the implementation of the MDP and HPTP. The signatories shall have 30 days from the date of receipt to comment on the undertaking interim report.

2. The USMC shall prepare, within six months of the completion of the Infantry Squad Battle Course Range Project (P-637) undertaking, and concurrently distribute to all

other signatories, a written draft technical report that documents the results of implementing the MDP and HPTP prepared for that undertaking and the terms of Stipulations III.B and III.C. The reviewing parties shall have 45 calendar days from receipt of a draft technical report to comment in writing to the USMC. The USMC may extend the review period at the request of a reviewing party. Absent such request or upon a decision by the USMC not to extend the review period, failure of the reviewing parties to respond within the stipulated time frame shall not preclude the USMC from finalizing a draft technical report as it may deem appropriate. Before finalizing a draft technical report, the USMC will provide the other signatories to the MOA written documentation indicating whether and how a final draft technical report will be modified in accordance with any reviewing party comments. Unless the other signatories to this MOA object to this documentation in writing to the USMC within 30 calendar days following receipt, the USMC may finalize a draft technical report that takes all received comments into account and distribute a final technical report in accordance with item 3, immediately below.

3. Copies of a final technical report documenting the results of implementing the MDP and HPTP and Stipulations III.B and III.C of this MOA will be distributed by the USMC to the SHPO, Invited Signatories, concurring parties, the appropriate California Historical Resources Information Survey (CHRIS) Regional Information Center, and members of the public who have requested copies subject to the terms of Stipulation VIII.B.

4. The USMC shall prepare a written draft document that communicates in non-technical terms the results of implementing the MDP and HPTP. The USMC will distribute this draft document for a 45-calendar day review and comment period concurrently with and in the same manner as that prescribed for a draft technical report by item 2 of Section B of this stipulation. Upon completion, the USMC shall publish the document in final form, and distribute it to the SHPO, to the Invited Signatories, concurring parties, and to any other entity that the USMC, the SHPO, and Tribes through consultation may deem appropriate, subject to the terms of Stipulation VIII.B.

V. DISCOVERIES AND UNANTICIPATED EFFECTS

The USMC shall address any post-review discoveries and unanticipated effects that may arise during implementation of the MDP or during construction of the undertaking in accordance with 36 CFR §§ 800.13 (a)(2) and 800.13(c) with the applicable provisions of the MDP. Should post-review discoveries of archaeological resources occur during the implementation of the undertaking, the USMC will assume that such resources are NRHP eligible based on criteria that will be specified in the MDP. The USMC will notify SHPO and the Invited Signatories, and concurring parties, by email, within 48 hours of the discovery and describe the plans to proceed in accordance with an approved MDP. The criteria for an assumption of eligibility specified in the MDP may include the presence of features, of an intact cultural deposit, of diagnostic artifacts, cultural information as provided by the Tribes, or of human remains. If such criteria are present, all ground-disturbing activities will be diverted within 25 meters of the resource until an assessment can be made of its nature and extent. Attempts will then be made to achieve

avoidance of the resource through engineering re-design or other measures as appropriate to the resource. If this is not feasible, then the resource will be treated as described above in the MDP and the USMC will implement the mitigation/data recovery portion of the MDP (Stipulation III.B) to mitigate impacts to the newly discovered resource and in some instances, as will be defined in the MDP. All such procedures and measures outlined here in Stipulation V, will be specified in the MDP and subject to approval by SHPO before the implementation of the undertaking within the APE (Stipulation IV.A and Attachment A).

VI. NATIVE AMERICAN CONSULTATION

The USMC has consulted with the Tribes regarding the proposed undertaking and their effects on historic properties and will continue to consult with the Tribes, and will afford the Tribes, should the Tribes so desire, with the opportunity to participate in the implementation of the MOA and of the undertaking. Such participation may include, but is not necessarily limited to, monitoring during any post-UXO clearance reconnaissance survey, data recovery excavations, and/or ground-disturbing construction activities prescribed in Stipulations III.B and III.C and during implementation of the undertaking. No monitoring will be allowed during subsurface UXO clearance due to health and safety concerns. .

VII. TREATMENT OF HUMAN REMAINS OF NATIVE AMERICAN ORIGIN

The USMC, in consultation with the Tribes, shall ensure the appropriate and respectful disposition of any human remains and associated funerary objects of Native American origin encountered during any action subject to this MOA complies with § 3(d)(2) of NAGPRA and its implementing regulations codified at 43 CFR Part 10. USMC will implement the MCB CamPen NAGPRA Comprehensive Agreement.

VIII. ADMINISTRATIVE PROVISIONS

A. Professional Qualifications and Standards

1. **Professional Qualifications.** The USMC shall ensure that all activities prescribed by Stipulations III, IV, V, and VI of this MOA be conducted by, or under the direct supervision of, a person or persons meeting, at a minimum, the Secretary of the Interior's Professional Qualifications Standards (PQS) in the discipline of archaeology (48 Federal Register [FR] 44716, Sept. 29, 1983). In addition, all tribal monitors participating in the undertaking shall be designated as monitors because they have specialized knowledge in religious and cultural significance for the Signatory tribes that they represent.

2. **Documentation Standards.** The USMC shall ensure that documentation prepared in partial fulfillment of the stipulations of this MOA is consistent with the *Secretary of the Interior's Standards and Guidelines: Archeology and Historic Preservation [As Amended and Annotated]* (48 FR 44716, Sept. 29, 1983), the *Secretary*

of the Interior's Guidelines for Archaeological Documentation (48 FR 44716, Sept. 29, 1983), and the *Secretary of the Interior's Standards for Archaeological Documentation* (48 FR 44716, Sept. 29, 1983), the California Office of Historic Preservation's December 1989 *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format* (Preservation Planning Bulletin No. 4[a]).

3. **Curation and Curation Standards**. The USMC shall ensure that, to the extent that it does not conflict with § 3(d) (2) of the NAGPRA and its implementing regulations codified at 43 CFR Part 10, curation of materials and records resulting from the activities prescribed by Stipulations III, IV, and V of this MOA complies with 36 CFR Part 79.

B. Confidentiality

1. Confidentiality regarding the nature and location of archaeological sites covered by this MOA or any of its attachments shall be maintained on a "need to know" basis limited to the Commanding Officer (or his designee), MCB Camp Pendleton; Naval Facilities Engineering Command, Southwest; designated representatives of the Signatory Tribes and Signatory Concurring Tribes, the SHPO, and the undertaking archaeological contractors.

2. The USMC shall ensure that all sensitive information relating to an historic property (as defined in Section 301(5) of the NHPA), a traditional cultural property (as defined in the Secretary of the Interior's Standards and Guidelines for Federal Agency Historic Preservation Programs Pursuant to the National Historic Preservation Act), and sacred objects, items of cultural patrimony, human remains and associated funerary objects (as defined in Section 2 of NAGPRA) is protected to the fullest extent available under law.

3. All parties to this MOA shall safeguard information about the nature and location of archeological, historic, and traditional cultural properties, and not reveal that information to any additional parties, pursuant to Section 304 of the NHPA and Section 9 of the Archaeological Resources Protection Act (ARPA), without the express written permission of the USMC.

C. Resolving Objections

1 Should any signatory or concurring party to this MOA object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, USMC shall notify other signatories then shall consult with such parties to resolve the objection. If USMC determines that such objection cannot be resolved, USMC will:

a. Forward all documentation relevant to the dispute, including the USMC's proposed resolution, to the ACHP. The ACHP shall provide USMC with its comments on the resolution of the objection within 30 days of receiving adequate documentation. Prior to reaching a final decision on the dispute, USMC shall prepare a written response that takes into account any timely comments regarding the dispute from the ACHP, signatories and

concurring parties, and provide them with a copy of this written response. USMC will then proceed according to its final decision.

b. If the ACHP does not provide its comments regarding the dispute within the 30 day time period, USMC may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, USMC shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories and concurring parties to the MOA, and provide them and the ACHP with a copy of such written response.

2. USMC's responsibility to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remain unchanged.

D. Amendments

Any signatory to this agreement may propose an amendment, whereupon USMC shall meet with the signatories to consult on the amendment for no more than 30 days. This MOA may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed with the ACHP.

E. Termination

If any signatory to this MOA determines that its terms will not or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per Stipulation VIII.D, above. If within 30 days (or another time period agreed to by all signatories) an amendment cannot be reached, any signatory may terminate the MOA upon written notification to the other signatories.

Once the MOA is terminated, and prior to work continuing on the undertaking, USMC shall follow 36 C.F.R. § 800 and notify the signatories.

F. Duration of the MOA

This MOA will expire if its stipulations are not carried out within five years from the date of its execution. At such time, and prior to work continuing on the undertaking, USMC shall consult with all parties to extend the terms and conditions of this PA. If the parties are unable to come to agreement on extending this PA, USMC shall comply with 36 CFR Part 800.

G Annual Reporting

The USMC shall provide all parties to this Agreement a summary report detailing work carried out pursuant to its terms by 30 January following the execution of this Agreement. Such report shall describe progress made implementing the terms of the Agreement as well as include any scheduling changes proposed, any problems encountered, and any disputes and objections received in the USMC' efforts to carry out the terms of this Agreement. The USMC shall meet with the SHPO within 30 days after the submission of the annual summary report to discuss the on-going implementation of

the MOA, if requested by SHPO. Any Signatory party may request to meet with the other Signatories to discuss implementation of this Agreement.

G. Effective Date of this MOA

This MOA will take effect on the date that it has been executed by the SHPO. Execution of this MOA by the USMC and SHPO, its transmittal by the USMC to the ACHP in accordance with 36 CFR § 800.6(b)(2), and subsequent implementation of its terms, shall evidence, pursuant to 36 CFR § 800.6(c), that this MOA is an agreement with the ACHP for the purposes of Section 106 of the NHPA, and shall further evidence the USMC has afforded the ACHP an opportunity to comment on the undertaking and its effects on historic properties, and that the USMC has taken into account the effects of the undertaking on historic properties.

SIGNATORY PARTIES:

THE UNITED STATES MARINE CORPS

8 FEB 2016

Brigadier General Edward D. Banta, Commanding General, MCIWEST-MCB Camp Pendleton — Date

CALIFORNIA STATE HISTORIC PRESERVATION OFFICER

for

2/17/16

Julianne Polanco, California State Historic Preservation Officer — Date

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8 REFERENCES

AMEC. 2011. Draft Results of Focused Surveys for Coastal California Gnatcatcher in Support of the Proposed P637 Project on Marine Corps Base Camp Pendleton, California. Submitted to Naval Facilities Engineering Command Southwest, San Diego, CA. September.

Apple, R.M., and J. H. Cleland. 1994. Archaeological Survey of Sierra I Impact Area and Foxtrot Firebreak Camp Pendleton, U.S. Marine Corps. Report submitted to the U.S. Marine Corps. On file, SCIC, San Diego State University, under NADB #1123670.

Baldwin, B. G., D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken, editors. 2012. The Jepson Manual: Vascular Plants of California, Second Edition. University of California Press, Berkeley.

Berryman, Stanley. 2008a. Replace Existing Steel and Poly-vinyl Chloride (PVC) Gas Lines with High Density Polyethylene (HDPE) Gas Lines in Various Areas of MCB Camp Pendleton. Report submitted to State of California Department of Parks and Recreation. On file, SCIC, San Diego State University, under NADB #1131973.

_____ . 2008b. Install Fiber to 62 Area Gate House, MCB Camp Pendleton. Report submitted to the State of California Department of Parks and Recreation. On file, SCIC, San Diego State University, under NADB #1131974.

Brehme, C.S., T.A. Matsuda and R. N. Fisher. 2012. MCBCP Arroyo Toad Monitoring Results for 2011. U.S. Geological Survey Western Ecological Research Center. DRAFT Data summary prepared for AC/S Environmental Security, Marine Corps Base Camp Pendleton.

Byrd, B.F. (ed.). 1998. *Coastal Archaeology of Las Flores Creek and Horno Canyon, Camp Pendleton, California*. Report on file at the South Coastal Information Center, San Diego State University.

_____ . 1996. Harvesting the Littoral Landscape During the Late Holocene: New Perspectives from Northern San Diego County. *Journal of California and Great Basin Archaeology* 20(2):195-218.

California Air Resources Board (ARB). 2012a. *Ambient Air Quality Standards (AAQS)*. Website: http://www.arb.ca.gov/research/aaqs/aaqs2.pdf.

_____. 2012b. *In-Use Off-Road Equipment 2011 Inventory Model*. Website: http://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles.

_____. 2011. EMFAC2011. Website: http://www.arb.ca.gov/msei/modeling.htm.

California Department of Fish and Game (CDFW). 2000. The Status of Rare, Threatened, and Endangered Animals and Plants of California, Thread-leaved brodiaea. http://www.dfg.ca.gov/hcpb/cgi-bin/more_info.asp?idKey=ssc_tespp&specy=plants &query=Brodiaea%20filifolia

California Department of Resources Recycling and Recovery. 2012a. *Facility/Site Summary Details for Las Pulgas Landfill*. Solid Waste Information System. Accessed on July 20, 2012.

_____. 2012b. *Facility/Site Summary Details for San Onofre Landfill*. Solid Waste Information System. Accessed on July 20, 2012.

California Department of Water Resources (DWR). 2003. *San Mateo Groundwater Basin*, California's Groundwater Bulletin 118. http://www.water.ca.gov/pubs/groundwater/bulletin_118/basindescriptions/9-2.pdf. Accessed 9/26/12.

_____ . 1967. *Ground Water Occurrence and Quality: San Diego Region*. Bulletin No. 106-2. 235 p.

California Division of Mines and Geology. 1999. *Fault Rupture Hazard Zones in California*. Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zone Maps. Special Publication 42. Sacramento, CA.

_____ . 1994. Fault Activity Map of California and Adjacent Areas, with Locations and Ages of Recent Volcanic Eruptions, compiled by C.W. Jennings.

California Energy Commission. 2012. Our Changing Climate 2012 – Vulnerability & Adaptation to the Increasing Risks from Climate Change in California: A Summary Report on the Third Assessment from the California Climate Center. Publication number CEC-500-2012-007. Available at: http://www.climatechange.ca.gov/adaptation/third_assessment/.

California Stormwater Quality Association. 2003. *Stormwater Best Management Practice Handbook: Construction*.

Carillo, Charles and Charles Bull. 1979. Archaeological Investigation of the MTDB Fixed Guideway Project Route, Center City to San Ysidro. Report submitted to Metropolitan Transit Development Board. On file, SCIC, San Diego State University, under NADB #1120698.

Cooley, Theodore. 1998. Cultural Resources Technical Report of Phase I and Phase II Studies Conducted for the Helicopter Outlying Landing Field (HOLF) at Marine Corps Base, Camp Pendleton, San Diego County, California. Report prepared by Mooney & Associates, San Diego. Report submitted to Southwest Division, NAVFACENGCOM. On file, SCIC, San Diego State University, under NADB #1123645.

Council on Environmental Quality (CEQ). 2010. White House Council on Environmental Quality Announces Steps to Modernize and Reinvigorate the National Environmental Policy Act. Website: http://www.whitehouse.gov/administration/eop/ceq/Press_Releases/18 February_2010.

____. 1997. Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses. http://www.epa.gov/compliance/resources/policies/ej/ej_guidance_nepa_epa0498.pdf.

Department of the Navy (DoN). 2010. 2010a. Marine Corps Base Camp Pendleton Master Plan. Prepared for Southwest Division, Naval Facilities Engineering Command. September.

_____ 2010b. Final Environmental Impact Statement for the West Coast Basing of the F-35B. Table 7-10 in Section 7.3.4.

_____ . 2006a. Final Results of the Condition Assessment, Site Monitoring, and Effects Treatment Program. On file, SCIC, San Diego State University, under NADB #1130496.

_____ . 2006b. *Department of the Navy Announces the Proposed Plan for Cleanup of Soil at Marine Corps Base Camp Pendleton for Operable Unit 4 Site 1H*. November 2006.

_____ . 1992. *Draft Programmatic EIS for Dredged Material Disposal* (from 3 volumes). Southwest Division, Naval Facilities Engineering Command, San Diego, CA.

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

Erlandson, Jon M. 1994. *Early Hunter-Gatherers of the California Coast*. New York: Plenum Press.

Erlandson, J.M. and R.H. Colton (eds.). 1991. *Hunter-Gatherers of Early Holocene California*. University of California, Los Angeles, Perspectives in California Archaeology 1.

Ezell, Paul and Joseph Theskin. 1987. The 1981 Archaeological Survey, Camp Joseph H. Pendleton. Report submitted to U.S. Marine Corps, Camp Pendleton. On file, SCIC, San Diego State University, under NADB #1120663.

Franzreb, K.E. 1989. *Ecology and Conservation of the Endangered Least Bell's Vireo*. U.S. Fish and Wildlife Service Biological Report 89(1).

Gallegos, D. R. 1987. A Review and Synthesis of Environmental and Cultural Material for the Batiquitos Lagoon Region. In *San Dieguito-La Jolla: Chronology and Controversy*, edited by Dennis Gallegos, pp. 23-24. San Diego County Archaeological Society Research Paper No. 1.

Hale, Micah J. and Mark S. Becker. 2007. An Archaeological Survey of Selected Areas for the Repair of 24 Access Roads to Training Ranges, Marine Corps Base, Camp Pendleton, San Diego County, California. Report submitted to Naval Facilities Engineering Command Southwest. On file, SCIC, San Diego State University, under NADB #1131836.

Howell, S.L. and B.E. Kus. 2009. Distribution, abundance and breeding activities of the Southwestern Willow Flycatcher at Marine Corps Base Camp Pendleton, California. 2009 Annual Report. Prepared for Assistant Chief of Staff, Environmental Security, Marine Corps Base Camp Pendleton.

Huey, Danielle M. 1995. Final Cultural Resources Inventory for All-Weather Access to Range 314 Marine Corps Base Camp Pendleton, California. Report submitted to Commanding General U.S. Marine Corps. On file, SCIC, San Diego State University, under NADB #1127319.

ICF. 2012a. Final Report *Brodiaea filifolia* Surveys, P-637 Infantry Squad Battle Course Project, Marine Corps Base Camp Pendleton, California. Prepared for Naval Facilities Engineering Command Southwest, San Diego. CA. March.

_____ . 2012b. Final Report Results of Protocol Surveys for Listed Fairy Shrimp, P-637 Infantry Squad Battle Course Project, Marine Corps Base Camp Pendleton. Prepared for Naval Facilities Engineering Command Southwest, San Diego. CA. February.

Intergovernmental Panel on Climate Change (IPCC). 2014. Fifth Assessment Report (AR5). Available at http://www.ipcc.ch/report/ar5/index.shtml.

James, Delman. 2009. Primary Record for P-37-031773/CA-SDI-20180. On file, SCIC, San Diego State University.

Jennings, C.W. 1994. *Fault Activity Map of California and Adjacent Areas, With Locations and Ages of Recent Volcanic Eruptions*. California Division of Mines and Geology, Geologic Data Map No. 6, Scale 1:750,000.

Johnson, J. and S. O'Neil. 2001. Descendants of Native Communities in the Vicinity of Camp Pendleton: An Ethnohistoric Study of Luiseño and Juaneño Cultural Affiliation (Draft). Prepared by Science Applications International Corporation. Submitted to MCB Camp Pendleton.

Jones, T. 1991. Marine Resource Value and the Priority of Coastal Settlement: A California Perspective. *American Antiquity* 56:419–443.

Jones, B.L. 1989. *Status of the Least Bell's Vireo on Marine Corps Base, Camp Pendleton, San Diego County, California in 1988*. Sweetwater Environmental Biologists, Spring Valley.

Kellogg and Kellogg. 1988. *Soil Erosion Assessment for the Camp Pendleton Marine Corps Base, San Diego County, California*. Prepared by Tierra Data Systems.

King, J. 2000. Archaeological Survey of Portions of the State Beach and Bravo Two Training Areas, MCB Camp Pendleton, San Diego County, California. Report submitted to Naval Facilities Engineering Command. Report prepared by Far Western Anthropological Research Group, Inc., Davis, California. On file, SCIC, San Diego State University, under NADB #1123778.

Kleinfelder. 2014. Geotechnical Report, P-637 Infantry Squad Defense Range, Range 314, Marine Corps Base Camp Pendleton, Oceanside, California. Prepared for RBF Consulting, 14 August.

_____. 2013. Geotechnical Report, P-637 Infantry Squad Defense Range, Range 314, Marine Corps Base Camp Pendleton, Oceanside, California. Prepared for RBF Consulting, September 6, revised November 8.

_____. 2012. Draft Geotechnical Report, P-637 Infantry Squad Defense Range Access Road and Bridge Over San Mateo Creek, Marine Corps Base Camp Pendleton, Oceanside, California. Prepared for RBF Consulting, December 10.

Kroeber, Alfred L. 1925 *Handbook of the Indian of California.* Smithsonian Institution, Washington, D.C.

Kus, B.E., and K.L. Miner. 1989. Use of Non-Riparian Habitats by Least Bell's Vireo. Pages 299-303. In *Proceedings of the California Riparian Systems Conference*. USDA Forest Service Gen. Tech. Rep. PSW-110.

Leedshill-Herkenhoff, Inc. 1989. Basewide Water Requirement/Availability Study; Revised February 1989. Unpublished report prepared for MCB Camp Pendleton, California.

_____ . 2012. P-637 Site Visit Minutes (Fire Analysis and Geotechnical CATEX discussions) 21 May.

Marine Corps Installations West (MCI West). 2009. Greenhouse Gas Assessment for Marine Corps Installations West.

Masters, P.M. and D. Gallegos. 1997. Environmental Change and Coastal Adaptations in San Diego County during the Middle Holocene. In: Erlandson, Jon M., and Michael A. Glassow (eds.) *Archaeology of*

the California Coast During the Middle Holocene. University of California, Los Angeles. Perspectives in California Archaeology, Vol. 4. pp 11–22.

Meighan, Clement W. 1954. A Late Complex in Southern California Prehistory. *Southwestern Journal of Anthropology* 10:215-227. 1959 California Cultures and the Concept of an Archaic Stage. *American Antiquity* 24:289-305.

Merkel & Associates, Inc. (M&A). 2007. 45-day Letter Report of Coastal California Gnatcatcher Protocol Surveys for the P-637 Infantry Squad Battle Course Project, Located on the Camp Pendleton Marine Corps Base, San Diego County.

Moyle, P.B., R.M. Yoshiyama, J.E. Williams, and E.D. Wikramanayake. 1995. *Fish Species of Special Concern in California*. Second Edition. Prepared for California Department of Fish and Game, Rancho Cordova. Contract No. 2128IF.

National Marine Fisheries Service (NMFS). 2011. Southern California Steelhead Recovery Plan. Southwest Region, Protected Resources Division, Long Beach, California. January.

_____. 2002. Endangered and Threatened Species: Range Extension for Endangered Steelhead in Southern California. Final Rule. Federal Register 67(84): 21586-21598.

_____ . 1997. Endangered and Threatened Species: Listing of Several Evolutionarily Significant Units (ESUs) of West Coast Steelhead. Final Rule. Federal Register 62(159): 43937-43954.

Oberbauer, T., M. Kelly, and J. Buegge. 2008. Draft Vegetation Communities of San Diego County. Based on "Preliminary Descriptions of the Terrestrial Natural Communities of California." Robert F. Holland, Ph.D., October 1986.

RBF Consulting. 2014. *Storm Water Protection Report for FY-12 Milcon Project P-637 Infantry Squad Defense Range Including Access Road and Bridge*, Camp Pendleton, CA, August.

Reddy, Seetha N. 2007. A Programmatic Approach for National Register Eligibility Determinations of Prehistoric Sites within the Southern Coast Archaeological Region, California. Statistical Research, Inc. Submitted to the Department of Defense. On file, SCIC, San Diego State University, under NADB #1131460.

Reddy, Seetha N. and Brian Byrd. 1997. A Window to the Past: Designing Archaeological Study on Camp Pendleton, California. ASM Affiliates, Inc. Technical Report prepared for the U.S. Army Corps of Engineers, Los Angeles District, CA.

Regional Water Quality Control Board (RWQCB). 1999. *Erosion and Sediment Control Field Manual*. Regional Water Quality Control Board. Sacramento, California.

SAIC. 2012. Final Delineation of Wetlands and Other Waters of the United States in Support of the P-637 Battle Course Range Upgrade Project. Prepared for Marine Corps Base Camp Pendleton, California. August.

_____ . 2007a. Vegetation Community Survey and Mapping Report P-637 Infantry Squad Battle Course at Marine Corps Base, Camp Pendleton. Prepared for Naval Facilities Engineering Command Southwest, San Diego. CA. February.

_____ . 2007b. Draft Rare Plant Survey and Mapping Report, P-637 Infantry Squad Battle Course at Marine Corps Base, Camp Pendleton. June.

_____. 2007c. Wetland Delineation Report, P-637 Infantry Squad Battle Course at Marine Corps Base, Camp Pendleton. February.

_____ . 2007d. Revised Cultural Resources Survey Report for the P-637 Infantry Squad Battle Course Range, Marine Corps Base, Camp Pendleton, California. Prepared for Naval Facilities Engineering Command, Southwest Division.

Salata, L.R. 1981. Status of the Least Bell's Vireo on Camp Pendleton California [in 1982]. Unpublished report prepared for the USFWS, Laguna Niguel Field Office. Laguna Niguel, California.

San Diego County Air Pollution Control District (SDCAPCD). 2012a. Air Quality Planning. Website: http://www.sdapcd.org/planning/plan.html.

_____ . 2012b. Rules and Regulations. Website: http://www.sdapcd.org/rules/rules.html.

Shaver, C., and A. York. 2004. Cultural Resources Inventory for Portions of Training Areas Alfa One and Bravo One, Marine Corps Base Camp Pendleton, California. Report prepared for U.S. Department of the Navy, Southwest Division, Naval Facilities Engineering Command. EDAW, Inc., San Diego, California.

Shaver, C., J. Smallwood, T. Spears, C. Zepeda, and C. Holton. 2002a. Primary Record for CA-SDI-16905. On file, SCIC, San Diego State University.

_____ . 2002b. Primary Record for CA-SDI-16906. On file, SCIC, San Diego State University.

Shipek, Florence C. 1977. A Strategy for Change: The Luiseño of Southern California. Ph.D. Dissertation, Department of Anthropology, University of Hawaii.

Tierra Data, Inc. 2014. Coastal California Gnatcatcher Surveys to Support the Environmental Assessment for P-637, Marine Corps Base Camp Pendleton, California. Draft Report. May.

Titus, R. G., D. C. Erman, and W. M. Snider. 2003. History and Status of Steelhead in California Coastal Drainages South of San Francisco Bay. Draft manuscript.

Turschak, G.M., C.S. Brehme, S.L. Schuster, C.J. Rochester, and R. N. Fisher. 2009. MCBCP Arroyo Toad Monitoring Results for 2008. U.S. Geological Survey Western Ecological Research Center, San Diego, CA. Data summary prepared for AC/S Environmental Security, Marine Corps Base Camp Pendleton.

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

United States Department of Agriculture (USDA). 1973. *Soil Survey, San Diego Area, California*. Prepared by the Soil Conservation Service and Forest Service in cooperation with the University of California Agricultural Experiment Station, United States Department of the Interior, Bureau of Indian Affairs, Department of the Navy, and the United States Marine Corps.

United States Environmental Protection Agency (USEPA). 2014. *National Greenhouse Gas Emissions Data - Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012*. Available at http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html.

_____ . 1995. Compilation of Air Pollution Emission Factors, AP-42, Volume I. Section 13.2.3 Website: http://www.epa.gov/otaq/ap42.htm. 1994. *Environmental Justice Task Force Draft Final Report*. Office of Solid Waste and Emergency Response.

United States Fish and Wildlife Service (USFWS). 2011a. Endangered and Threatened Wildlife and Plants; Final Revised Critical Habitat for *Brodiaea filifolia* (Thread-Leaved Brodiaea). Federal Register. 50 CFR Part 17. Vol. 76, No. 26. February 8.

_____ . 2011b. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Arroyo Toad; Final Rule. 50 CFR Part 17, Vol. 76, No. 27. February 9.

_____ . 2005a. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*); Final Rule. Federal Register 70 (201): 60886-61009. October 19, 2005.

_____. 2002. *Southwestern Willow Flycatcher Recovery Plan.* USFWS, Albuquerque, New Mexico.

_____ . 1999. Arroyo southwestern toad (*Bufo microscaphus californicus*) recovery plan. U.S. Fish and wildlife Service, Portland, Oregon. vi + 119 pp.

_____ . 1998a. Draft recovery plan for the least Bell's vireo. U.S. Fish and Wildlife Service, Portland, Oregon.

_____ . 1998b. Endangered and Threatened Wildlife and Plants; Determination of Endangered or Threatened Status for Four Southwestern California Plants from Vernal Wetlands and Clay Soils. Federal Register 63(197): 54975 - 54994.

_____ . 1998c. Endangered and threatened wildlife and plants: Listing of several evolutionarily significant units of west coast steelhead. Federal Register 63(116): 32996 - 32998.

_____ . 1997a. Endangered and Threatened Wildlife and Plants; Final Determination of Critical Habitat for the Southwestern Willow Flycatcher. Federal Register. Vol. 62, No. 140. pp. 39129-39147.

_____ . 1997b. Endangered and Threatened Wildlife and Plants; Final Determination of Critical Habitat for the Southwestern Willow Flycatcher; Correction. August 20.

_____ . 1995a. Biological Opinion (1-6-95-F-02), Programmatic Activities and Conservation Plans in Riparian and Estuarine/Beach Ecosystems on MCB Camp Pendleton. Prepared by Carlsbad Field Office. October 30.

_____ . 1995b. Endangered and Threatened Wildlife and Plants; Final Rule Determining Endangered Status for the Southwestern Willow Flycatcher. Federal Register 60: 10694.

_____ . 1994a. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Arroyo Southwestern Toad, Southern California and Northwestern Baja California, Mexico. 59 Federal Register 64859. December. 17 pp.

_____ . 1994b. Endangered and Threatened Wildlife and Plants; Final Determination of Critical Habitat for the Least Bell's Vireo. Federal Register. 50 CFR Part 17 Vol. 59, No. 22. pp. 4845-4867.

_____ . 1986. Endangered and Threatened Wildlife and Plants; Least Bell's Vireo; Determination of Endangered Status, and Reopening of Comment Period in the Proposed Critical Habitat Designation. *Federal Register* 51(85): 16474-16483.

United States Geological Survey (USGS). 2013. Scarlett L. Howell and Barbara E. Kus. Western Ecological Research Center. Distribution, Abundance, and Breeding Activities of the Southwestern Willow Flycatcher at Marine Corps Base Camp Pendleton, California. 2013 Annual Data Summary.

_____ . 2011. Camp Pendleton Tidewater Goby Monitoring Project Report. Prepared for U.S.M.C. Camp Pendleton. 2011.

United States Global Change Research Program. 2014. National Climate Assessment. Available at www.globalchange.gov.

United States Marine Corps (USMC). 2012. Marine Corps Base Camp Pendleton, Installation Restoration Program. Website: http://www.marines.mil/unit/basecamppendleton/Pages/BaseStaffandAgencies/Environmental/IR/ir_sites4.html.

_____ . 2011. Military Construction Program 1391. Description of Proposed Construction.

_____. 2007a updated. *MCB Camp Pendleton Integrated Natural Resources Management Plan*. March. Updated March 2012.

_____ . 2000. *MCB Camp Pendleton Soil Erosion Management Practice Handbook*. November.

URS. 2011. *San Mateo Creek Hydraulics and Scour Report, Final*. Prepared for Naval Facilities Engineering Command, Southwest Division, Central IPT, 15 April.

Warren, Claude N. 1968. Cultural Change and Ecological Adaptation on the Southern California Coast. In *Archaic Prehistory in the Western United States,* edited by Cynthia Irwin-Williams, pp. 1-14. Eastern New Mexico University Contributions in Anthropology 1, Portales, New Mexico.

Warren, C.N. and M. G. Pavesic. 1963. Shell Midden Analysis of Site SDI-603 and Ecological Implications for Cultural Development of Batiquitos Lagoon, San Diego County, California. Los Angeles: *University of California Archaeological Survey Annual Report 1962-1963*, pp. 407-438.

Warren, C.N., D.L. True, and A.A. Eudey. 1961. Early Gathering Complexes of Western San Diego County: Results and Interpretations of an Archaeological Survey. Los Angeles: *University of California Archaeological Survey Annual Report 1960-1961*, pp. 1-106.

White, Raymond. 1963. *Luiseno Social Organization*. University of California Press, Berkeley.

Widell, Cheryl. 1998. Helicopter Outlying Landing Field, Camp Pendleton. Submitted to the U.S. Marine Corps. On file, SCIC, San Diego State University, under NADB #1126906.

Woodward-Clyde Consultants. 1998. Summary of Sediment Sample Analytical Results, CVN Berthing Wharf — Phase II (P-700A). Letter report to Naval Facilities Engineering Command, Department of the Navy, San Diego, California.

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Appendix A

RETS Range Letters

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UNITED STATES MARINE CORPS
MARINE CORPS BASE
BOX 555010
CAMP PENDLETON, CALIFORNIA 92055-5010

IN REPLY REFER TO:
1500
O&TTRMD
29 OCT 1998

From: Commanding General, Marine Corps Base, Camp Pendleton
To: Commanding General, Marine Corps Combat Development Command (Attn: T&E Div)
Via: (1) Commanding General, First Marine Expeditionary Force
(2) Commanding General, Marine Forces Pacific

Subj: **ADDITIONAL REMOTED TARGET SYSTEM (RETS) RANGES**

1. Request Marine Corps Base, Camp Pendleton receive Military Construction acquisition priority for the following RETS Ranges:

(1) P-633 Infantry Squad Battle Course (ISBC)
(2) P-634 Armor/Anti-Armor Tracking Range (A/AATR)
(3) P-607 Infantry Squad Defensive Range (ISDR)
(4) P-613 Close Combat Pistol Course (CCPC)

2. The original Acquisition Objective (AO) for the RETS ranges was based on a study of Individual Training Standards (ITS), Tables of Organization/Equipment, and Camp Pendleton's range capacity. Camp Pendleton currently has four RETS ranges out of the original AO of sixteen, and there are no others funded for the future. The multi-purpose range complex, infantry platoon battle course, infantry squad defensive range, and multi-purpose machinegun range that exist now, when complemented by the ranges identified above, will offer the Fleet Marine Force and Formal Schools aboard Camp Pendleton the training opportunity and challenges of each type of RETS range. While the original AO is a desirable end-state, the four ranges being requested are the most crucial to solving the existing training deficiencies on the Base.

3. The Infantry Squad Battle Course (P-633) will primarily support over 5,000 entry-level infantry Marines per year from Infantry Training Battalion (ITB), in addition to the numerous FMF units aboard Camp Pendleton. With an ever-increasing requirement for immediate feedback during live-fire and excess demand for existing training facilities, Camp Pendleton requires a dedicated ISBC to support ITB's Program of Instruction, and still provide adequate facilities to support the sustainment-level ITSs of the FMF. ISBC (P-633) will support 16 ITSs from occupational field 03.

4. Armor/Anti-Armor Tracking Range (P-634) will provide tanks, LAVs, AAVs, and Weapons Company Anti-Armor assets with an enhanced live-fire tracking opportunity. The additional moving targets associated with P-634 will increase those currently available by over 100%. The existing Multi-Purpose Range Complex (MPRC) located on Range 409 is structured to primarily support training at the platoon level. The combined effect of building an A/AATR adjacent to, and integrated with the existing MPRC, will offer an expansive maneuver and target area capable of supporting a company-sized attack. Additionally, an A/AATR built to complement the MPRC on Range 409 will support the re-orientation of the range toward the Zulu Impact Area, and reduce the risk of training-related wildfires crossing the Base border into the community of Fallbrook. An A/AATR (P-634) will support 26 ITSs from occupational fields 03 and 18.

5. The addition of an Infantry Squad Defensive Range (P-607) will primarily support over 13,000 entry-level, non-infantry Marines per year from Marine Combat Training (MCT) Battalion. Since MCT has range requirements 48 weeks per year, the entire Base will benefit from a dedicated ISDR for MCT as they train their entry-level Marines in the employment of mutually supporting fires from defensive positions, one of our most basic combat skills. An ISDR (P-607) will support 15 ITSs from occupational field 03.

6. A Close Combat Pistol Course (P-613) will fill a requirement for a combat pistol range aboard Camp Pendleton. Currently, the only dedicated pistol ranges aboard the Base are Known Distance ranges associated with annual requalification. The dynamic training opportunities offered by a Close Combat Pistol Course will enhance the proficiency and combat-readiness of those Marines whose T/O weapon is the pistol.

7. As the Marine Corps addresses a decrease in training ammunition, and recognizes that every live-fire round must count, the RETS ranges offer a dynamic solution to future ammunition reductions, which will continue to provide significant utility well into the 21st century. The RETS ranges, designed by the Army Corps of Engineers, offer the flexibility to integrate the MILES 2000 training system through the use of the MILES Target Interface Device (MTID). This instrumentation system permits simulation of live-fire training *scenarios approaching battle*

tempo, and will allow significant savings in ammunition expenditure.

8. My point of contact is Major Greg Branigan, Training Resources Management Division, Operations & Training Department at DSN 365-6010.

EDWARD HANLON, JR.

Copy to:
O&T(TRMD)
AC/S FACILITIES

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UNITED STATES MARINE CORPS
MARINE CORPS BASE
BOX 555010
CAMP PENDLETON, CALIFORNIA 92055-5010

IN REPLY REFER TO:
1500
O&TTRMD
09 NOV 1998

From: Commanding General, Marine Corps Base, Camp Pendleton
To: Commanding General, Marine Corps Combat Development Command (Attn: T&E Div)
Via: (1) Commanding General, First Marine Expeditionary Force
(2) Commanding General, Marine Forces Pacific

Subj: **ADDITIONAL REMOTED TARGET SYSTEM (RETS) RANGES**

1. Request Marine Corps Base, Camp Pendleton receive POM procurement priority support for the RETS ranges listed below. Results from the recent MARFORPAC MILCON Integrated Prioritization Board rendered range projects for FY2002/03 below the expected MILCON funding levels. In light of the limited MILCON funding, there is concern that these ranges will not be developed without additional sponsor support. Accordingly, these RETS ranges, which are included in Camp Pendleton's MILCON Program, must be included in the POM procurement process to help ensure their realization:

(1) P-633 Infantry Squad Battle Course (ISBC)
(2) P-634 Armor/Anti-Armor Tracking Range (A/AATR)
(3) P-607 Infantry Squad Defensive Range (ISDR)
(4) P-613 Close Combat Pistol Course (CCPC)

2. The original Acquisition Objective (AO) for the RETS ranges was based on a study of Individual Training Standards (ITS), Tables of Organization/Equipment, and Camp Pendleton's range capacity. Camp Pendleton currently has four RETS ranges out of the original AO of sixteen, and there are no others funded for the future. The multi-purpose range complex, infantry platoon battle course, infantry squad defensive range, and multi-purpose machinegun range that exist now, when complemented by the ranges identified above, will offer the Fleet Marine Force and Formal Schools aboard Camp Pendleton the training opportunity and challenges of each type of RETS range. While the original AO is a desirable end-state, the four ranges being requested are the most crucial to solving the existing training deficiencies on the Base.

3. The Infantry Squad Battle Course (P-633) will primarily support over 5,000 entry-level infantry Marines per year from Infantry Training Battalion (ITB), in addition to the numerous FMF units aboard Camp Pendleton. With an ever-increasing requirement for immediate feedback during live-fire and excess

SUBJ: ADDITIONAL REMOTED TARGET SYSTEM (RETS) RANGES

4. There are also cost savings benefits associated with RETS ranges. As the Marine Corps faces decreases in training ammunition and realizes that every live-fire training round must count, RETS ranges also offer a dynamic solution to future ammunition reductions. These ranges offer the flexibility to integrate with systems such as Laser Enhanced Silhouette (LES) and MILES 2000. This allows the use of MILES equipped weapons on RETS ranges. The combination of RETS, MILES and LES permits simulation of live-fire training scenarios approaching battle tempo while creating significant savings in ammunition expenditure.

5. My point of contact is Major Joe Spair, Training Resources Management Division, Operations & Training Department at DSN 365-6010.

E. HANLON, JR.

Copy to: AC/S, FAC
AC/S, O&T (TRMD/ROD)

Appendix B

UXO Removal Standard Operating Procedures

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Standing Operating Procedure
(SOP)

Surface Clearance

Approved by:
Daniel Skrobialowski
Director, UXO Services: _____

(Signature) **(Date)**

1.0 INTRODUCTION

1.1 Purpose

The purpose of this standard operating procedure (SOP) is to provide procedures for surface clearance of materials potentially presenting an explosive hazard (MPPEH) Range-Related Debris (RRD), Munitions Debris (MD), and miscellaneous trash. In selected work areas during the MEC clearance that will be conducted at MCBCP Project Sites. These procedures will be conducted in accordance with the Work Plan (WP) / Site Health and Safety Plan (SHSP) and SOPs. These procedures are general in nature and may be refined with concurrence of the Senior UXO Supervisor (SUXOS) to adapt to specific site conditions and circumstances.

1.2 Scope

The procedures described in this SOP are intended to provide a safe environment for personnel performing surface clearance activities to remove or dispose of MEC, MPPEH, MD, and RDD that may be present in the area of concern.

All munitions related items are considered to be MPPEH until they are subjected to a multi phase certification / verification inspection. If the item is determined to contain energetic material (EM), it is re-categorized as a Munitions and Explosives of Concern (MEC) item that is either unexploded ordnance (UXO), munitions debris or munitions constituents (MC). If the item is found to be free of ME, it is re-categorized as munitions debris (MD).

UXO team members performing surface clearance tasks use care when inspecting located items, but will not perform intrusive operations.

The procedures in this document are applicable to all UXO employees conducting a surface clearance.

2.0PERSONNEL REQUIREMENTS

Surface Clearance Operations require specific organizational roles and personnel assignments, specifically:

- A SUXOS responsible for planning, directing, and executing clearance operations.
- A UXOSO and UXOQCS to ensure that all work is performed safely and in accordance with the approved site-specific plans.
- Qualified UXO Technicians per team will be used to conduct clearance operations.
- UXO Technician III will only be designated as the Team Leader (UXOTL).

- UXO Technicians (level I or II) will assist the TL.

2.1 Two-Man Rule

The Two-Man Rule is a safety concept that is the basis of UXO operations. These individuals must be trained and be capable of recognizing safety hazards and improper procedures.

The Two-Man Rule will apply whenever UXO or MPPEH are handled or transported.

3.0 REQUIREMENTS

This section delineates the administrative, training, and logistical aspects of conducting a surface clearance.

3.1 Minimum Requirements

UXO Technicians performing clearance activities will follow the requirements listed in this procedure, but may request a variance if these procedures are perceived to conflict with MCBCP Policy, are unsafe, or are not compatible with contract or site-specific requirements. Permission to vary from this procedure must be obtained from the SUXOS and the UXOQCS. Changes to these procedures require that a field change request be completed.

All personnel engaged in surface clearance operations must be thoroughly trained in explosive safety, be capable of recognizing hazardous situations, and be capable of taking prompt corrective action. Surface clearance operations will not be conducted without authorization, approved plans/SOPs, qualified and trained UXO personnel, and proper search and safety equipment.

The minimum qualification standards for the various UXO positions (Senior UXO Supervisor, UXO Safety Officer, UXO Quality Control Specialist, Team Leader, etc.) in the project can be found in the Department of Defense Explosives Safety Board (DDESB) Technical Paper (TP) 18.

3.2 Coordination

A coordination meeting will be held to discuss roles and responsibilities before clearance operations commence. The meeting will address specific elements of planning and organizational responsibilities and will include, but not be limited to, the following topics:

- Team composition and assignments.
- Equipment checks and maintenance.
- Surface clearance procedures.

- Required support services, fire, medical, security, etc.
- Emergency procedures.
- Notification process.
- Exclusion zones and minimum safe distances.

3.3 Notifications

The SUXOS will ensure that the agencies responsible for emergency response are notified as far in advance as possible of the scheduled clearance activities. The notifications should address scheduling, evacuations, road closures, exclusion zones (EZs), and any required support. As a minimum, the following agencies should be notified and be prepared to respond, as applicable:

- Medical.
- Fire Department.
- Security/Police Department.
- LONGRIFLE (Range Control).

3.4 Exclusion Zone, Evacuations, and Road Closures

The unintentional detonation horizontal fragmentation distance for the munitions with the greatest fragment distance will be used to calculate the Exclusion Zone (EZ) for clearance operations.

The UXOSO establishes the EZ based on the MGFD. If/when a MEC item is encountered with a greater MGFD, the EZ will be adjusted accordingly.

3.4.1 Visitors

Authorized visitors may be granted access to the EZ provided that the following requirements are fulfilled, however if intrusive operations are being conducted then those intrusive tasks must cease while the visitor is in the area. The only exception is for a UXO qualified safety or QC.

- Access is limited to essential and authorized personnel.
- The UXO Safety Officer (UXOSO) has completed an operational risk assessment.
- The maximum number of visitors allowed in the EZ at one time is two.

- Individuals requesting access to the EZ must demonstrate a legitimate need for access and obtain authorization from the SUXOS and UXOSO.

- Visitors must receive a site-specific briefing explaining the hazards and safety procedures associated with the EZ and must acknowledge the receipt of the briefing in writing.

- Authorized visitors must be escorted by the SUXOS, UXOSO or base EOD at all times.

The EZ will remain intact until the clearance operation is complete. If MEC items larger than the identified MGFD are encountered, an EZ appropriate for that munition will be put into effect.

3.4.2 Team Separation Distances

The team separation distance between UXO teams will be the K40 distance of the MGFD.

3.5 Equipment/Material Requirements

The UXOTL will be responsible for ensuring that all required equipment and materials are available.

3.5.1 Navigation Equipment

Hand held/vehicle mounted global positioning systems will be used for navigation and recording location data.

3.5.2 Functionality Testing

The UXOQCS will verify that all equipment/instruments used by UXO personnel are checked out and working properly, and that the functionality of the navigation equipment is verified and documented on a daily basis.

3.5.3 Required Documents

The following documents are required to be available during clearance operations:

- Approved WP, SHSP and applicable SOPs.

3.6 Communications

Site operations will not be conducted unless off-site and Range Control (LONGRIFLE) communications are available. Off-site communications will be accomplished through the use of field radios and cell phones. A repeater may be established as necessary to ensure reliable radio communications with LONGRIFLE. The contact information for emergency services, including telephone numbers for the project personnel, is provided in the SHSP. These telephone numbers will be posted in the office and in site vehicles. Radios capable of communicating with the BSE

field office will be located in each vehicle or taken with teams on foot. Cell phones may used in lieu of radios. LONGRIFLE emergency phone number is (760) 725-3974.

Communications between personnel in the support zone (SZ) and personnel in the EZ will be maintained at all times.

Air horns are provided in each vehicle and EZ as a backup emergency notification system. The following air horn signals will be used to communicate with personnel if the radio is not operable:

- One Long Blast – Evacuate Area
- Two Short Blasts – All Clear
- Three Short Blasts – Emergency Help Required

The location of assembly points, emergency evacuation procedures, and emergency routes will be discussed during the tailgate safety meeting. The hospital routes and emergency telephone numbers will be posted in the BSE/P field office and site vehicles.

3.7 Range Vehicles

There will be a sufficient number of range vehicles (i.e. SUVS and pickup trucks) to transport all personnel involved in the clearance operation, and each range vehicle must have a seat, with a seat belt for each occupant.

Vehicles will be parked in a protected area, free of vegetation, facing away from the detonation site. The keys will remain in the ignition at all times, doors will remain unlocked.

3.8 Emergency Medical and Fire Support

- All emergencies shall be communicated to LONGRIFLE using the base-issued radios. LONGRIFLE will then coordinate the appropriate response and resources for the emergency.
- If base-issued radios are not operative, LONGRIFLE may be notified by telephone (760) 725-3974
- The telephone number and radio call sign of the EMS (LONGRIFLE) will be prominently posted at the BSE field office.
- At least two UXO personnel on each clearance team will be trained in first aid and CPR.
- A first-aid kit, portable eyewash, and blood-borne pathogen kit and burn blanket will be on site at all times, additional kits will be located in team vehicles. The first-aid kit will

contain dressings capable of treating traumatic injuries that could result from an explosion.

- All fires on range will be reported via radio to LONGRIFLE. LONGRIFLE will report the fire to MCBCP Fire Dept.

- Evacuate to a safe area if the fire occurs on an active range.

- In accordance with BSE's health & safety policy, BSE will not attempt to fight fires.

3.9 Personal Protective Equipment

Unless otherwise directed, clearance operations will be conducted in Level "D" personal protective equipment (PPE). This will consist of non-static producing clothing, gloves, safety glasses, and composite-toed safety boots or work boots.

4.0 Surface Clearance Procedures

Before clearance operations commence, all personnel assigned to, or working with clearance teams will attend a site-specific briefing. The purpose of the briefing will be to review surface clearance and emergency response procedures. Course attendance sheets, discussion topics, will be used to document the completion of each days briefing. The topics to be covered during the briefing will include, but not be limited to:

Briefings that will be conducted every work day are as follows:

- Daily health and safety briefing (including tail-gate briefings)

- Daily Weather Forecast

- Team assignments

- Operation overview

- Two-Man rule

- Site visitors

Surface clearance activities will not be conducted until the following requirements have been met:

- Training (both general and site-specific) has been conducted.

- Proper equipment/vehicle checks have been completed.

- The appropriate EZ is established based upon the MGFD.

4.1 Clearance Team Composition

Clearance activities will be conducted by a team of at least three individuals, one of whom must be a qualified UXO Technician III. The UXO Technician III will be the assigned Team Leader (UXOTL) and will be responsible for coordinating team activities to accomplish the daily work assignments in a safe, effective manner.

4.2 Clearance Boundaries and Survey Lanes

Prior to beginning the surface clearance, the corners/boundaries of the work areas will be staked or marked to provide navigational guidance for the team performing the clearance. UXO avoidance procedures will be employed prior to placing any marking stakes. After the EZ has been established, the UXOTL will notify the SUXOS that the team is ready to begin operations. When approval to begin the clearance/reconnaissance operation is received, the team will enter the work area. The clearance team will form a line abreast, spaced in a manner that permits a slight visual overlap of individual lanes. The team member on one end of the line will act as the guide and navigate a straight path along the marked boundary line. The team will maintain even spacing and alignment with the guide. The team member on the opposite end of the line will mark the border of each sweep providing a clear delineation of the sweep boundary. The team will use this line on their return trips. The UXOTL will determine which technique will be used to mark the sweep boundaries (line, marking flags, cones, etc.) The marked boundary will guide the next pass as the sweep progresses.

The following actions will take place during the surface clearance:

- All visible items, (or partially visible) will be removed by hand once a UXO technician determines the item is not MEC or MPPEH. The UXOTL will be notified immediately if MEC is located.

- MPPEH, MEC and MD will be disposed of in accordance with approved procedures in the WP and applicable SOP.

- All appropriate documentation for data collection and MEC discovery will be completed.

- The UXOTL will inform the SUXOS when surface clearance activities are completed.

- At the end of each day, the UXOTL will complete his log either using a PDA or a log book to document successful completion of required activities. The completed log or PDA will be submitted to the SUXOS for review and, if necessary, correction. Clearance teams are subject to QC inspection at any time.

5.0 Items Other than MPPEH

It is possible that hazardous and non-hazardous material other than MPPEH may be located during the surface clearance, including radium dials, tires, creosote wood and other hazards. They will be processed as follows:

Tires, creosote treated items, and other hazardous items will be handled IAW the Base requirement.

5.1 Radiation-Contaminated Targets (Radium Dials)

In accordance with the recent Marine Corps directive, all radioactive materials will be handled as stated below:

Effective immediately, the Marine Corps ORC program has adopted Interim Radiological Procedures while awaiting the outcome of radium discussions between the NRC and DOD. These procedures will allow BSE not to invoke an NRC license. With regard to BSE's work, these procedures apply to radiation-contaminated targets (primarily radium dials) discovered while performing ORC on Operational Training Ranges.

In order to comply with the limitations and concerns regarding the radium issues, BSE will suspend the handoff of any radium dials to the Installation Radiation Safety Officer (IRSO), or any movement of those dials until further notification from the Marine Corps.

Once BSE has confirmed the presence of a radioactive target, the target will be marked with red paint, it's position will be recorded using a handheld GPS unit, and the target will be left in-place for later disposal. All GPS coordinates will be provided to Range Management.

If the contaminated target is a tank, BSE will paint the turret red. If the target is a vehicle, frame, or other target, BSE will paint a visible portion of it red. BSE will position all red paint markings so that it may be seen from a 360 degree view.

BSE will leave all identified contaminated targets in-place in compliance with the new directive which does not allow movement at the present time. BSE will provide location coordinates to the range managers who must maintain a record of known radiation-contaminated targets if found, and they must stay on the range.

6.0 Disposition, Handling, Transportation, and Storage

MEC found during surface clearance operations will be blown in place (BIP) or consolidated at the collection point and disposed of on an as needed basis then inspected to determine if item has any remaining explosive hazards, and then handled IAW the processes for MPPEH. If the item is determined to be hazard free and categorized as MD the process for MD will be followed.

7.0 Special Considerations

All surface clearance operations in sensitive areas (environmental and/or archeological) will be conducted in accordance with BSE's Environmental Protection Plan and all federal, state, Marine Corps, and base regulations and orders.

7.1 Access Procedures for Base Archeological and Environmental Personnel in Clearance Areas

- Base archeological and environmental personnel must coordinate through range operations and base EOD for access to clearance areas during surface clearance operations.
- It is recommended that no access be allowed into the clearance areas until BSE has completed surface clearance operations.

- The SUXOS will coordinate any deviations to this SOP and the site-specific EPP through MCBCP and NAVFAC SW representatives.

8.0 References

- DDESB (Department of Defense Explosives Safety Board). 2004. Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel. Technical Paper 18. Alexandria, Virginia. December 20.

- DoD (Department of Defense). 2006. *Methodologies for Calculating Primary Fragment Characteristics.* DDESB TP 16, Revision 2. December 1.

- Navy. 2003. Ammunition and Explosives Ashore: Safety Regulations for Handling, Storing, Production, Renovation, and Shipping. NAVSEA OP 5, Volume 1, Seventh Revision. Commander, Naval Sea Systems Command. Washington, D.C.

- Work Plan Amendment 2, Operational Range Clearance at Multiple Training Range Locations, Marine Corps Base Camp Pendleton, California, Contract No. N62473-09-D-2617, Delivery Order 0006, BSE, April 2011

- DID MR -005-12

- BO 3500-1N

- Applicable PED and CAT-X documents

- Interim Radiological Procedures (email communication from NAVFAC SW to BSE dated 18 May 2012)

Standing Operating Procedure
(SOP)

Subsurface Clearance

Approved by:
Daniel Skrobialowski
Director, UXO Services: _____

(Signature) **(Date)**

1.0 INTRODUCTION

1.1 Purpose

The purpose of this standard operating procedure (SOP) is to provide procedures for subsurface clearance of materials potentially presenting an explosive hazard (MPPEH) Range-Related Debris (RRD), Munitions Debris (MD), and miscellaneous trash. In selected work areas during the MEC clearance that will be conducted at MCBCP Project Sites. These procedures will be conducted in accordance with the Work Plan (WP) / Site Health and Safety Plan (SHSP) and SOPs. These procedures are general in nature and may be refined with concurrence of the Senior UXO Supervisor (SUXOS) to adapt to specific site conditions and circumstances.

1.2 Scope

The procedures described in this SOP are intended to provide a safe environment for personnel performing subsurface clearance activities to remove or dispose of MEC, MPPEH, MD, and RDD that may be present in the area of concern.

All munitions related items are considered to be MPPEH until they are subjected to a multi-phase certification / verification inspection. If the item is determined to contain energetic materials (EM), it is re-categorized as a Munitions and Explosives of Concern (MEC) item that is either unexploded ordnance (UXO), munitions debris or munitions constituents (MC). If the item is found to be free of EM, it is re-categorized as munitions debris (MD).

UXO team members performing subsurface clearance tasks will use care when locating inspecting, and identifying located anomalies. The procedures in this document are applicable to all UXO employees conducting a subsurface clearance.

2.0 PERSONNEL REQUIREMENTS

Subsurface Clearance Operations require specific organizational roles and personnel assignments, specifically:

- A SUXOS responsible for planning, directing, and executing clearance operations.
- A UXOSO and UXOQCS to ensure that all work is performed safely and in accordance with the approved site-specific plans.
- Qualified UXO Technicians per team will be used to conduct clearance operations.
- UXO Technician III will only be designated as the Team Leader (UXOTL).
- UXO Technicians (level I or II) will assist the TL.

2.1 Two-Man Rule

The Two-Man Rule is a safety concept that is the basis of UXO operations. These individuals must be trained and be capable of recognizing safety hazards and improper procedures.

The Two-Man Rule will apply whenever UXO or MPPEH are handled or transported.

3.0 REQUIREMENTS

This section delineates the administrative, training, and logistical aspects of conducting a subsurface clearance.

3.1 Minimum Requirements

UXO Technicians performing clearance activities will follow the requirements listed in this procedure, but may request a variance if these procedures are perceived to conflict with MCBCP Policy, are unsafe, or are not compatible with contract or site-specific requirements. Permission to vary from this procedure must be obtained from the SUXOS and the UXOQCS. Changes to these procedures require that a field change request be completed.

All personnel engaged in subsurface clearance operations must be thoroughly trained in explosive safety, be capable of recognizing hazardous situations, and be capable of taking prompt corrective action. Subsurface clearance operations will not be conducted without authorization, approved plans/SOPs, qualified and trained UXO personnel, and proper search and safety equipment.

The minimum qualification standards for the various UXO positions (Senior UXO Supervisor, UXO Safety Officer, UXO Quality Control Specialist, Team Leader, etc.) in the project can be found in the Department of Defense Explosives Safety Board (DDESB) Technical Paper (TP) 18.

3.2 Coordination

A coordination meeting will be held to discuss roles and responsibilities before clearance operations commence. The meeting will address specific elements of planning and organizational responsibilities and will include, but not be limited to, the following topics:

- Team composition and assignments.
- Equipment checks and maintenance.
- Subsurface clearance procedures.
- Required support services, fire, medical, security, etc.

- Emergency procedures.
- Notification process.
- Exclusion zones and minimum safe distances.

3.3 Notifications

The SUXOS will ensure that the agencies responsible for emergency response are notified as far in advance as possible of the scheduled clearance activities. The notifications should address scheduling, evacuations, road closures, exclusion zones (EZs), and any required support. As a minimum, the following agencies should be notified and be prepared to respond, as applicable:

- Medical.
- Fire Department.
- Security/Police Department.
- LONGRIFLE (Range Control).

3.4 Exclusion Zone, Evacuations, and Road Closures

The unintentional detonation horizontal fragmentation distance for the munition with the greatest fragment distance will be used to calculate the Exclusion Zone (EZ) for clearance operations. This item known to have been found in the clearance area is a 155 MM HE projectile. The minimum safe distance is 447 ft.

The UXOSO establishes the EZ based on the MGFD. If/when a MEC item is encountered with a greater MGFD, the EZ will be adjusted accordingly.

3.4.1 Visitors

Authorized visitors may be granted access to the EZ provided that the following requirements are fulfilled, however if intrusive operations are being conducted then those intrusive tasks must cease while the visitor is in the area. The only exception is for a UXO qualified safety or QC.

- Access is limited to essential and authorized personnel.
- The UXO Safety Officer (UXOSO) has completed an operational risk assessment.
- The maximum number of visitors allowed in the EZ at one time is two.

- Individuals requesting access to the EZ must demonstrate a legitimate need for access and obtain authorization from the SUXOS and UXOSO.

- Visitors must receive a site-specific briefing explaining the hazards and safety procedures associated with the EZ and must acknowledge the receipt of the briefing in writing.

- Authorized visitors must be escorted by the SUXOS, UXOSO or base EOD at all times.

The EZ will remain intact until the clearance operation is complete. If MEC items larger than the identified MGFD are encountered, an EZ appropriate for that munition will be put into effect.

3.4.2 Team Separation Distances

The team separation distance between UXO teams will be the K40 distance of the MGFD.

3.5 Equipment/Material Requirements

The UXOTL will be responsible for ensuring that all required equipment and materials are available.

3.5.1 Navigation Equipment

Hand held/vehicle mounted global positioning systems will be used for navigation and recording location data.

3.5.2 Functionality Testing

The UXOQCS will verify that all equipment/instruments used by UXO personnel are checked out and working properly, and that the functionality of the navigation equipment is verified and documented on a daily basis.

3.5.3 Required Documents

The following documents are required to be available during clearance operations:

- Approved WP, SHSP and applicable SOPs.

3.6 Communications

Site operations will not be conducted unless off-site and Range Control (LONGRIFLE) communications are available. Off-site communications will be accomplished through the use of field radios and cell phones. A repeater may be established as necessary to ensure reliable radio communications with LONGRIFLE. The contact information for emergency services, including telephone numbers for the project personnel, is provided in the SHSP. These telephone numbers will be posted in the office and in site vehicles. Radios capable of communicating with the BSE

field office will be located in each vehicle or taken with teams on foot. Cell phones may used in lieu of radios.

Communications between personnel in the support zone (SZ) and personnel in the EZ will be maintained at all times.

Air horns are provided in each vehicle and EZ as a backup emergency notification system. The following air horn signals will be used to communicate with personnel if the radio is not operable:

- One Long Blast – Evacuate Area
- Two Short Blasts – All Clear
- Three Short Blasts – Emergency Help Required

The location of assembly points, emergency evacuation procedures, and emergency routes will be discussed during the tailgate safety meeting. The hospital routes and emergency telephone numbers will be posted in the BSE/P field office and site vehicles.

3.7 Range Vehicles

There will be a sufficient number of range vehicles (i.e. SUVS and pickup trucks) to transport all personnel involved in the clearance operation, and each range vehicle must have a seat, with a seat belt for each occupant.

Vehicles will be parked in a protected area, free of vegetation, facing away from the detonation site. The keys will remain in the ignition at all times, doors will remain unlocked.

3.8 Emergency Medical Support

- The telephone number and radio call sign of the EMS will be prominently posted at the BSE field office.
- First aid/CPR response personnel will be notified of the location and duration of disposal operations each day.
- At least two UXO personnel will be trained in first aid and CPR.
- At first-aid kit, portable eyewash, and blood-borne pathogen kit and burn blanket will be on site at all times, additional kits will be located in team vehicles. The first-aid kit will contain dressings capable of treating traumatic injuries that could result from an explosion.

3.10 Fire Support

- All fires on range will be reported via radio to Long Rifle. Long Rifle will report the fire to MCBCP Fire Dept.
- Evacuate to a safe area if the fire occurs on an active range.
- In accordance with BSE's health & safety policy, BSE will not attempt to fight fires.

3.11 Personal Protective Equipment

Unless otherwise directed, clearance operations will be conducted in Level "D" personal protective equipment (PPE). This will consist of non-static producing clothing, gloves, safety glasses, and composite-toed safety boots or work boots.

4.0 Surface Clearance Procedures

Before subsurface clearance operations commence, all personnel assigned to, or working with clearance teams will attend a site-specific briefing. The purpose of the briefing will be to review subsurface clearance and emergency response procedures. Course attendance sheets, discussion topics, will be used to document the completion of each days briefing. The topics to be covered during the briefing will include, but not be limited to:

Briefings that will be conducted every work day are as follows:

- Daily health and safety briefing (including tail-gate briefings)
- Daily Weather Forecast
- Team assignments
- Operation overview
- Two-Man rule
- Site visitors

Subsurface clearance activities will not be conducted until the following requirements have been met:

- Training (both general and site-specific) has been conducted.
- Proper equipment/vehicle checks have been completed.
- The appropriate EZ is established based upon the MGFD.

4.1 Clearance Team Composition

Clearance activities will be conducted by a team of at least three individuals, one of whom must be a qualified UXO Technician III. The UXO Technician III will be the assigned Team Leader (UXOTL) and will be responsible for coordinating team activities to accomplish the daily work assignments in a safe, effective manner.

4.2 Clearance Boundaries and Survey Lanes

Prior to beginning subsurface clearance, the corners/boundaries of the clearance areas will be staked or marked to provide navigational guidance for the team performing the clearance. UXO avoidance procedures will be employed prior to placing any marking stakes. After the EZ has been established, the UXOTL will notify the SUXOS that the team is ready to begin operations. When approval to begin the clearance/reconnaissance operation is received, the team will enter the work area. The clearance team members will lay out sweep lanes as determined by the Team Leader and SUXOS. These lanes will be of a width that the sweep team members will have an overlap into the lanes on either side of their assigned lane using the magnetometer. This will prevent any area from being missed by team members. The tip of the magnetometer should be as close to the ground surface as possible. All audible detections will be investigated to determine if the source is an item of MEC or just debris of the size required to be removed. All ordnance debris is to be removed as well as all range debris greater than 4 inches in any direction.

The following actions will take place during the subsurface clearance:

- All ordnance scrap will be removed by hand once a UXO technician determines the item is not MEC or MPPEH. The UXOTL will be notified immediately if MEC is located.

- MPPEH, MEC and MD will be disposed of in accordance with approved procedures in the WP and applicable SOP.

- All appropriate documentation for data collection and MEC discovery will be completed.

- The UXOTL will inform the SUXOS when subsurface clearance activities are completed in the assigned grid area.

- At the end of each day, the UXOTL will complete his journal either using a PDA or a log book to document successful completion of required activities. The completed log or PDA will be submitted to the SUXOS for review and, if necessary, correction. Clearance teams are subject to QC inspection at any time.

5.0 Items Other than MPPEH

It is possible that hazardous and non-hazardous material other than MPPEH may be located during the clearance, including radium dials, tires, creosote wood and other hazards. They will be processed as follows:

Tires, creosote treated items, and other hazardous items will be handled IAW the Base requirement.

5.1 Radiation-Contaminated Targets (Radium Dials)

Radium Dials – Radium Dials located during the clearance will be documented in the logbook maintained by the UXOTL and will be treated under the terms of the Marine Corps Interim Radiological Procedures as stated below:

The Marine Corps ORC program has adopted Interim Radiological Procedures while awaiting the outcome of radium discussions between the NRC and DOD. These procedures will allow BSE not to invoke an NRC license. With regard to BSE's work, these procedures apply to radiation-contaminated targets (primarily radium dials) discovered while performing ORC on Operational Training Ranges.

In order to comply with the limitations and concerns regarding the radium issues, BSE will suspend the handoff of any radium dials to the Installation Radiation Safety Officer (IRSO), or any movement of those dials until further notification from the Marine Corps.

Once BSE has confirmed the presence of a radioactive target, the target will be marked with red paint, it's position will be recorded using a handheld GPS unit, and the target will be left in-place for later disposal. All GPS coordinates will be provided to Range Management.

If the contaminated target is a tank, BSE will paint the turret red. If the target is a vehicle, frame, or other target, BSE will paint a visible portion of it red. BSE will position all red paint markings so that it may be seen from a 360 degree view.

BSE will leave all identified contaminated targets in-place in compliance with the new directive which does not allow movement at the present time. BSE will provide location coordinates to the range managers who must maintain a record of known radiation-contaminated targets if found, and they must stay on the range.

6.0 Disposition, Handling, Transportation, and Storage

MEC found during surface clearance operations will be blown in place (BIP) or consolidated at the collection point and disposed of on an as needed basis then inspected to determine if item has any remaining explosive hazards, and then handled IAW the processes for MPPEH. If the item is determined to be hazard free and categorized as MD the process for MD will be followed.

7.0 Special Considerations

All subsurface clearance operations in sensitive areas (environmental and/or archeological) will be conducted in accordance with BSE's Environmental Protection Plan and all federal, state, Marine Corps, and base regulations and orders.

7.1 Access Procedures for Base Archeological and Environmental Personnel in Clearance Areas

- Base archeological and environmental personnel must coordinate through range operations and base EOD for access to clearance areas during subsurface clearance operations.
- It is recommended that no access be allowed into the clearance areas until BSE has completed subsurface clearance operations.
- Non-UXO personnel will not be authorized to dig in the clearance areas until all subsurface anomalies have been cleared by BSE personnel. BSE personnel will ensure all spoils removed from the site during clearance operations are set aside (i.e., on tarps, in buckets, etc.) to facilitate investigation by archeological/environmental personnel. BSE personnel will discontinue digging if items of interest are found until cleared to continue by base personnel. Non-UXO personnel will remain in the safe area until the cleared area is turned over to base EOD personnel at which time base EOD will escort the non-UXO personnel into the clearance area to conduct their operations.
- The SUXOS will coordinate any deviations to this SOP and the site-specific EPP through MCBCP and NAVFAC SW representatives.

8.0 Downhole UXO Survey

- BSE will mark the proposed borehole locations.

- UXO personnel will go out prior to drilling and clear the near surface area to 2 feet below ground surface.

- UXO personnel will perform downhole magnetometer surveys to detect metal objects in the path of the boring apparatus until undisturbed soils are reached.

- Boring location will be moved if subsurface metal objects are detected.

9.0 References

- DDESB (Department of Defense Explosives Safety Board). 2004. Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel. Technical Paper 18. Alexandria, Virginia. December 20.

- DoD (Department of Defense). 2006. *Methodologies for Calculating Primary Fragment Characteristics.* DDESB TP 16, Revision 2. December 1.

- Navy, 2003. Ammunition and Explosives Ashore: Safety Regulations for Handling, Storing, Production, Renovation, and Shipping. NAVSEA OP 5, Volume 1, Seventh Revision. Commander, Naval Sea Systems Command. Washington, D.C.

- Work Plan Amendment 2, Operational Range Clearance at Multiple Training Range Locations, Marine Corps Base Camp Pendleton, California, Contract No. N62473-09-D-2617, Delivery Order 0006, BSE, April 2011

- DID MR -005-12

- MCBCP BO 3500-1N

- Applicable PED and CAT-X documents

- Interim Radiological Procedures (email communication from NAVFAC SW to BSE dated 18 May 2012)

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Appendix C

Air Quality Technical Data (Air Emissions Calculations and RONA)

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Appendix C-1

Air Quality Technical Data

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Appendix C.1 - Emission Calculations for Construction of the P-637 Range 314 Project Alternatives at MCB Camp Pendleton

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	A	B	C	D	E	F	G	H	I	J
1	Table C.1-1. Emission Source Data for P-637 at MCB Camp Pendleton - Range 314C Alternative 1 (Page 1 of 2).									
2		*Hp*	*Fuel*	*Load*	*Number*	*Hourly*	*Hours/*	*Daily*	*Total*	*Total*
3	*Construction Activity/Equipment Type*	*Rating*	*Type*	*Factor (1)*	*Active*	*Hp-Hrs*	*Day*	*Hp-Hrs*	*Days*	*Hp-Hrs*
4	Site Preparation/ Grading									
5	Backhoe	160	D	0.37	1	59	6	355	12	4,262
6	Bulldozer - D8	310	D	0.43	2	267	8	2,133	24	51,187
7	Compactive Roller	165	D	0.38	2	125	8	1,003	6	6,019
8	Dump Truck - 18 CY	260	D	0.38	6	593	8	4,742	32	151,757
9	Grader	180	D	0.41	1	74	8	590	4	2,362
10	Loader	215	D	0.37	3	239	8	1,909	28	53,458
11	Scraper - 23 CY	365	D	0.48	3	526	8	4,205	38	159,782
12	Water Truck - 5000 Gallons	175	D	0.38	2	133	6	798	66	52,668
13	Fugitive Dust (2)	NA	D	NA	5	NA	NA	NA	66	330
14	Demolition									
15	Backhoe	160	D	0.37	1	59	4	237	1	237
16	Bulldozer - D8	310	D	0.43	1	133	4	533	1	533
17	Crane	180	D	0.29	1	52	4	209	2	418
18	Loader	215	D	0.37	1	80	4	318	2	636
19	Haul Truck (3)	NA	D	NA	30	NA	5	150	2	300
20	Fugitive Dust (2)	NA	D	NA	0.25	NA	NA	NA	2	1
21	Building Construction									
22	Air Compressor - 100 CFM	50	G	0.54	1	27	8	216	13	2,808
23	Backhoe/Loader	110	D	0.37	1	41	4	163	13	2,116
24	Concrete/Industrial Saw	84	G	0.42	1	35	6	212	13	2,752
25	Crane	230	D	0.47	1	108	6	649	13	8,432
26	Forklift	94	G	0.20	1	19	6	113	13	1,466
27	Generator	45	D	0.54	1	24	8	194	13	2,527
28	Truck - Haul Aggregate (3)	NA	D	NA	15	NA	68	1,017	13	13,223
29	Truck - Haul Concrete (3)	NA	D	NA	20	NA	6	120	10	1,203
30	Truck - Concrete On-site	285	D	0.20	6	343	0.25	86	10	857
31	Truck - Materials (3)	NA	D	NA	40	NA	5	200	10	2,000
32	Fugitive Dust (2)	NA	D	NA	0.25	NA	NA	NA	13	3
33	Notes: (1) From ARB In-Use Off-Road Equipment Inventory Model, where applicable (ARB 2011).									
34	(2) Number Active is the average daily acres disturbed on a continuous basis and Total Hp-Hrs are total acre-days for the entire activity.									
35	(3) Number Active = miles/roundtrip, Hours/Day = daily truck trips, Daily Hp-Hrs = daily miles, and Total Hp-Hrs = total miles.									
36	(4) Activity data develop in part from Revised Design Charrette Report (RBF Consulting 2012) and project 1391 document.									

	A	B	C	D	E	F	G	H	I	J
39	Table C.1-1. Emission Source Data for P-637 at MCB Camp Pendleton - Range 314C Alternative 1 (Page 2 of 2).									
40		*Hp*	*Fuel*	*Load*	*Number*	*Hourly*	*Hours/*	*Daily*	*Total*	*Total*
41	*Construction Activity/Equipment Type*	*Rating*	*Type*	*Factor (1)*	*Active*	*Hp-Hrs*	*Day*	*Hp-Hrs*	*Days*	*Hp-Hrs*
42	Road Construction									
43	Bulldozer - D8	310	D	0.43	1	133	4	533	1	533
44	Compactive Roller	165	D	0.38	2	125	8	1,003	2	2,006
45	Grader	150	D	0.41	2	123	6	274	2	548
46	Loader - 966	220	D	0.37	1	81	4	274	5	1,370
47	Water Truck - 5000 Gallons	175	D	0.38	1	67	4	274	5	1,370
48	Fugitive Dust (2)	NA	NA	NA	0.5	NA	NA	NA	5	3
49	Bridge Construction									
50	Air Compressor - 100 CFM	50	G	0.54	1	27	8	216	88	19,008
51	Backhoe/Loader	110	D	0.37	1	41	4	163	12	1,954
52	Crane	180	D	0.29	1	52	4	209	76	15,869
53	Generator	45	D	0.54	1	24	8	194	92	17,885
54	Truck - Haul Concrete (3)	NA	D	NA	20	NA	21	421	4	1,683
55	Truck - Concrete On-site	285	D	0.20	21	1,199	0.25	300	4	1,199
56	Truck - Haul Materials (3)	NA	D	NA	40	NA	3	137	10	1,366
57	Paving - Access and Fire Roads									
58	Backhoe	160	D	0.37	1	59	8	474	1	474
59	Bulldozer - D6	165	D	0.43	1	71	8	568	1	568
60	Compactive Roller	165	D	0.38	2	125	8	1,003	25	25,080
61	Grader	180	D	0.41	1	74	8	590	20	11,808
62	Loader	215	D	0.37	1	80	8	636	20	12,728
63	Paving Machine	200	D	0.36	1	72	8	576	5	2,880
64	Water Truck - 5000 Gallons	175	D	0.38	1	67	8	532	20	10,640
65	Truck - Haul Base Material (3)	NA	D	NA	15	NA	63	950	20	19,008
66	Truck - Haul Paving Material (3)	NA	D	NA	20	NA	48	970	5	4,848
67	Fugitive Dust (2)	NA	NA	NA	2	NA	NA	NA	20	40
68	Notes: (1) From ARB In-Use Off-Road Equipment Inventory Model, where applicable (ARB 2011).									
69	(2) Number Active is the average daily acres disturbed on a continuous basis and Total Hp-Hrs are total acre-days for the entire activity.									
70	(3) Number Active = miles/roundtrip, Hours/Day = daily truck trips, Daily Hp-Hrs = daily miles, and Total Hp-Hrs = total miles.									
71	(4) Activity data develop in part from Revised Design Charrette Report (RBF Consulting 2012) and project 1391 document.									

	L	M	N	O	P	Q	R	S	T	U
1	Table C.1-2. Air Emission Factors for Equipment Associated with the P-637 at MCB Camp Pendleton Project Alternatives.									
2		*Fuel*	*Emission Factors (Grams/Horsepower-Hour)*							
3	*Project Year/Source Type*	*Type*	*VOC*	*CO*	*NOx*	*SO2*	*PM10*	*PM2.5*	*CO2*	*Reference*
4	Year 2012									
5	Off-Road Equipment - 26-50 Hp	D	1.45	3.66	5.83	0.004	0.59	0.29	568	(1)
6	Off-Road Equipment - 51-120 Hp	D	0.66	2.32	7.14	0.004	0.56	0.29	568	(1)
7	Off-Road Equipment - 121-175 Hp	D	0.50	2.00	6.81	0.004	0.36	0.17	568	(1)
8	Off-Road Equipment - 176-250 Hp	D	0.39	0.89	6.44	0.004	0.25	0.10	568	(1)
9	Off-Road Equipment - 251-500 Hp	D	0.31	0.96	5.31	0.003	0.20	0.09	568	(1)
10	Gasoline-powered Equipment <250 Hp	G	0.59	29.86	1.51	0.27	0.06	0.06	710	(2)
11	On-road Truck - Idle (Gms/Hr)	D	10.60	44.59	90.79	0.05	1.22	1.12	5,472	(3)
12	On-road Truck - 5 mph (Gms/Mi)	D	5.95	10.25	36.21	0.04	1.24	1.14	4,028	(4)
13	On-road Truck - 25 mph (Gms/Mi)	D	0.62	2.84	12.83	0.04	0.35	0.33	2,011	(4)
14	On-road Truck - 55 mph (Gms/Mi)	D	0.31	1.68	10.92	0.04	0.34	0.31	1,586	(4)
15	On-Road Trucks - Composite (Gms/Mi)	D	1.00	3.00	14.21	0.04	0.43	0.40	2,000	(5)
16	Fugitive Dust (Lbs/acre-day)	-	-	-	-	-	27.50	2.75	-	(6)
17	Notes: (1) Emissions factors developed for calendar year 2012 off-road composite equipment fleet with the use of the ARB In-Use Off-Road Equipment Inventory Model (ARB 2011)									
18	except CO emissions factors obtained from the Urbemis 2007 model (Jones&Stokes Ass. 2007).									
19	(2) Data for new phase 1 engines (year 1997) from NONROAD2008 model (USEPA 2010).									
20	(3) Idling emission factors developed from EMFAC2007 (ARB 2006). Units in grams/hour.									
21	(4) Generated with the use of the EMFAC2011 model for calendar year 2012 for truck fleet in San Diego County (ARB 2011). Assumes an annual average temperature of									
22	60 degrees and 50% humidity. Units in grams/mile.									
23	(5) Composite factors based on a round trip of 10% at 5 mph, 40% at 25 mph, and 50% at 55 mph. Units in grams/mile. Although									
24	not shown in these calculations, emissions from 5 minutes of idling mode included for each truck round trip.									
25	(6) Units in lbs/acre-day from section 11.2.3 of AP-42 (USEPA 1995). Emissions reduced by 50% from uncontrolled levels to simulate implementation of									
26	best management practices (BMPs) for fugitive dust control.									

	W	X	Y	Z	AA	AB	AC	AD
1	Table C.1-3. Annual Emissions associated with the P-637 at MCB Camp Pendleton - Range 314C Alternative 1 (Page 1 of 2).							
2		*Total Emissions (Tons)*						
3	*Construction Activity/Equipment Type*	*VOC*	*CO*	*NOx*	*SO2*	*PM10*	*PM2.5*	*CO2*
4	Site Preparation/ Grading							
5	Backhoe	0.00	0.01	0.03	0.00	0.00	0.00	2.67
6	Bulldozer - D8	0.02	0.05	0.30	0.00	0.01	0.00	32.05
7	Compactive Roller	0.00	0.01	0.05	0.00	0.00	0.00	3.77
8	Dump Truck - 18 CY	0.05	0.16	0.89	0.00	0.03	0.01	95.02
9	Grader	0.00	0.00	0.02	0.00	0.00	0.00	1.48
10	Loader	0.02	0.05	0.38	0.00	0.01	0.01	33.47
11	Scraper - 23 CY	0.06	0.17	0.94	0.00	0.04	0.02	100.04
12	Water Truck - 5000 Gallons	0.03	0.12	0.40	0.00	0.02	0.01	32.98
13	Fugitive Dust					4.54	0.45	
14	Subtotal	0.18	0.58	2.99	0.00	4.66	0.51	301.47
15	Demolition							
16	Backhoe	0.00	0.00	0.00	0.00	0.00	0.00	0.15
17	Bulldozer - D8	0.00	0.00	0.00	0.00	0.00	0.00	0.33
18	Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.26
19	Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.40
20	Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.67
21	Fugitive Dust					0.01	0.00	
22	Subtotal	0.00	0.00	0.02	0.00	0.01	0.00	1.81
23	Building Construction							
24	Air Compressor - 100 CFM	0.00	0.09	0.00	0.00	0.00	0.00	2.20
25	Backhoe/Loader	0.00	0.01	0.02	0.00	0.00	0.00	1.33
26	Concrete/Industrial Saw	0.00	0.09	0.00	0.00	0.00	0.00	2.15
27	Crane	0.00	0.01	0.06	0.00	0.00	0.00	5.28
28	Forklift	0.00	0.05	0.00	0.00	0.00	0.00	1.15
29	Generator	0.00	0.01	0.02	0.00	0.00	0.00	1.58
30	Truck - Haul Aggregate	0.02	0.05	0.21	0.00	0.01	0.01	29.60
31	Truck - Haul Concrete	0.00	0.00	0.02	0.00	0.00	0.00	2.68
32	Truck - Concrete On-site	0.00	0.00	0.01	0.00	0.00	0.00	0.54
33	Truck - Materials	0.00	0.01	0.03	0.00	0.00	0.00	4.43
34	Fugitive Dust					0.04	0.00	
35	Subtotal	0.03	0.31	0.38	0.00	0.06	0.01	50.94

	W	X	Y	Z	AA	AB	AC	AD
38	Table C.1-3. Annual Emissions associated with the P-637 at MCB Camp Pendleton - Range 314C Alternative 1 (Page 2 of 2).							
39		*Total Emissions (Tons)*						
40	*Construction Activity/Equipment Type*	*VOC*	*CO*	*NOx*	*SO2*	*PM10*	*PM2.5*	*CO2*
41	Road Construction							
42	Bulldozer - D8	0.00	0.00	0.00	0.00	0.00	0.00	0.33
43	Compactive Roller	0.00	0.00	0.02	0.00	0.00	0.00	1.26
44	Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.34
45	Loader - 966	0.00	0.00	0.01	0.00	0.00	0.00	0.86
46	Water Truck - 5000 Gallons	0.00	0.00	0.01	0.00	0.00	0.00	0.86
47	Fugitive Dust					0.03	0.00	
48	Subtotal	0.00	0.01	0.04	0.00	0.04	0.00	3.65
49	Bridge Construction							
50	Air Compressor - 100 CFM	0.01	0.63	0.03	0.01	0.00	0.00	14.88
51	Backhoe/Loader	0.00	0.00	0.02	0.00	0.00	0.00	1.22
52	Crane	0.01	0.02	0.11	0.00	0.00	0.00	9.94
53	Generator	0.03	0.07	0.12	0.00	0.01	0.01	11.20
54	Truck - Haul Concrete	0.00	0.01	0.03	0.00	0.00	0.00	3.75
55	Truck - Concrete On-site	0.00	0.00	0.01	0.00	0.00	0.00	0.75
56	Truck - Haul Materials	0.00	0.00	0.02	0.00	0.00	0.00	3.03
57	Subtotal	0.05	0.73	0.33	0.01	0.02	0.01	44.76
58	Paving - Access and Fire Roads							
59	Backhoe	0.00	0.00	0.00	0.00	0.00	0.00	0.30
60	Bulldozer - D6	0.00	0.00	0.00	0.00	0.00	0.00	0.36
61	Compactive Roller	0.01	0.06	0.19	0.00	0.01	0.00	15.70
62	Grader	0.01	0.01	0.08	0.00	0.00	0.00	7.39
63	Loader	0.01	0.01	0.09	0.00	0.00	0.00	7.97
64	Paving Machine	0.00	0.00	0.02	0.00	0.00	0.00	1.80
65	Water Truck - 5000 Gallons	0.01	0.02	0.08	0.00	0.00	0.00	6.66
66	Truck - Haul Base Material	0.02	0.07	0.31	0.00	0.01	0.01	42.55
67	Truck - Haul Paving Material	0.01	0.02	0.08	0.00	0.00	0.00	10.81
68	Fugitive Dust					0.55	0.06	
69	Subtotal	0.06	0.19	0.86	0.00	0.58	0.08	93.54
70	Total Emissions - Alternative 1 (1)	0.33	1.83	4.61	0.01	5.36	0.61	496.16
71	San Diego County NEPA Thresholds	100	100	100	250	250	250	NA
72	Notes: (1) All construction emissions from Alternative 1 would occur within one calendar year.							

	A	B	C	D	E	F	G	H	I	J
1	Table C.1-4. Emission Source Data for P-637 at MCB Camp Pendleton - Range 314B Alternative 2 (Page 1 of 2).									
2		*Hp*	*Fuel*	*Load*	*Number*	*Hourly*	*Hours/*	*Daily*	*Total*	*Total*
3	*Construction Activity/Equipment Type*	*Rating*	*Type*	*Factor (1)*	*Active*	*Hp-Hrs*	*Day*	*Hp-Hrs*	*Days*	*Hp-Hrs*
4	Site Preparation/ Grading									
5	Backhoe	160	D	0.37	1	59	6	355	16	5,506
6	Bulldozer - D8	310	D	0.43	2	267	8	2,133	31	66,117
7	Compactive Roller	165	D	0.38	2	125	8	1,003	8	7,775
8	Dump Truck - 18 CY	260	D	0.38	6	593	8	4,742	41	196,019
9	Grader	180	D	0.41	1	74	8	590	5	3,050
10	Loader	215	D	0.37	3	239	8	1,909	36	69,049
11	Scraper - 23 CY	365	D	0.48	3	526	8	4,205	49	206,386
12	Water Truck - 5000 Gallons	175	D	0.38	2	133	6	798	85	68,030
13	Fugitive Dust (2)	NA	D	NA	5	NA	NA	NA	85	426
14	Demolition									
15	Backhoe	160	D	0.37	1	59	4	237	1	237
16	Bulldozer - D8	310	D	0.43	1	133	4	533	1	533
17	Crane	180	D	0.29	1	52	4	209	2	418
18	Loader	215	D	0.37	1	80	4	318	2	636
19	Haul Truck (3)	NA	D	NA	30	NA	5	150	2	300
20	Fugitive Dust (2)	NA	D	NA	0.25	NA	NA	NA	2	1
21	Building Construction									
22	Air Compressor - 100 CFM	50	G	0.54	1	27	8	216	13	2,808
23	Backhoe/Loader	110	D	0.37	1	41	4	163	13	2,116
24	Concrete/Industrial Saw	84	G	0.42	1	35	6	212	13	2,752
25	Crane	230	D	0.47	1	108	6	649	13	8,432
26	Forklift	94	G	0.20	1	19	6	113	13	1,466
27	Generator	45	D	0.54	1	24	8	194	13	2,527
28	Truck - Haul Aggregate (3)	NA	D	NA	15	NA	68	1,017	13	13,223
29	Truck - Haul Concrete (3)	NA	D	NA	20	NA	6	120	10	1,203
30	Truck - Concrete On-site	285	D	0.20	6	343	0.25	86	10	857
31	Truck - Materials (3)	NA	D	NA	40	NA	5	200	10	2,000
32	Fugitive Dust (2)	NA	D	NA	0.25	NA	NA	NA	13	3
33	Notes: (1) From ARB In-Use Off-Road Equipment Inventory Model, where applicable (ARB 2010).									
34	(2) Number Active is the average daily acres disturbed on a continuous basis and Total Hp-Hrs are total acre-days for the entire activity.									
35	(3) Number Active = miles/roundtrip, Hours/Day = daily truck trips, Daily Hp-Hrs = daily miles, and Total Hp-Hrs = total miles.									
36	(4) Activity data develop in part from Revised Design Charrette Report (RBF Consulting 2012).									

	A	B	C	D	E	F	G	H	I	J
39	Table C.1-4. Emission Source Data for P-637 at MCB Camp Pendleton - Range 314B Alternative 2 (Page 2 of 2).									
40		*Hp*	*Fuel*	*Load*	*Number*	*Hourly*	*Hours/*	*Daily*	*Total*	*Total*
41	*Construction Activity/Equipment Type*	*Rating*	*Type*	*Factor (1)*	*Active*	*Hp-Hrs*	*Day*	*Hp-Hrs*	*Days*	*Hp-Hrs*
42	Road Construction									
43	Bulldozer - D8	310	D	0.43	1	133	6	800	1	800
44	Compactive Roller	165	D	0.38	2	125	8	1,003	3	3,010
45	Grader	150	D	0.41	2	123	6	274	3	822
46	Loader - 966	220	D	0.37	1	81	4	274	8	2,191
47	Water Truck - 5000 Gallons	175	D	0.38	1	67	4	274	8	2,191
48	Fugitive Dust (2)	NA	NA	NA	0.5	NA	NA	NA	8	4
49	Bridge Construction									
50	Air Compressor - 100 CFM	50	G	0.54	1	27	8	216	88	19,008
51	Backhoe/Loader	110	D	0.37	1	41	4	163	12	1,954
52	Crane	180	D	0.29	1	52	4	209	76	15,869
53	Generator	45	D	0.54	1	24	8	194	92	17,885
54	Truck - Haul Concrete (3)	NA	D	NA	20	NA	21	421	4	1,683
55	Truck - Concrete On-site	285	D	0.20	21	1,199	0.25	300	4	1,199
56	Truck - Haul Materials (3)	NA	D	NA	40	NA	3	137	10	1,366
57	Paving - Access and Fire Roads									
58	Backhoe	160	D	0.37	1	59	8	474	1	668
59	Bulldozer - D6	165	D	0.43	1	71	8	568	1	800
60	Compactive Roller	165	D	0.38	2	125	8	1,003	35	35,363
61	Grader	180	D	0.41	1	74	8	590	28	16,649
62	Loader	215	D	0.37	1	80	8	636	28	17,946
63	Paving Machine	200	D	0.36	1	72	8	576	7	4,061
64	Water Truck - 5000 Gallons	175	D	0.38	1	67	8	532	28	15,002
65	Truck - Haul Base Material (3)	NA	D	NA	15	NA	45	674	28	19,008
66	Truck - Haul Paving Material (3)	NA	D	NA	20	NA	34	688	7	4,848
67	Fugitive Dust (2)	NA	NA	NA	2	NA	NA	NA	28	56
68	Notes: (1) From ARB In-Use Off-Road Equipment Inventory Model, where applicable (ARB 2010).									
69	(2) Number Active is the average daily acres disturbed on a continuous basis and Total Hp-Hrs are total acre-days for the entire activity.									
70	(3) Number Active = miles/roundtrip, Hours/Day = daily truck trips, Daily Hp-Hrs = daily miles, and Total Hp-Hrs = total miles.									
71	(4) Activity data develop in part from Revised Design Charrette Report (RBF Consulting 2012).									

	W	X	Y	Z	AA	AB	AC	AD
1	Table C.1-5. Annual Emissions associated with the P-637 at MCB Camp Pendleton - Range 314B Alternative 2 (Page 1 of 2).							
2		*Total Emissions (Tons)*						
3	*Construction Activity/Equipment Type*	*VOC*	*CO*	*NOx*	*SO2*	*PM10*	*PM2.5*	*CO2*
4	Site Preparation/ Grading							
5	Backhoe	0.00	0.01	0.04	0.00	0.00	0.00	3.45
6	Bulldozer - D8	0.02	0.07	0.39	0.00	0.01	0.01	41.40
7	Compactive Roller	0.00	0.02	0.06	0.00	0.00	0.00	4.87
8	Dump Truck - 18 CY	0.07	0.21	1.15	0.00	0.04	0.02	122.73
9	Grader	0.00	0.00	0.02	0.00	0.00	0.00	1.91
10	Loader	0.03	0.07	0.49	0.00	0.02	0.01	43.23
11	Scraper - 23 CY	0.07	0.22	1.21	0.00	0.05	0.02	129.22
12	Water Truck - 5000 Gallons	0.04	0.15	0.51	0.00	0.03	0.01	42.59
13	Fugitive Dust					5.86	0.59	
14	Subtotal	0.24	0.75	3.87	0.00	6.02	0.65	389.39
15	Demolition							
16	Backhoe	0.00	0.00	0.00	0.00	0.00	0.00	0.15
17	Bulldozer - D8	0.00	0.00	0.00	0.00	0.00	0.00	0.33
18	Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.26
19	Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.40
20	Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.67
21	Fugitive Dust					0.01	0.00	
22	Subtotal	0.00	0.00	0.02	0.00	0.01	0.00	1.81
23	Building Construction							
24	Air Compressor - 100 CFM	0.00	0.09	0.00	0.00	0.00	0.00	2.20
25	Backhoe/Loader	0.00	0.01	0.02	0.00	0.00	0.00	1.33
26	Concrete/Industrial Saw	0.00	0.09	0.00	0.00	0.00	0.00	2.15
27	Crane	0.00	0.01	0.06	0.00	0.00	0.00	5.28
28	Forklift	0.00	0.05	0.00	0.00	0.00	0.00	1.15
29	Generator	0.00	0.01	0.02	0.00	0.00	0.00	1.58
30	Truck - Haul Aggregate	0.02	0.05	0.21	0.00	0.01	0.01	29.60
31	Truck - Haul Concrete	0.00	0.00	0.02	0.00	0.00	0.00	2.68
32	Truck - Concrete On-site	0.00	0.00	0.01	0.00	0.00	0.00	0.54
33	Truck - Materials	0.00	0.01	0.03	0.00	0.00	0.00	4.43
34	Fugitive Dust					0.04	0.00	
35	Subtotal	0.03	0.31	0.38	0.00	0.06	0.01	50.94

	W	X	Y	Z	AA	AB	AC	AD
38	Table C.1-5. Annual Emissions associated with the P-637 at MCB Camp Pendleton - Range 314B Alternative 2 (Page 2 of 2).							
39		*Total Emissions (Tons)*						
40	*Construction Activity/Equipment Type*	*VOC*	*CO*	*NOx*	*SO2*	*PM10*	*PM2.5*	*CO2*
41	Road Construction							
42	Bulldozer - D8	0.00	0.00	0.00	0.00	0.00	0.00	0.50
43	Compactive Roller	0.00	0.01	0.02	0.00	0.00	0.00	1.88
44	Grader	0.00	0.00	0.01	0.00	0.00	0.00	0.51
45	Loader - 966	0.00	0.00	0.02	0.00	0.00	0.00	1.37
46	Water Truck - 5000 Gallons	0.00	0.00	0.02	0.00	0.00	0.00	1.37
47	Fugitive Dust					0.06	0.01	
48	Subtotal	0.00	0.02	0.07	0.00	0.06	0.01	5.64
49	Bridge Construction							
50	Air Compressor - 100 CFM	0.01	0.63	0.03	0.01	0.00	0.00	14.88
51	Backhoe/Loader	0.00	0.00	0.02	0.00	0.00	0.00	1.22
52	Crane	0.01	0.02	0.11	0.00	0.00	0.00	9.94
53	Generator	0.03	0.07	0.12	0.00	0.01	0.01	11.20
54	Truck - Haul Concrete	0.00	0.01	0.03	0.00	0.00	0.00	3.75
55	Truck - Concrete On-site	0.00	0.00	0.01	0.00	0.00	0.00	0.75
56	Truck - Haul Materials	0.00	0.00	0.02	0.00	0.00	0.00	3.03
57	Subtotal	0.05	0.73	0.33	0.01	0.02	0.01	44.76
58	Paving - Access and Fire Roads							
59	Backhoe	0.00	0.00	0.01	0.00	0.00	0.00	0.42
60	Bulldozer - D6	0.00	0.00	0.01	0.00	0.00	0.00	0.50
61	Compactive Roller	0.02	0.08	0.27	0.00	0.01	0.01	22.14
62	Grader	0.01	0.02	0.12	0.00	0.00	0.00	10.42
63	Loader	0.01	0.02	0.13	0.00	0.00	0.00	11.24
64	Paving Machine	0.00	0.00	0.03	0.00	0.00	0.00	2.54
65	Water Truck - 5000 Gallons	0.01	0.03	0.11	0.00	0.01	0.00	9.39
66	Truck - Haul Base Material	0.02	0.07	0.31	0.00	0.01	0.01	42.55
67	Truck - Haul Paving Material	0.01	0.02	0.08	0.00	0.00	0.00	10.81
68	Fugitive Dust					0.78	0.08	
69	Subtotal	0.07	0.24	1.05	0.00	0.82	0.10	110.01
70	Total Emissions - Alternative 2 (1)	0.40	2.05	5.70	0.01	6.98	0.79	602.56
71	San Diego County NEPA Thresholds	100	100	100	250	250	250	NA
72	Notes: (1) All construction emissions from Alternative 2 would occur within one calendar year.							

Appendix C-2

Record of Non-Applicability (RONA)

UNITED STATES MARINE CORPS
MARINE CORPS INSTALLATIONS WEST-MARINE CORPS BASE
BOX 555010
CAMP PENDLETON, CALIFORNIA 92055-5010

5090
ENV/PLN
25 JUN 2016

MEMORANDUM FOR THE RECORD

From: Commanding General
To: Director, Environmental Security

Subj: RECORD OF NON-APPLICABILITY (RONA) FOR NEPA PE010098; INFANTRY QUAD BATTLE COURSE (P-637), CAMP PENDLETON

Ref: (a) U.S. Environmental Protection Agency, Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule, published in the Federal Register on 30 November 1993 (40 CFR Parts 6, 51, and 93)
(b) U.S. Environmental Protection Agency, Revisions to the General Conformity Regulations; Final Rule, published in the Federal Register on 5 April 2010 (40 CFR Parts 51 and 93)
(c) OPNAVINST 5090.1C (Appendix F)

Encl: (1) P-637 Infantry Squad Battle Course, Camp Pendleton Emissions Analysis for Clean Air Act Conformity Applicability

1. References (a), (b), and (c) provide implementing guidance for documenting Clean Air Act (CAA) Conformity Determination requirements. The General Conformity Rule applies to federal actions proposed within areas which are designated as either non-attainment or maintenance areas for a National Ambient Air Quality Standard (NAAQS) for any of the criteria pollutants.

2. The Proposed Action would occur within the San Diego Air Basin (SDAB) portion of Marine Corps Base, Camp Pendleton. This portion of the SDAB is currently in non-attainment of the 8-hour ozone (O_3) NAAQS and is a maintenance area for carbon monoxide (CO) NAAQS. The SDAB is in attainment of the NAAQS for all other criteria pollutants. Therefore, only project emissions of CO and O_3 (or its precursors, volatile organic compounds [VOCs] and oxides of nitrogen [NO_x]) were analyzed for conformity rule applicability. The annual *de minimis* threshold levels for this

region are 100 tons of VOC, NO_x, and CO. Federal actions may be exempt from conformity determinations if they do not exceed designated *de minimis* threshold levels.

3. An emissions analysis for P-637 Infantry Squad Battle Course, Camp Pendleton is presented in the enclosure. *De minimis* thresholds for applicable criteria pollutants would not be exceeded as a result of implementation of the Proposed Action and a formal Conformity Determination is not considered necessary.

4. To the best of my knowledge, the information presented in this RONA is correct and accurate, and I concur in the finding that implementation of the Proposed Action does not require a formal CAA Conformity Determination.

EDWARD D. BANTA

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Appendix D

Minimization, Mitigation, Monitoring, and Reporting (MMMR) Tracking Sheet

MINIMIZATION, MITIGATION, MONITORING, AND REPORTING (MMMR) TRACKING SHEET
P-637 Infantry Squad Battle Course Range

SCM #	*Minimization, Mitigation, Monitoring, Reporting Measures*	*Environmental Assessment Section*	*Implementation Procedure or Action*	*Responsible Organization*	*Deliverable/ Report*	*Compliance Schedule*	*Verification of Compliance*
1	Recommendations provided in the Geotechnical Reports (Kleinfelder 2012, 2013, and 2014) would be adhered to during final project design and construction to prevent slope instability and seismically induced damage.	Sections 2.3 and 3.1	Slope and Soil Stability	Const KTR	None	During Construction	Verified by: Date:
2	Temporary erosion control measures would consist of bonded fiber matrix with local native hydroseed, in accordance with an approved Revegetation Plan (see Special Conservation Measure 10). All disturbed slopes would require the application of a bonded fiber matrix with a local native hydroseed mixture. Any disturbed portion of the project site left unattended for more than 14 days would be covered to prevent erosion during construction. When hydroseed cannot be established in advance of forecasted rain, another equally effective erosion control method (e.g., coir erosion blankets) would be applied in accordance with the General Construction Permit obtained from the State Water Resources Control Board (SWRCB) and installed to manufacturer's specifications. Photodegradable double nylon straw blankets would not be utilized. All erosion control materials would be weed-free.	Sections 2.3 and 3.2	Temporary Erosion Control Measures	Const KTR	None	During Construction	Verified by: Date:
3	Temporary sediment control practices would be applied throughout the construction phase within the project site and would include fiber roll and/or silt fence perimeter protection, fiber roll slope protection, gravel bag, check dam protection, and a minimum of one stabilized construction entrance. A proposed basin, located adjacent to the access road that leads up to the firing range, would serve as a sediment basin during construction activities.	Sections 2.3 and 3.2	Temporary Sediment Control Measures	Const KTR	None	During Construction	Verified by: Date:
4	Permanent erosion control practices would be applied to the project in the form of riprap energy dissipaters at all proposed channel discharge locations. The alluvial channel would be lined with high-performance turf reinforcement matting (which is pervious and allows vegetation to grow) and vegetated with native grasses and native trees. An effective slope of six percent would be achieved through evenly spaced grade control near the upstream portion of the meandering alluvial channel. An effective slope of 0.5 percent would be achieved where the alluvial channel parallels the range.	Sections 2.3 and 3.2	Permanent Erosion Control Practices	Const KTR	None	During Construction	Verified by: Date:

MINIMIZATION, MITIGATION, MONITORING, AND REPORTING (MMMR) TRACKING SHEET
P-637 Infantry Squad Battle Course Range

SCM #	*Minimization, Mitigation, Monitoring, Reporting Measures*	*Environmental Assessment Section*	*Implementation Procedure or Action*	*Responsible Organization*	*Deliverable/ Report*	*Compliance Schedule*	*Verification of Compliance*
5	A drainage system would be constructed at the facility to minimize impacts to water resources. The system would be designed and located to provide on-site stormwater retardation of runoff flows, trap eroded soils, and filter out surface water contaminants. The drainage system would implement Low Impact Development (LID) in accordance with Energy Independence and Security Act (EISA) (2007) and official Department of the Navy (DoN), United States Marine Corps (USMC) and DoD LID policies (2007, 2008, 2010). The system would include various stormwater management features, which may include, but are not limited to vegetated swale(s), an alluvial channel, and bio-retention basins (Figure 2.1-3). The bio-retention basins would be of sufficient size to manage anticipated water flows and volumes. A Maintenance Plan for the on-site drainage system would be prepared by the project Design Contractor and approved by Marine Corps Base (MCB) Camp Pendleton before the start of construction. This plan would include measures to address the following maintenance issues: • Management of trash, debris, and excessive sediment. • Vegetation trimming to maintain a clear flow path. • Visual inspection of conveyances before and after storm events to be sure the systems are clear of trash, sediment, and debris. • Hydro-jetting, as necessary, to clear blocked storm drain pipes or culverts. • Clearing riprap areas of sediment; clearing activities include removing the riprap, clearing excessive sediment and debris, checking filter fabric, and placing riprap back as it was designed. • Removal and replacement of the engineered media in the bio-retention areas to remove clogging from fine sediment.	Sections 2.3 and 3.2	Construction, Operation and Maintenance of an On-site Drainage System	Const KTR	Design drawings & Maintenance Plan	Design Phase/ During Construction	Verified by: Date:

MINIMIZATION, MITIGATION, MONITORING, AND REPORTING (MMMR) TRACKING SHEET
P-637 Infantry Squad Battle Course Range

SCM #	*Minimization, Mitigation, Monitoring, Reporting Measures*	*Environmental Assessment Section*	*Implementation Procedure or Action*	*Responsible Organization*	*Deliverable/ Report*	*Compliance Schedule*	*Verification of Compliance*
6	Recommendations provided in the Storm Water Protection Report (RBF Consulting 2014) and Geotechnical Reports (Kleinfelder 2012, 2013, and 2014), would be adhered to during access road/bridge final design and construction to prevent scour adjacent to piers and embankments, as required.	Sections 2.3 and 3.2	Scour Protection	Const KTR	None	During construction	Verified by: Date:
7	Stockpiles of soil would be properly contained and covered to eliminate or reduce sediment transport from the site to streets, drainage facilities, or adjoining properties via runoff, vehicles, tracking, dispersal by wind and to minimize impacts to water quality and arroyo toads.	Sections 2.3 and 3.2; Appendix C	Stockpile Containment	Const KTR	None	During construction	Verified by: Date:
8	Runoff from on-site equipment and vehicle washing would be contained at the construction site and would not be discharged to receiving waters or the local storm drain system.	Sections 2.3 and 3.2	On-site Equipment and Vehicle Washing	Const KTR	None	During construction	Verified by: Date:
9	To the maximum extent feasible, vegetation removal would occur from 01 September to 14 February, which is outside the bird breeding season for nesting birds under the Migratory Bird Treaty Act (MBTA). Trimming or removal of vegetation during the peak breeding season (15 February to 31 August) would require a pre-activity survey by a qualified wildlife biologist, hired by the project proponent and approved by MCB Camp Pendleton Environmental Security (ES), to confirm that active nests would not be affected. The wildlife biologist must conduct the survey within three days of the start of vegetation removal.	Sections 2.3 and 3.3	Avoid Impacts on Migratory Bird Treaty Act-Protected Species	Const KTR	None	15 February to 31 August	Verified by: Date:
10	The final project would be designed to minimize impacts by reducing disturbance footprints to native grassland and areas densely vegetated with native vegetation to the maximum extent practicable. In addition, staging areas or other temporary construction-related requirements would be located on previously disturbed areas to the maximum extent feasible. For native plant communities impacts that would not be avoided by the project design, the Construction Contractor would develop a Revegetation Plan that would be approved by MCB Camp Pendleton ES before the start of construction. MCB Camp Pendleton ES would provide a copy of the Revegetation Plan to the United States Fish and Wildlife Service (USFWS) for comment, review, and approval. The Revegetation Plan would be	Sections 2.3 and 3.3	Avoid and Minimize Disturbance to Upland Native Plant Communities; Develop a Revegetation Plan to Compensate for Disturbance to Native Plant Communities.	Const KTR	Design Drawings; Restoration Plan; Post Project Report	Before Design/ During Construction/ Following Construction	Verified by: Date:

MINIMIZATION, MITIGATION, MONITORING, AND REPORTING (MMMR) TRACKING SHEET
P-637 Infantry Squad Battle Course Range

SCM #	*Minimization, Mitigation, Monitoring, Reporting Measures*	*Environmental Assessment Section*	*Implementation Procedure or Action*	*Responsible Organization*	*Deliverable/ Report*	*Compliance Schedule*	*Verification of Compliance*
	submitted to the USFWS before initiating project activities that would impact federally listed species. This plan would include the following: • The Revegetation Plan would include the proposed restoration location, existing conditions of the restoration site, methodology for creating/restoring habitat, monitoring requirements and time periods, success criteria, and follow-up measures if needed. • For temporary impacts to federally listed species occupied habitat, restoration would be initiated within six months of completion of construction. • The Revegetation Plan would address all revegetation efforts associated with the proposed action and include specific erosion control measures, irrigation requirements, species composition, seed mix origins and ratios, weed control, water regimes, maintenance activities, success criteria, and monitoring requirements. Weed treatment addressed in the Revegetation Plan would include all erosion control areas and permanent non-vegetated areas such as gravel associated with erosion control features. The plan components would be implemented as soon as feasible after construction. • Temporary disturbance to riparian habitat would be restored in accordance with the *Biological Opinion (1-6-05-F-02), Programmatic Activities and Conservation Plans in Riparian and Estuarine/Beach Ecosystems on MCB Camp Pendleton* (Riparian BO) (USFWS 1995a). • The Revegetation Plan would consider replacing disturbed native vegetation. In addition, for upland areas temporarily impacted, the Revegetation Plan would consider the appropriate planting mix for the areas of the project site relative to impact conditions, fire spread potential, and annual fire maintenance activities. Seed mixes used for native grassland and coastal sage scrub revegetation would be from locally collected sources. A suggested seed mix						

MINIMIZATION, MITIGATION, MONITORING, AND REPORTING (MMMR) TRACKING SHEET
P-637 Infantry Squad Battle Course Range

SCM #	*Minimization, Mitigation, Monitoring, Reporting Measures*	*Environmental Assessment Section*	*Implementation Procedure or Action*	*Responsible Organization*	*Deliverable/ Report*	*Compliance Schedule*	*Verification of Compliance*
	includes the following species: purple needle grass (*Stipa [= Nassella] pulchra*), black sage (*Salvia mellifera*), coastal sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), golden yarrow (*Eriophyllum confertiflorum var. confertiflorum*), California everlasting (*Pseudognaphalium microcephalum* [= *Gnaphalium canescens ssp. microcephalum*]), deerweed (*Acmispon glaber* [= *Lotus scoparius*]), sticky monkeyflower (*Mimulus aurantiacus*), and vinegarweed (*Trichostema lanceolatum*). The Construction Contractor would obtain approval of seed mixes, container plants, and planting/seeding methods proposed for use in revegetation. • The Revegetation Plan would outline a monitoring program for the revegetated areas, including success criteria and the duration and frequency of monitoring. Non-native invasive species should be monitored and treated with Base-approved herbicides for a minimum of three years following application of the first treatment. Areas impacted by construction would be inspected by MCB Camp Pendleton ES within one year following the completion of construction to determine whether any remedial measures are required. Remedial measures may include reseeding/replanting, weed control, watering, and/or erosion control. The results of the monitoring would be summarized in an Annual Monitoring Report and would indicate if success criteria have been met. The Construction Contractor would obtain approval of the monitoring methods proposed for use in revegetation. The Annual Monitoring Report would be submitted to MCB Camp Pendleton ES annually until the success criteria are met. • A Post Project Report would be prepared that details the exact acreage of all vegetation communities, including riparian, that were impacted by the project.						

MINIMIZATION, MITIGATION, MONITORING, AND REPORTING (MMMR) TRACKING SHEET
P-637 Infantry Squad Battle Course Range

SCM #	*Minimization, Mitigation, Monitoring, Reporting Measures*	*Environmental Assessment Section*	*Implementation Procedure or Action*	*Responsible Organization*	*Deliverable/ Report*	*Compliance Schedule*	*Verification of Compliance*
11	Cut slopes, staging, and lay down areas not planned for development would be restored and revegetated using local, native, drought tolerant vegetation in accordance with the Revegetation Plan (Special Conservation Measure 10). The affected areas would be stabilized to prevent erosion during and following construction per standard construction Best Management Practices (BMPs). The removed soil (waste material) site would be delineated before construction, and placed to minimize the disturbance area while maintaining approximately the same topographic characteristics of the site. To the extent feasible, topsoil would be collected in areas of native vegetation to conserve natural seed banks and stockpiled for replacement where cut slopes are to be revegetated. To the extent practicable, soil layers excavated from the site would be returned in the same order they were removed (i.e., the topsoil is to be returned to the topmost level). In accordance with Standard Construction Measure 15, topsoil would be stockpiled in a manner that would facilitate survival of mycorrhizal organisms.	Sections 2.3 and 3.3	Revegetate Cut Slopes and the Waste Material Disposal Areas with Drought Tolerant Local Native Vegetation	Const KTR	None	During/ Following Construction	Verified by: Date:
12	All equipment and/or vehicles would be power-washed before entering MCB Camp Pendleton property and the project site. While washing wheeled vehicles, the front wheels would be turned lock-to-lock to allow for exposure of surfaces that may hold weed seeds. This is to control the spread of invasive (non-native) weeds and is in support of Executive Order (EO) 13112, National Invasive Species Act, Federal Noxious Weed Act, the Noxious Plant Control Act, and Marine Corps Order (MCO) P5090.2A, 11200.7 that requires installations to restrict the introduction of exotic species into natural ecosystems.	Sections 2.3 and 3.3	Exotic Plant Species Control	Const KTR	None	During Construction	Verified by: Date:
13	a. Parking, driving, laydown, stockpiling, and storing vehicles and equipment would be limited to existing roads and previously compacted and developed area. No off-road traveling would be permitted outside the project boundary. b. Due to the known proximity of federally listed species, any removal of surface vegetation occurring within 1,600 ft (500 m) of San Mateo Creek would not be	Sections 2.3 and 3.3	Avoid Impacts on Southwestern Willow Flycatcher, Least Bell's Vireo, and other Sensitive Riparian Wildlife Species and Habitats	Const KTR	None	During/ Following Construction	Verified by: Date:

MINIMIZATION, MITIGATION, MONITORING, AND REPORTING (MMMR) TRACKING SHEET
P-637 Infantry Squad Battle Course Range

SCM #	*Minimization, Mitigation, Monitoring, Reporting Measures*	*Environmental Assessment Section*	*Implementation Procedure or Action*	*Responsible Organization*	*Deliverable/ Report*	*Compliance Schedule*	*Verification of Compliance*
	scheduled between 15 March and 31 August, to the maximum extent feasible, to avoid potential impacts to nesting. If surface vegetation removal cannot be completed outside of the breeding season, a nest survey would be completed outside of the breeding season, a nest survey would be completed within 330 ft (100 m) of proposed vegetation removal by a MCB Camp Pendleton ES-approved biologist immediately before construction to ensure that no nests would be affected. If active nests are observed, the biologist, in coordination with MCB Camp Pendleton ES and USFWS, would determine adequate setbacks from nests to prevent nest disturbance. c. Grading and removal of riparian vegetation would be minimized. Subsequent construction in woody riparian habitat would occur outside of the southwestern willow flycatcher/least Bell's vireo breeding season (15 March to 31 August) whenever feasible. d. A qualified biologist would be required for project work adjacent to the San Mateo Creek riparian corridor during the breeding season. The biologist would be a trained ornithologist with at least one field season (minimum of 40 hours) of documented experience conducting least Bell's vireo and southwestern willow flycatcher surveys. The biologist would also be capable of visual and auditory identification of typical southern California riparian bird species. Qualifications for this biologist would be reviewed and approved by MCB Camp Pendleton ES before initiation of this action. If deemed appropriately qualified, a single person may act as the arroyo toad and bird biologist. e. If seasonal avoidance is not feasible, at least three protocol-level pre-construction surveys would be conducted by the approved biologist in accordance with USFWS requirements for the least Bell's vireo and southwestern willow flycatcher and their active nests in all suitable habitats within 330 ft (100 m) of the						

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	proposed construction area and weekly throughout the breeding season. The biologist would not be authorized to use recorded vocalizations to locate or attract vireos or willow flycatchers. If an active southwestern willow flycatcher or least Bell's vireo nest occurs within 250 ft (76 m) of the proposed construction corridor, the biologist would coordinate with MCB Camp Pendleton ES to determine whether project activities need to be temporarily modified or halted to avoid impacts to these species. MCB Camp Pendleton ES would coordinate with the USFWS directly to discuss potential additional avoidance measures, such as sound attenuation devices. An approved biologist would monitor nest progress and construction activities in and adjacent to the riparian habitats to ensure compliance and would keep the project engineer informed of construction activities that may threaten significant biological resources. f. Final designs for construction would minimize the removal of riparian habitat that could support federally listed species (riparian arroyo toad aestivation habitat is included in this habitat type). The following measures would be taken: • Areas temporarily disturbed by construction activities would be treated for a minimum of three years post-construction to control the establishment of exotic vegetation within the cleared or otherwise disturbed area. • Biological monitoring and reporting would be implemented during construction activities occurring in or adjacent to riparian areas. • Signs would be placed to indicate the necessity for all activities to be strictly confined to the project site. • Construction site boundaries would be clearly delineated on the ground by flagging, survey lath, or wooden stakes.						

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P-637 Infantry Squad Battle Course Range

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	In addition, the permanent loss of riparian habitat would be compensated in accordance with the Riparian BO (USFWS 1995a). MCB Camp Pendleton proposes two alternatives for compensating impacts to riparian habitat: (1) on-Base at the Santa Margarita River in the form of native riparian habitat, with costs identified in the Riparian BO adjusted for inflation and (2) utilizing MCB Camp Pendleton's future mitigation requirements to be fulfilled by conservation actions elsewhere within the ecoregion that promote recovery efforts of endangered and threatened species or their habitats (up to 20 percent annual total as named in the Riparian BO). Any reduction of impacts to riparian habitat achieved as a result of further minimizing the project footprint would proportionally reduce the amount of restoration implemented. g. Construction project personnel would be briefed by the prime Contractor during all project phases regarding the potential presence of listed species, the requirements and boundaries of the project, the importance of complying with measures designed to avoid and minimize adverse effects to listed species potentially resulting from project activities, and problem reporting and rectification.						
14	Although measures to protect sensitive riparian bird species (above) would provide protection for arroyo toad habitat during the breeding season (15 March to 30 September), if riparian avoidance during the entire period is not be feasible, the following specific toad-specific measures would be implemented. a. Nighttime construction is not anticipated as a requirement of the proposed action. However, if night work and lighting are required, a biological monitor would be required for the duration of any nighttime construction activities. In addition, any proposed work at night would require nighttime-specific measures approved by MCB Camp Pendleton ES and in compliance with Riparian BO.	Sections 2.3 and 3.3	Avoid and/or Reduce Potential Effects on Arroyo Toad	Const KTR	None	During Construction	Verified by: Date:

MINIMIZATION, MITIGATION, MONITORING, AND REPORTING (MMMR) TRACKING SHEET
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	b. Before commencement of the proposed project, the project proponent would submit the resume from the qualified biologist to MCB Camp Pendleton ES for review and approval. The designated project biologist for measures associated with arroyo toads would have at least two years of independent experience conducting arroyo toad surveys and have demonstrated experience in handling arroyo toads. c. For range improvements and construction, toad exclusionary fencing would be installed along the range side of San Mateo Creek by the Construction Contractor at least two weeks before construction and monitored by the approved toad biologist for the entire construction period within the arroyo toad activity period (1 February to 30 September). Where movement of arroyo toads into the construction area is possible, a toad flap or other approved device would be installed at access points to prevent movement of arroyo toads into the enclosed area. Toad flaps would be inspected every morning for arroyo toads by the project biologist. The linear extent of fencing necessary to reasonably limit access to the range would be determined by the approved toad biologist and MCB Camp Pendleton ES. For bridge construction, temporary silt fencing would be installed by the Construction Contractor at least two weeks before construction activities around the perimeter of work areas including laydown areas, to the maximum extent feasible and would remain in place for the duration of bridge construction. Where construction is to occur in the creek, design of the exclusionary fencing would be developed by the approved toad biologist and MCB Camp Pendleton ES to exclude arroyo toads from entering work areas to the maximum extent feasible. d. The following specific toad-specific measures would be implemented.						

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	• Fencing would extend below ground to a depth of about 6 inches (15 centimeters) to prevent arroyo toads from burrowing beneath the fence. If it is not possible to extend fencing below ground, sand bags would be placed over the bottom lip of the fence to hold it in place. • Before construction activities within the project footprint for the bridge, but after exclusionary fencing has been installed, at least two nights of surveys for arroyo toads would be conducted within the fenced areas by the project biologist. The total number of surveys necessary would be determined based on the findings from the minimum two nights of surveys. These surveys would be conducted during appropriate climatic conditions and at the appropriate time of day or night to maximize the likelihood of encountering arroyo toads. • If arroyo toads are found within the project site, they would be captured and translocated by the project biologist to the closest area of suitable habitat along San Mateo Creek. • After the initiation of construction, the project biologist would be present each morning before construction activities begin and during removal of excavation unit covers and soil stockpile tarps. The project biologist would check the integrity of the arroyo toad fence and locate and remove any arroyo toads that may have entered the area. • Access to project construction sites would occur via the temporary access road. Project-related vehicle travel would be limited to daylight hours to the extent feasible, as arroyo toad movement across roadways occurs primarily during nighttime hours and ingress and egress of construction equipment						

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	and personnel would be kept to a minimum. Dirt/sand piles left overnight would be covered with tarps or plastic sheeting with the edges sealed with sandbags, bricks, or boards to prevent arroyo toads from burrowing into the dirt. Holes or trenches would be covered with material such as plywood or solid metal plates with the edges sealed with sandbags, bricks, or boards to prevent arroyo toads from falling into holes or trenches. All holes and trenches within potential arroyo toad habitat would be inspected each morning by the project biologist. • The project biologist would be present at the end of the day to ensure that the excavations are properly covered to prevent arroyo toads from entering any open pits and to check the integrity of the arroyo toad fence. The project biologist would be on call and available as needed at other times in the event that an arroyo toad is encountered during the activities. The project biologist would be present on site full-time for the three days following any measurable rainfall event (i.e., 0.05 inch [0.13 centimeter] or greater) or other appropriate climatic conditions (e.g., high relative humidity and moderate temperatures) that are likely to elicit above-ground arroyo toad movement. • The project biologist would contact MCB Camp Pendleton ES regarding any arroyo toad sighting within the project footprint. Any incidental excavation, capture and relocation, injury, or death of arroyo toads in association with project activities would be reported immediately to MCB Camp Pendleton ES. • The project site would be kept as clean as possible to avoid attracting arroyo toad predators or small insects (i.e., arroyo toad prey items). All food-						

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	related trash would be placed in sealed bins or removed from the site regularly. • Dust control measures (i.e., water truck spraying) would be conducted in a manner that does not attract arroyo toads into the project activity areas (e.g., avoid over-spraying of water; near occupied habitat, spraying would occur only when arroyo toad exclusion fence has been installed). • Fencing would be removed immediately after work is completed. All temporary impacts to riparian habitat, regardless of listed species presence, would be offset as specified in the Riparian BO (USFWS 1995a). Compensation for individual impacts to habitat occupied by arroyo toads, vireos, and flycatchers is not additive, as some areas may be occupied by more than one species. Compensation is based on the total amount of riparian habitat impacted.						
15	Permanent impacts to occupied arroyo toad upland aestivation habitat (all habitats within the 82-ft [25-m] relative contour from occupied riparian habitat) would be offset by restoring riparian habitat that has been invaded by non-native plant species on MCB Camp Pendleton at a ratio of 0.5:1 (restored:impacted). The permanent loss of arroyo toad upland aestivation habitat would be offset by compensation/restoration of riparian habitat following the Riparian BO. Alternatively, upland habitat on MCB Camp Pendleton that is mutually agreed to by MCB Camp Pendleton ES and the USFWS could be restored at a ratio of 2:1. Permanent impacts to occupied arroyo toad upland aestivation habitat (all habitats within the 82-ft [25-m] relative contour from occupied riparian habitat) would be offset by restoring riparian habitat that has been invaded by non-native plant species on MCB Camp Pendleton at a ratio of 0.5:1 (restored:impacted). The permanent loss of arroyo toad upland aestivation habitat would be offset by compensation/restoration of riparian habitat following the	Sections 2.3 and 3.3	Restoration of Arroyo Toad Upland Aestivation Habitat	Const KTR	None	Following Construction	Verified by: Date:

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	Riparian BO. Alternatively, upland habitat on MCB Camp Pendleton that is mutually agreed to by MCB Camp Pendleton ES and the USFWS could be restored at a ratio of 2:1.						
16	Boundaries of sensitive plant communities located in the vicinity of Range 314C were mapped in support of the project and identified in a *Rare Plant Report* (SAIC 2007b). One occurrence (defined by USFWS as a plant or group of plants that occurs farther than 0.25 mi from another individual or group of plants) of thread-leaved brodiaea (represented by 0.05 acres [0.02 hectares] and 26 flowering individuals that survey year) was mapped on the north edge of Range 314C. To avoid effects to the species, the known occurrence would be specified on construction plans. As determined necessary by MCB Camp Pendleton ES or the project biologist, and in coordination with the Range Safety Officer, populations would be clearly marked in the field with markers or exclusion fencing. Known populations and restricted areas would be monitored by the project biologist (familiar with the ecology and display of thread-leaved brodiaea) during construction phases, as determined necessary by MCB Camp Pendleton ES. Avoidance within 200 ft (61 m) of known thread-leaved brodiaea (sub) populations would occur to the maximum extent feasible. Where avoidance is not feasible, MCB Camp Pendleton would compensate for the permanent loss of about 0.05 acre (0.02 hectare) of occupied thread-leaved brodiaea at a 2:1 ratio at the Lima thread-leaved brodiaea Mitigation Area at MCB Camp Pendleton. Any reduction of impacts to thread-leaved brodiaea-occupied grassland achieved as a result of further minimizing the project footprint would proportionately reduce the amount of restoration implemented.	Sections 2.3 and 3.3	Removal of Thread-leaved Brodiaea Populations	Const KTR	None	During/ Following Construction	Verified by: Date:
17	All traffic accessing the project site would reduce speeds to less than 5 miles per hour (mph) (8 km per hour [kph]) when utilizing the current access road or temporary access road during construction. In addition, construction activities would be avoided within or near San Mateo Creek when flow is present. Erosion and sedimentation control measures (Measures 1 through 3) adjacent to San Mateo Creek would be established and	Sections 2.3 and 3.3	Minimize Impacts at San Mateo Creek Crossing for Fish	Const KTR	None	During Construction	Verified by: Date:

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	maintained if construction activities have the potential to increase sedimentation into San Mateo Creek.						
18	MCB Camp Pendleton ES would be notified at least 15 days in advance of ground-disturbing activities associated with investigative activities (e.g., geotechnical borings, potholing), with MCB Camp Pendleton ES authorization required prior to these activities. All impacts associated with these surveys would remain within the project footprint. A project biologist would be present during investigative surveys and would work with the geotechnical crews to avoid and minimize impacts to natural resources to the maximum extent practicable. Due to the short duration of investigations, neither arroyo toad fencing nor species-specific surveys are required.		Investigative Measures	Const KTR	None		
19	Unavoidable impacts to jurisdictional non-wetland Waters of the U.S. would require mitigation. Temporary impacts would also occur associated with construction and temporary access. The development of a mitigation and monitoring plan is a requirement of the Clean Water Act Section 401 and 404 permit applications for activities that would discharge dredge or fill materials into jurisdictional Waters of the U.S. This plan should include details regarding site appropriateness, preparation (e.g., grading), recontouring, planting specifications (including seed mixes and plant palettes), and irrigation design (if determined necessary), as well as maintenance and monitoring procedures (including monitoring period and reporting). The plan should also outline yearly success criteria and remedial measures should the mitigation effort fall short of the success criteria.	Sections 2.3 and 3.4	Mitigation for Permanent Impacts to Waters of the U.S.	Const KTR	None	Following Construction	Verified by: Date:
20	The project proponent, construction oversight authority, or duly designated Contractor would ensure that fugitive dust emissions do not extend beyond the property line for more than 3 minutes in any 60 minute period and would mitigate fugitive dust to minimize track out/carry out emissions during demolition, construction, and transport in accordance with the San Diego Air Pollution Control District (SDAPCD) Rule 55. The Construction Contractor would implement the following measures, where applicable, to minimize fugitive dust emissions:	Sections 2.3 and 3.4	Fugitive Dust Control	Const KTR	None	During Construction	Verified by: Date:

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	a. Use water trucks or sprinkler systems to keep all areas of vehicle movement damp enough to prevent dust from leaving the construction area. b. Minimize the amount of disturbed ground area at a given time. c. Minimize traffic speeds on all unpaved roads. d. Install gravel pads at construction area access points to prevent tracking of soil onto paved roads. e. Provide temporary wind fencing around sites being graded or cleared. f. Suspend all soil disturbance activities when winds exceed 25 mph (40 kph) or when visible dust plumes emanate from the site. Stabilize all disturbed areas at this time. g. Cover truck loads that haul dirt, sand, or gravel or maintain at least 2 ft of freeboard in accordance with Section 23114 of the California Vehicle Code. h. After completion of clearing, grading, earthmoving, or excavation, treat the disturbed areas by watering, re-vegetation, or by spreading non-toxic soil binders until they are paved or otherwise developed to prevent dust generation. i. Designate personnel to monitor the dust control program and to order increased watering, as necessary, to prevent the transport of dust off-site. Their duties would include holiday and weekend periods when work may not be in progress.						
21	The Construction Contractor would implement the following measures during proposed construction activities, where feasible. a. Maintain equipment according to manufacturer specifications. b. Restrict idling of equipment and trucks to a maximum of five minutes at any location.	Sections 2.3 and 3.4	Construction Equipment Emission Control Measures	Const KTR	None	During Construction	Verified by: Date:

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	c. Use diesel oxidation catalysts and/or catalyzed diesel particulate traps. d. Use electricity from power poles rather than temporary diesel- or gasoline-powered generators. e. If needed, provide temporary traffic control, such as a flag person, during construction activities to maintain smooth traffic flow. f. Keep construction equipment and equipment staging areas away from sensitive receptor areas (such as day care centers). g. Re-route construction trucks away from congested streets or sensitive receptor areas. h. Use construction equipment with engines that meet USEPA Tier 3 and 4 nonroad standards. i. Use alternatively-fueled construction equipment, such as compressed natural gas (CNG), liquefied natural gas (LNG), or electric.						
22	MCB Camp Pendleton ES would approve all operational equipment proposed for use on site that would generate air emissions before procurement.	Sections 2.3 and 3.4	Procurement of Operational Equipment	ES	None	Following construction; prior to use of new facilities	Verified by: Date:
23	The USMC has consulted with the California State Historic Preservation Officer (SHPO), interested federally recognized and non-federally recognized Indian tribes and other consulting parties regarding potential impacts to five recorded archaeological sites within the project area for Alternative 1 and has entered into a Memorandum of Agreement (MOA) with the SHPO. The MOA has been developed providing stipulations to take into account the effects of the undertaking on historic properties and satisfy the USMC's requirement under the National Historic Preservation Act (NHPA) Section 106 (36 CFR 800.6) to minimize or mitigate impacts to historic properties for which adverse effects cannot be avoided. The USMC would prepare or cause to be prepared, and subsequently implement, a Historic Properties Treatment Plan for	Sections 2.3 and 3.5	Memorandum of Agreement with the State Historic Preservation Officer	ES	Historic Properties Treatment Plan and monitoring plan.	During Construction	Verified by: Date:

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	the five historic properties located within the undertaking's area of potential effect (APE) as well as a monitoring plan and unanticipated discoveries and procedures.						
24	A professional archaeologist and a Native American representative would monitor ground disturbing activities during construction, once unexploded ordnance (UXO) clearance has been completed and the project site deemed safe by MCB Camp Pendleton personnel, to ensure that the project does not adversely affect cultural resources that may be discovered during construction. A Monitoring Discovery Plan must be submitted 30 days before the construction begins, for approval by MCB Camp Pendleton ES. A technical monitoring report would be prepared and submitted to MCB Camp Pendleton ES. This requirement would be subject to any additional requirements resulting from Section 106 consultation with SHPO.	Sections 2.3 and 3.5	Archaeological and Native American Monitoring	Const KTR	Technical monitoring report.	During construction	Verified by: Date:
25	If the recorded archaeological sites for Alternative 2 determined by the SHPO during Section 106 consultation to be eligible for inclusion in the NRHP, the USMC would enter into a MOA with the SHPO and consult on ways to "avoid, minimize or mitigate the adverse effects" (36 CFR 800.6), which may include conducting a data recovery project based on criteria and procedures outlined by the SHPO and MCB Camp Pendleton ES.	Sections 2.3 and 3.5	Phase III Data Recovery Project	ES	None	Design phase; During Construction	Verified by: Date:
26	In the event soil is removed from the project site, appropriate hazardous constituent sampling and testing would be completed in accordance with applicable regulations. During grading and construction, if soil contamination (discolored and/or odorous soil) is discovered, MCB Camp Pendleton ES would be contacted for necessary remedial requirements. Work would be accomplished with every effort to prevent the spread of any potential contamination or release of any potential existing contaminants to the environment, in accordance with all federal, state, and local laws, regulations, and instructions.	Sections 2.3 and 3.5	Contaminated Soil Testing and Management	Const KTR	None	During Construction	Verified by: Date:
27	The action proponent, or their Contractor, would ensure that all trash and construction debris resulting from construction activities, including asphalt or concrete, would be properly disposed of and would not be discarded on site. In the event of	Sections 2.3 and 3.7	Construction Debris Management	Const KTR	None	During construction	Verified by: Date:

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	excavation of asphalt or concrete, excess material would be disposed of in accordance with California Code of Regulations (CCR) Title 14, Division 3, Article 5.9. To the greatest extent possible, the construction debris generated from this project would be diverted from placement in a landfill through recycling or reuse [EO 13423; MCO P5090.2A, 17200.3.3(b)].						
28	Removal of UXO would be required before the start of construction to accommodate proposed site improvements. UXO would be handled, stored, transported, and disposed of in accordance with the Military Munitions Rule (40 CFR Part 266, Subpart M).	Sections 2.3 and 3.7	Unexploded Ordnance Removal	Const KTR	None	Before and during construction	Verified by: Date:
29	The following measures/BMPs would be implemented to reduce the possibility of a wildfire including: a. The MCB Camp Pendleton Wildland Fire Prescription Burn Plan would be updated by MCB Camp Pendleton ES to accommodate the project. b. The Wildfire Prevention Plan (WPP) would be updated yearly by MCB Camp Pendleton ES and would incorporate changes to the Range 314 Complex resulting from the proposed action. c. Compliance with the WPP would continue. d. The WPP would continue to use minimal impact suppression tactics (MIST) for fire suppression. e. Range users would continue to comply with the Fire Danger Rating on the Base. f. Activities on the range would be limited to non-dud producing ammunition and tracer rounds when approved by the fire marshal. There would be no firing rockets, dropping bombs, detonating ordnance, or other types of activities that would be more likely to start fires. g. The range would be mowed on a regular basis. h. There would be Class 2 base material and asphalt on the roads and parking lot.	Sections 2.3 and 3.7	Wildland Fire Protection	Const KTR	Design Plan; Updated Wildfire Prevention Plan	Before and during construction	Verified by: Date:
30	The construction contractor will prepare a construction traffic	Section 2.6	Transportation	Const KTR	Traffic	Prior to	Verify by:

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	management and detour plan that would specify necessary lane closures, detours, signage/lighting, flaggers, and other traffic control measures needed to avoid accidents and provide access and continued traffic movement along North Range Road during construction.				manage-ment plan	start of construction	Date:
FWS 1	Final designs for construction will minimize the removal of riparian habitat that could support federally listed species.	Section 7	Final construction designs.	Const KTR	Dwgs	Prior to start of construction	Verify by: Date:
FWS 2	The project work areas will be limited to the sites specified in the BA. Access to the project site will use the current existing road or temporary access road. Parking, driving, lay-down, stockpiling, and vehicle and equipment storage will be limited to previously compacted and developed areas, and no off-road vehicle use will be permitted beyond the project site and designated access routes. Disturbances to the adjacent native vegetation will be minimized.	Section 7	Limit project work areas.	Const KTR	None	Before and during construction	Verify by: Date:
FWS 3	A biological monitor will oversee avoidance and minimization measures specified within these conservation measures. Different biological monitors may be designated for specific measures listed based on the qualifications necessary to satisfy the specific measure. If multiple biological monitors are required, their activities will be coordinated through one primary biological monitor. The biological monitor(s) will have experience and training necessary to conduct tasks described in this biological opinion. A resume of experience and training for each designated biological monitor will be submitted for review and approval to MCBCP Environmental Security	Section 7	Biological Monitor.	Const KTR	Monitoring report	Before and during construction	Verify by: Date:
FWS 4	All traffic accessing Range 314C will reduce speeds to less than 5 miles per hour when using the current access road or temporary access road during construction. In addition, construction activities will be avoided within or near San Mateo Creek when flow is present. Erosion and sedimentation control measures (CM 8 to CM 10) adjacent to San Mateo Creek will be established and maintained if construction activities have the potential to increase sedimentation into San Mateo Creek.	Section 7	Minimize impacts at San Mateo Creek crossing.	Const KTR	None	Before and during construction	Verify by: Date:

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FWS 5	To the maximum extent feasible, vegetation removal will occur from September 1 to February 14, which is outside the bird breeding season for federally listed and other bird species. Trimming or removal of vegetation during the peak breeding season (February 15 to August 31) will require a pre-activity survey by a wildlife biologist, hired by the project proponent and approved by MCBCP Environmental Security, to confirm that active nests will not be affected. The wildlife biologist must conduct the survey within 3 days of the start of vegetation removal.	Section 7	Avoid impacts on nesting birds.	Const KTR	Pre-nesting survey	Before construction	Verify by: Date:
FWS 6	The final project will be designed to minimize impacts by reducing disturbance footprints to native grassland and areas densely vegetated with native vegetation to the maximum extent practicable. In addition, staging areas or other temporary construction-related requirements will be located on previously disturbed areas to the maximum extent feasible. For native plant community impacts that will not be avoided by the project design, the Construction Contractor will develop a Revegetation Plan that will be approved by MCBCP Environmental Security before the start of construction. MCBCP Environmental Security will provide a copy of the Revegetation Plan to the Service for comment, review, and approval. The Revegetation Plan will be submitted to the Service before initiating project activities that will impact federally listed species. The Revegetation Plan will: a. Include the proposed restoration location, existing conditions of the restoration site, methodology for creating/restoring habitat, monitoring requirements and time periods, success criteria, and follow-up measures if needed. b. Require restoration for temporary impacts to federally listed species occupied habitat to be initiated within 6 months of completion of	Section 7	Avoid and minimize disturbance to upland native plant communities; develop a Revegetation Plan to compensate for disturbance to native plant communities	Const KTR	Reveg-etation Plan	Before construction	Verify by: Date:

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	construction. c. Require areas temporarily disturbed by construction activities be treated for a minimum of 5 years post-construction to control the establishment of exotic vegetation within the cleared or otherwise disturbed area. However, if success criteria have been met at year 3, additional treatment and monitoring will not be required. 1. Biological monitoring and reporting will be implemented during construction activities occurring in or adjacent to riparian areas. 2. Signs will be placed to indicate the necessity for all activities to be strictly confined to the project area. 3. Construction site boundaries will be clearly delineated on the ground by flagging, survey lath, or wooden stakes. All project-related activities will occur within the project boundary. d. Require temporary disturbance to riparian habitat be restored in accordance to the Riparian BO (Service 1995). e. Address all revegetation efforts associated with						

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	the proposed action and include specific erosion control measures, irrigation requirements, species composition, seed mix origins and ratios, weed control, water regimes, maintenance activities, success criteria, and monitoring requirements. Weed treatment addressed in the Revegetation Plan will include all erosion control areas and permanent non-vegetated areas such as gravel associated with erosion control features. f. Consider replacing disturbed native vegetation. Restoration of temporarily impacted coastal sage scrub will be in a manner consistent with the Final Conceptual Coastal Sage Scrub Restoration Plan for MCBCP, Southwest Division, Naval Facilities Engineering Command, December 2001 (or any other updated standardized coastal sage scrub restoration plan approved by the Land Management Section of Environmental Security for use on MCBCP or a project-specific coastal sage scrub restoration plan approve by the Land Management Section of Environmental Security). g. Outline a monitoring program for the revegetated areas, including success criteria and the duration and frequency of monitoring. Non-native invasive species should be treated with Base-approved herbicides for a minimum of 3 years following application of the first treatment. Areas impacted by construction will be inspected by MCBCP Environmental Security within 1 year of						

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	completion of construction to determine whether any remedial measures are required. Remedial measures may include re-seeding/re-planting, weed control, watering, and/or erosion control. The results of the monitoring program will be summarized in an Annual Monitoring Report and will indicate if success criteria have been met. The Construction Contractor will obtain approval of the monitoring methods proposed for use in revegetation. The Annual Monitoring Report will be submitted to MCBCP Environmental Security annually until the success criteria are met. h. Require a Post-Project Report be prepared that details the exact acreage of all vegetation communities, including riparian, that were impacted by the project.						
FWS 7	As stated in the Section II.a.1.2 of the Biological Assessment (USMC 2015), cut slopes, staging, and laydown areas not planned for development will be restored and revegetated to their original condition, or better, using local, native, drought-tolerant vegetation in accordance with the Revegetation Plan (CM 5). The affected areas will be stabilized to prevent erosion during and following construction per standard construction BMPs (see Appendix A of the BA). The removed soil (waste material) site will be delineated before construction and placed to minimize the disturbance area while maintaining about the same topographic characteristics of the site. To the extent feasible, topsoil will be collected in areas of native vegetation to conserve natural seed banks and stockpiled for replacement where cut slopes are to be revegetated. To the extent practicable, soil layers excavated from the site will be returned in the same order they were removed (i.e., the topsoil is to be returned to the topmost level). In accordance	Section 7	Revegetate cut slopes and waste material disposal areas with drought-tolerant local native vegetation.	Const KTR	None	Post-construction	Verify by: Date:

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	with Standard Construction Measure 15 in Appendix A of the BA, topsoil will be stockpiled in a manner that will facilitate survival of mycorrhizal organisms.						
FWS 8	Permanent erosion control practices will be applied to the project in the form of riprap energy dissipaters at all proposed channel discharge locations. The alluvial channel will be lined with high performance turf reinforcement matting (which is pervious and allows vegetation to grow) and vegetated with native grasses and native trees. An effective slope of 6 percent will be achieved through evenly spaced grade control near the upstream portion of the alluvial channel. An effective slope of 0.5 percent will be achieved through evenly spaced grade control where the alluvial channel parallels the range.	Section 7	Permanent Erosion Control Practices.	Const KTR	None	Before and during construction	Verify by: Date:
FWS 9	Temporary erosion control measures will consist of bonded fiber matrix with local native hydroseed, in accordance with an approved Revegetation Plan (see CM-6). All disturbed slopes will require the application of a bonded fiber matrix with a native hydroseed mixture. Any disturbed portion of the project area left unattended for more than 14 days will be covered to prevent erosion during construction. When hydroseed cannot be established in advance of forecasted rain, another equally effective erosion control method (e.g., coir erosion blanket) will be applied in accordance with the General Construction Permit obtained from the State Water Resources Control Board and installed to manufacturer's specifications. Photodegradable double-nylon straw blankets will not be used. All erosion control materials will be weed-free.	Section 7	Temporary Erosion Control Measures.	Const KTR	None	Before and during construction	Verify by: Date:
FWS 10	A Storm Water Pollution Prevention Plan will be prepared and will incorporate Best Management Practices (BMPs), such as fiber roll and/or silt fence perimeter protection, fiber roll slope protection, gravel bag, check dam protection, and a minimum of one stabilized construction entrance. Erosion and sediment control devices used for the proposed project, including fiber rolls, will be made from biodegradable materials such as jute, with no plastic mesh, to avoid creating a wildlife entanglement hazard. A proposed basin, located adjacent to the access road that	Section 7	Temporary Sediment Control Measures. hazard	Const KTR	SWPPP	Before and during construction	Verify by: Date:

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	leads up to the firing range, will serve as a sediment basin during construction activities						
FWS 11	A drainage system will be constructed at the facility to minimize impacts to water resources. The system will be designed and located to provide onsite stormwater retardation of runoff flows, trap eroded soils, and filter out surface water contaminants. The drainage system will implement Low Impact Development (LID)[1] in accordance with the Energy Independence and Security Act (2007) and official USMC, Department of the Navy, and Department of Defense LID policies. The system will include various stormwater management features, which may include, but are not limited to, vegetated swale(s), an alluvial channel, and bio-retention basins. The bio-retention basins will be of sufficient size to manage anticipated water flows and volumes. A Maintenance Plan for the onsite drainage system will be prepared by the project design contractor and approved by MCBCP before the start of construction. This plan will include measures to address the following maintenance issues: i. Management of trash, debris, and excessive sediment. j. Vegetation trimming to maintain a clear flow path. k. Visual inspection of conveyances before and	Section 7	Construction, Operation, and Maintenance of an Onsite Drainage System	Const KTR	Prepare drainage mainten-ance plan	Before and during construction	Verify by: Date:

[1] LID is an approach to managing stormwater through engineering and planning in a manner that replicates natural processes such as infiltration, filtration, and storage of stormwater.

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	after storm events to be sure the systems are clear of trash, sediment, and debris. l. Hydro-jetting, as necessary, to clear blocked storm drain pipes or culverts. m. Clearing riprap areas of sediment. Clearing activities include removing the riprap, clearing excessive sediment and debris, checking filter fabric, and placing riprap back as it was designed. n. Removal and replacement of the engineered media in the bio-retention areas to remove clogging from fine sediment.						
FWS 12	Recommendations provided in the Draft Hydraulics and Scour Report (RBF 2013) will be adhered to during access road/bridge final design and construction to prevent scour adjacent to piers and embankments, if required. Scour mitigation could include placement of riprap, sheet piles, and other scour-resistant materials, and/or implementation of other structural scour countermeasures.	Section 7	Armoring of Bridge Piers, Abutments, and Embankments to Prevent Scour.	Const KTR	None	Before and during construction	Verify by: Date:
FWS 13	. Stockpiles of soil will be properly contained and covered to eliminate or reduce sediment transport from the site to streets, drainage facilities, or adjoining properties via runoff, vehicles, tracking, or dispersal by wind and to minimize impacts to water quality and arroyo toads.	Section 7	Stockpile Containment	Const KTR	None	Before and during construction	Verify by: Date:
FWS 14	Runoff from onsite equipment and vehicle washing will be contained at the construction site and will not be discharged to receiving waters or the local storm drain system.	Section 7	Onsite Equipment and Vehicle Washing.	Const KTR	None	Before and during construction	Verify by: Date:
FWS 15	**.** Fueling of equipment will not occur within 100 feet of any drainage or creek and will be allowed only in designated areas.	Section 7	Onsite Equipment Fueling	Const KTR	None	Before and during	Verify by: Date:

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						construction	
FWS 16	Impacts from fugitive dust will be avoided and minimized through watering and other appropriate BMPs.	Section 7	Dust Control.	Const KTR	None	Before and during construction	Verify by: Date:
FWS 17	To ensure fire does not commence due to project activities, construction trucks will carry water and shovels or fire extinguishers in the field. Shields, protective mats, or other fire prevention equipment will be used during grinding and welding, and vehicles will not be driven or parked in areas where catalytic converters could ignite dry vegetation. No smoking or disposal of cigarette butts will take place within vegetated areas.	Section 7	Fire Prevention.	Const KTR	None	Before and during construction	Verify by: Date:
FWS 18	A contractor education program will be conducted by the biological monitor with oversight by Environmental Security personnel. It will be conducted during all project phases and will cover the potential presence of listed species; the requirements and boundaries of the project; the importance of complying with avoidance, minimization, and compensation measures; and problem reporting and resolution methods.	Section 7	Contractor education program	Const KTR	Notify ES	Before and during construction	Verify by: Date:
FWS 19	All equipment and/or vehicles will be power-washed before entering MCBCP property and the project area. While washing wheeled vehicles, the front wheels will be turned lock-to-lock to allow for exposure of surfaces that may hold weed seeds. This is to control the spread of invasive (non-native) weeds and is in support of Executive Order 13112, National Invasive Species Act, Federal Noxious Weed Act, the Noxious Plant Control Act, and Marine Corps Order P5090.2A, 11200.7 that requires installations to restrict the introduction of exotic species into natural ecosystems.	Section 7	Exotic Plant Species Control..	Const KTR	None	Before and during construction	Verify by: Date:
FWS 20	MCBCP Environmental Security will be notified at least 15 days in advance of ground-disturbing activities associated with investigative activities (e.g., geotechnical borings, potholing), with MCBCP Environmental Security authorization required prior to these activities. All impacts associated with these surveys will remain within the project footprint described in this biological opinion and the Biological Assessment (USMC 2015). A	Section 7	Investigative Measures. to avoid and minimize impacts	Const KTR	Notify ES	Before and during construction	Verify by: Date:

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	biological monitor will be present during investigative surveys and will work with the geotechnical crews to avoid and minimize impacts to natural resources to the maximum extent practicable. Due to the limited scope and short duration of investigations, neither arroyo toad fencing nor species-specific surveys will be implemented.						
FWS 21	A biological monitor[2] familiar with the arroyo toad will be responsible for overseeing construction to ensure compliance with the conservation measures and for preventing unanticipated impacts to federally listed species. The biological monitor will be on site during vegetation removal, pre-project flagging, and other construction activities with the potential to impact arroyo toad. The biological monitor will be empowered to halt work activity to avoid impacts to arroyo toad, if necessary. Before commencement of the proposed project, the project proponent will submit the resume from the biologist to MCBCP Environmental Security for review and approval.	Section 7	Biological monitor.	Const KTR	Resume and Monitoring report	Before and during construction	Verify by: Date:
FWS 22	Nighttime construction is not anticipated as a requirement of the proposed project. However, if night work and lighting is required, a biological monitor will be required for the duration of any nighttime construction activities. In addition, any proposed work at night will require nighttime-specific measures approved by MCBCP Environmental Security, and in compliance with the Riparian BO.	Section 7	Nighttime construction.	Const KTR	Notify ES		Verify by: Date:
FWS 23	For range improvements and construction, arroyo toad exclusionary fencing will be installed along the range side of San Mateo Creek at least 2 weeks before construction and will be monitored by the biological monitor for arroyo toad for the entire construction period within the arroyo toad activity period (1 February – 30 September). Where movement of arroyo toads into the construction area is possible, a toad flap or other approved device will be installed at access points to prevent movement of arroyo toads into the enclosed area. Toad flaps will	Section 7	Fencing for range construction.	Const KTR	Notify ES	Before and during construction	Verify by: Date:

[2] The designated biological monitor for this measure will have at least 2 years and 30 hours of documented experience with location and observation of arroyo toads and a minimum of 20 hours of field experience involving capture and handling of arroyo toads.

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	be inspected by the biological monitor every morning for arroyo toads. The linear extent of fencing necessary to reasonably limit access to the range will be determined by the biological monitor and MCBCP Environmental Security						
FWS 24	For bridge construction, temporary silt fencing will be installed at least 2 weeks before construction activities around the perimeter of work areas including laydown areas, to the maximum extent feasible, and will remain in place for the duration of bridge construction. Where construction will occur in the creek, design of the exclusionary fencing will be developed by the biological monitor and MCBCP Environmental Security to exclude arroyo toads from entering work areas, to the maximum extent feasible.	Section 7	Fencing for bridge construction	Const KTR	Fencing plan	Before and during construction	Verify by: Date:
FWS 25	Fencing will extend below ground to a depth of about 6 inches to prevent arroyo toads from burrowing beneath the fence. If it is not possible to extend fencing below ground, sand bags will be placed over the bottom lip of the fence to hold it in place. Fencing will be removed immediately after work is completed.	Section 7	Fencing design.	Const KTR	none	Before and during construction	Verify by: Date:
FWS 26	Before construction activities within the project footprint for the bridge, but after exclusionary fencing has been installed, at least 2 nights of surveys for arroyo toads will be conducted within the fenced areas by the biological monitor. The total number of surveys necessary will be determined based on the findings from the minimum 2 nights of surveys. These surveys will be conducted during appropriate climatic conditions and during the appropriate time of day or night to maximize the likelihood of encountering arroyo toads	Section 7	Pre-construction surveys	Const KTR	Monitoring report	2 nights before construction	Verify by: Date:
FWS 27	If the project biological monitor, in coordination with the MCBCP Environmental Security, believes artificial watering is warranted of all or a portion of the site to illicit a response from arroyo toads, such efforts will be enacted. This generally is done when climatic conditions are not appropriate for arroyo toad movement during clearance surveys and is done during nights (i.e., at least 1 hour after sunset) with temperatures above 50 degrees Fahrenheit, by spraying the project area with water to simulate a rain event.	Section 7	Artificial watering.	Const KTR	Notify ES	Before and during construction	Verify by: Date:

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FWS 28	If arroyo toads are found within the project site, they will be captured and translocated by the biological monitor to the closest area of suitable habitat along San Mateo Creek. The date, time of capture, specific location of capture (using GPS), approximate size, age, and health of the individual will be recorded. Immediately following removal and translocation, the biological monitor will notify Environmental Security personnel. Within 2 weeks of the translocation, Environmental Security will provide the Service with the above information.	Section 7	Translocation.	Const KTR	Monitoring report	Before and during construction	Verify by: Date:
FWS 29	After the initiation of construction, the biological monitor will be present each morning before construction activities begin and during removal of excavation unit covers and soil stockpile tarps. The biological monitor will check the integrity of the arroyo toad fence and locate and remove any arroyo toads that may have entered the area. The biological monitor will be present at the end of the day to ensure that the excavations are properly covered to prevent arroyo toads from entering any open pits and to check the integrity of the arroyo toad fence. The biological monitor will be on call and available as needed at other times in the event that an arroyo toad is encountered during the activities. The biological monitor will be present on site full-time for the 3 days following any measurable rainfall event (i.e., 0.05 inch or greater) or other appropriate climatic conditions (e.g., high relative humidity and moderate temperatures) that are likely to elicit above-ground arroyo toad movement. The biological monitor will be present during any	Section 7	Monitoring by biological monitor.	Const KTR	An annual report will be submitted to the CFWO via ES	Before and during construction	Verify by: Date:

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	maintenance activities at the bridge or range in arroyo toad habitat (riparian and upland areas) that require ground disturbing activities such as, but not limited to, removal of sediment behind the check dams within the diversions or detention basins, cleaning of culverts/piers, minor repairs of eroded, undermined, or scoured areas, and replacement of jute netting. An annual post-maintenance report will be submitted to the CFWO summarizing maintenance activities and documenting any arroyo toads killed, encountered, or relocated from within the bridge and range areas during maintenance activities.						
FWS 30	The biological monitor will contact MCBCP Environmental Security regarding any arroyo toad sighting within the project area and will immediately notify Environmental Security personnel regarding any incidental excavation, injury, or death of arroyo toads in association with project activities. In the event of excavation, injury, or death, the date, time of incident, specific location of incident (using GPS), approximate size, age, and health of the individual will be recorded, and Environmental Security will provide the Service with this information within 72 hours of the incident occurring.	Section 7	Reporting to MCBCP Environmental Security	Const KTR	CFWO notification via ES	Before and during construction	Verify by: Date:
FWS 31	Access to project construction sites will occur via the temporary access road. Project-related vehicle travel will be limited, to the extent practicable, to daylight hours, as arroyo toad movement across roadways occurs primarily during night-time hours, and ingress and egress of construction equipment and personnel will be kept to a minimum. Dirt/sand piles left overnight will be covered with tarps or plastic sheeting with the edges sealed with sandbags, bricks, or boards to prevent arroyo toads from burrowing into the dirt. Holes or trenches will be covered with material such as plywood or solid metal plates with the edges sealed with sandbags, bricks, or boards to prevent arroyo toads	Section 7	Site access.	Const KTR	None	Before and during construction	Verify by: Date:

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	from falling into holes or trenches. All holes and trenches within potential arroyo toad habitat will be inspected each morning by the biological monitor.						
FWS 32	The project area will be kept as clean as possible to avoid attracting arroyo toad predators or small insects (i.e., arroyo toad prey items). All food-related trash will be placed in sealed bins or removed from the site regularly.	Section 7	Trash storage and removal.	Const KTR	None	Before and during construction	Verify by: Date:
FWS 33	Dust control measures (i.e., water truck spraying) will be conducted in a manner that does not attract arroyo toads into the project activity areas (e.g., avoid over-spraying of water; near occupied habitat, spraying will occur only when an arroyo toad exclusion fence has been installed).	Section 7	Dust Control.	Const KTR	None	Before and during construction	Verify by: Date:
FWS 34	All impacts to riparian habitat, regardless of listed species presence, will be offset in accordance with the Riparian BO. Compensation is not additive for individual impacts to habitat occupied by arroyo toad, vireo, and flycatcher, as some areas may be occupied by more than one species. Compensation is based on the total amount of riparian habitat impacted.	Section 7	Offset riparian impacts.	Const KTR	None	Before and during construction	Verify by: Date:
FWS 35	Permanent impacts to occupied arroyo toad upland aestivation habitat (all habitats within the 82-foot relative contour from occupied riparian habitat or within 4,921 feet from the channel if the 82-foot elevation limit has not yet been reached at that point) will be offset by restoring riparian habitat that has been invaded by non-native plant species on MCBCP at a ratio of 0.5:1 (restored:impacted). The permanent loss of an estimated 1.50 acre of arroyo toad upland aestivation habitat will be offset by compensation/restoration of riparian habitat following the Riparian BO. Alternatively, upland habitat on MCBCP that is mutually agreed to by MCBCP Environmental Security and the Service could be restored at a ratio of 2:1	Section 7	Restoration of Arroyo Toad Upland Aestivation Habitat.	Const KTR	HMP	Before and during construction	Verify by: Date:
FWS 36	Boundaries of sensitive plant communities located in the vicinity of Range 314C were mapped in support of the project and identified in a Rare Plant Report [Science Applications International Corporation (SAIC) 2007]. One occurrence of thread-leaved brodiaea (represented by 0.05 acre and 26 flowering	Section 7	Removal of thread-leaved brodiaea populations.	Const KTR	Fencing	Before and during construction	Verify by: Date:

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	individuals that survey year) was mapped on the north edge of Range 314C. To avoid effects to the species, the known occurrence will be specified on construction plans. As determined necessary by MCBCP Environmental Security or the biological monitor, and in coordination with the Range Safety Officer, populations will be clearly marked in the field with markers or exclusion fencing. Known populations and restricted areas will be monitored by the biological monitor (familiar with the ecology and appearance of thread-leaved brodiaea) during construction phases, as determined necessary by MCBCP Environmental Security. Avoidance within 200 feet of known thread-leaved brodiaea locations will occur to the maximum extent feasible. Where avoidance is not feasible, MCBCP will compensate for the permanent loss of about 0.05 acre of occupied thread-leaved brodiaea at a 2:1 ratio at the Lima thread-leaved brodiaea Mitigation Area at MCBCP. Any reduction of impacts to thread-leaved brodiaea-occupied grassland achieved as a result of further minimizing the project footprint will proportionately reduce the amount of restoration implemented.						
FWS 37	A biologist (biological monitor) familiar with vireo and flycatcher will be responsible for overseeing construction adjacent to the San Mateo Creek riparian corridor during the breeding season to ensure compliance with the conservation measures and for preventing unanticipated impacts to federally listed species. The biologist will be a trained ornithologist with a minimum of 40 hours of documented experience conducting vireo and flycatcher surveys. The biologist will also be capable of visual and auditory identification of typical southern California riparian bird species. Qualifications for this biologist will be reviewed and approved by MCBCP Environmental Security before initiation of this action. If deemed appropriately qualified, a single person may act as both the arroyo toad and bird biologist. The biological monitor will be on site during construction activities with the potential to impact federally listed species.	Section 7	Biological monitor.	Const KTR		Before and during construction	Verify by: Date:
FWS 38	Prior to initiating construction on the project, MCBCP Environmental Security will review the previous year's basewide	Section 7	Pre-project review of previous year's	ES	CFWO notification	Before construction	Verify by: Date:

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	survey results for vireo and flycatcher, which are conducted an annual basis pursuant to the Riparian BO. This information will be provided to the Carlsbad Fish and Wildlife Office (CFWO) prior to initiating construction. If vireos or flycatchers are observed within the project footprint in the prior year, MCBCP Environmental Security and CFWO will coordinate to determine if the project will impact vireos or flycatchers in a manner not addressed by this biological opinion (i.e., if additional consultation is necessary).		survey data.		via ES		
FWS 39	Due to the known proximity of federally listed species, any removal of surface vegetation occurring within 1,600 feet of San Mateo Creek will not be scheduled between March 15 and August 31, to the maximum extent feasible, to avoid potential impacts to nesting. If surface vegetation removal cannot be completed outside of the breeding season, a nest survey will be completed within 500 feet of proposed vegetation removal by an MCBCP Environmental Security-approved biologist immediately before construction to ensure that no nests will be affected. If active nests are observed, the biologist, in coordination with MCBCP Environmental Security and the CFWO, will determine adequate setbacks from nests to prevent nest disturbance. a. Grading and removal of riparian vegetation will be minimized. Subsequent construction in woody riparian habitat will occur outside the majority of the flycatcher/vireo breeding season (March 15 to August 31) whenever feasible. b. If seasonal avoidance is not feasible, at least three protocol-level pre-construction surveys will be conducted by the approved biologist for the vireo and flycatcher and their active nests in all suitable habitat within 500 feet of the proposed construction area and weekly thereafter throughout the breeding season. The biologist will not be authorized to use recorded vocalizations to locate or attract vireos or flycatchers. If an active flycatcher or vireo nest occurs within 250 feet of the proposed construction corridor, the biologist will coordinate with MCBCP Environmental Security to determine whether project activities	Section 7	Construction Seasonal Limits.	Const KTR	CFWO notification via ES	Before and during construction	Verify by: Date:

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	need to be temporarily modified or halted to avoid impacts to these species. MCBCP Environmental Security will coordinate with the CFWO directly to discuss potential additional avoidance measures, such as sound attenuation devices. An approved biologist will monitor nest progress and construction activities in and adjacent to the riparian habitats to ensure compliance and will keep the project engineer informed of construction activities that may threaten significant biological resources.						
FWS 40	The net permanent loss of about 0.09 acre (following removal and restoration of the at-grade crossing) of riparian habitat will be offset in accordance with the Riparian BO (Service 1995). MCBCP proposes two alternatives to offset impacts to riparian habitat: (1) on-Base at the Santa Margarita River in the form of native riparian habitat, with cost identified in the Riparian BO adjusted for inflation; and (2) using MCBCP's future mitigation requirements to be fulfilled by conservation actions elsewhere within the ecoregion that promote recovery efforts of endangered and threatened species or their habitats (up to 20 percent annual total as described in the Riparian BO). Any reduction of impacts to Mr. Bart Battista (FWS-MCBCP-08B0581-08F0696-R002) Appendix A, Page 47 riparian habitat achieved as a result of further minimizing the project footprint will proportionally reduce the amount of restoration implemented.	Section 7	Offset riparian impacts.	Const KTR	CFWO notification via ES		Verify by: Date:
TC 1.1	At least 14 days prior to initiation of the P-637 project that will directly impact habitat that supports listed species or has a high potential to support listed species, the Marine Corps will submit to the CFWO a figure showing the impact area of the project based on final project designs relative to the impact area depicted in the BA (USMC 2015). The figure will include vegetation mapping and all federally listed species observations from basewide and project-specific surveys and a table showing the final permanent and temporary impacts by habitat type.	Section 7	Marine Corps will submit to the CFWO a figure showing the impact area of the project based on final project designs relative to the impact area depicted in the BA	ES	CFWO notification via ES	14 days before and during construction	Verify by: Date:
TC 2.1	Prior to initiating the P-637 project, the Marine Corps will provide the results of the pre-construction arroyo toad surveys and capture/relocation efforts to the CFWO.	Section 7	provide the results of the pre-construction arroyo	ES	CFWO notification via ES	Before and during construction	Verify by: Date:

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			toad surveys and capture/relocation efforts to the CFWO.				
TC 2.2	For the P-637 project, the Marine Corps will notify the CFWO within 30 days of completing removal of arroyo toad habitat resulting from the project. The purpose of this notification is to ensure that the impacts to arroyo toad habitat from the P-637 project do not exceed the exempted amount or extent of take based on impacts to arroyo toad habitat.	Section 7	the Marine Corps will notify the CFWO within 30 days of completing removal of arroyo toad habitat resulting from the project.	Env KTR	CFWO notification via ES	30 Before disturbance	Verify by: Date:
TC 2.3	Within 30 days of completing construction activities at P-637, the Marine Corps will notify the CFWO of any arroyo toads that were captured and translocated during construction activities. This notification will include the number of arroyo toads captured and translocated as a result of the completed P-637 project. If the exempted amount or extent of take for capture and translocation of arroyo toads is reached (i.e., if a cumulative total of 25 arroyo toads are captured and translocated as a result of the P-637 project), the Marine Corps will cease construction activities and notify the CFWO within 1 business day.	Section 7	Marine Corps will notify the CFWO of any arroyo toads that were captured and translocated	Env KTR	CFWO notification via ES	30 days after construction	Verify by: Date:
TC 2.4	If death or injury of any arroyo toads is observed in association with capture and translocation activities or construction activities, the Marine Corps will notify the CFWO within 1 business day and submit a written report describing the incident within 2 business days so that the activities resulting in take can be reviewed to determine if additional protective measures are required.	Section 7	Marine Corps will notify the CFWO describing the activities resulting in take	Env KTR	CFWO notification	1 day after incident	Verify by: Date:
NM 1	Dewatering activities will occur between May 15 and November 1 to avoid the steelhead migration window and therefore presence of steelhead. A qualified biologist will be present during construction and demolition activities to inspect the dewatered area daily to ensure the diversion remains intact. The dewatering plan will be submitted to NMFS at least 30 days prior to construction for review and approval.	Section 7	Avoid the steelhead migration window	Const KTR	NOAA notification	30 days Before a construction	Verify by: Date:

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NM 2	To further reduce the likelihood of direct effects to steelhead, pump intakes will be screened with wire mesh no larger than 0.2 inches to prevent steelhead from entering the pump system.	Section 7	pump intakes will be screened with wire mesh	Const KTR	None	Before and during construction	Verify by: Date:
NM 3	Best management practices (BMPs) will be implemented during dewatering, drilling, and construction activities to minimize the likelihood that water-quality alterations within and downstream of the action area would be observed.	Section 7	(BMPs) will be implemented during dewatering, drilling, and construction activities	Const KTR	None	Before and during construction	Verify by: Date:
NM 4	Alteration of the streambed will be minimized to the maximum extent possible. Disturbed areas of the streambed will be returned to pre-existing conditions before streamflow is restored.	Section 7	Disturbed areas of the streambed will be returned to pre-existing conditions	Const KTR	None	Before and during construction	Verify by: Date: