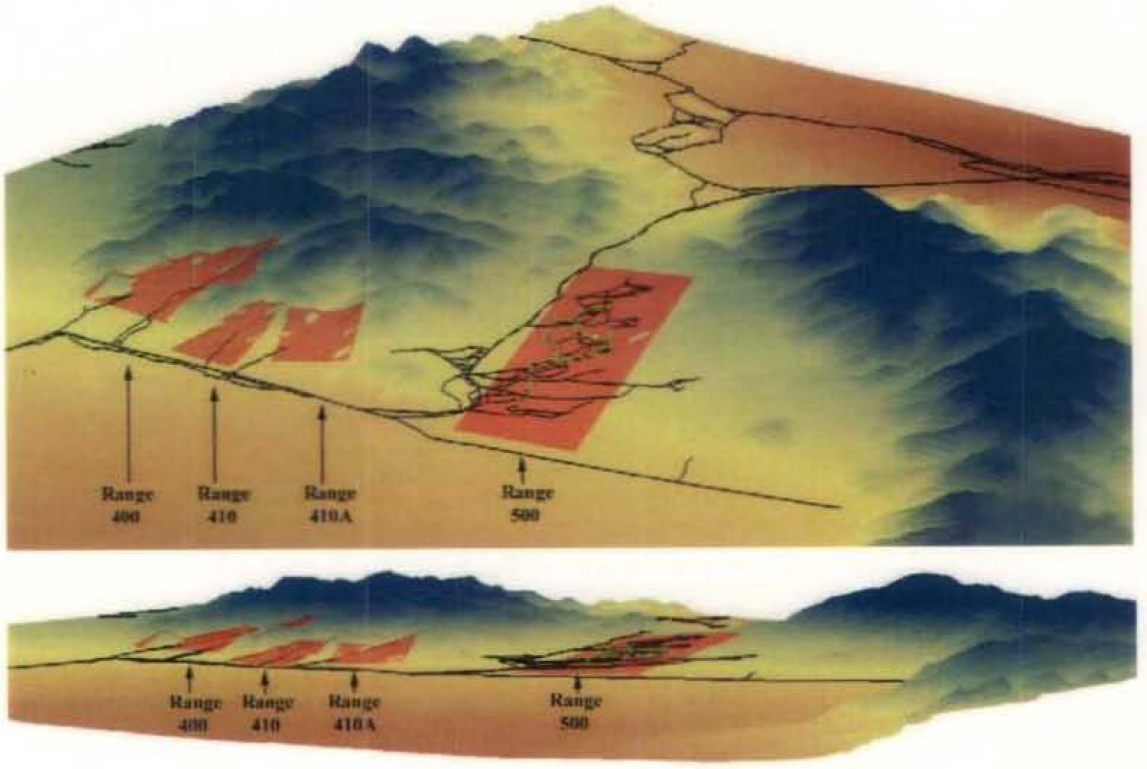
Final

ENVIRONMENTAL ASSESSMENT

Range 500 Upgrades
Marine Corps Air Ground Combat Center
Twentynine Palms, California



September 2003

DEPARTMENT OF DEFENSE
UNITED STATES MARINE CORPS

FINDING OF NO SIGNIFICANT IMPACT FOR PROPOSED RANGE 500 UPGRADES AT MARINE CORPS AIR GROUND COMBAT CENTER TWENTYNINE PALMS, CALIFORNIA.

Pursuant to Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] §§ 1500-1508) implementing procedural provisions of the National Environmental Policy Act (NEPA), the U.S. Department of the Navy (U.S. Navy) gives notice that an Environmental Assessment (EA) has been prepared and an Environmental Impact Statement (EIS) is not required for proposed Range 500 upgrades at Marine Corps Air Ground Combat Center (MCAGCC), Twentynine Palms, California.

The purpose of the proposed action is to increase armored vehicle training efficiency and to allow more training requirements to be satisfied at MCAGCC. The proposed upgrades are needed because the current range layout provides only one tank trail and thus allows Tank and Light Armored Reconnaissance (LAR) units to accomplish only *crew-level* portions of their training requirements; *platoon-level* or *section-level* portions of their training requirements (for Tank units and LAR units, respectively) cannot be met without traveling to other locations.

The proposed action includes construction and installation of infrastructure upgrades, as well as associated increases in operational tempo facilitated by these range upgrades. Upon full implementation of the proposed action, operational tempo would be approximately 15 percent greater than current conditions. The proposed action would be implemented in three phases.

Phase 1 consists of the priority short-term equipment upgrades that are needed for basic range operations. Phase 1 would support Tank and LAR training requirements by increasing the number and variety of trails and targets; consequently, the units would be able to satisfy more training requirements at MCAGCC. Total estimated ground disturbance for Phase 1 (including buffer areas surrounding each construction component) would be approximately 27.8 acres (11.3 hectares), and operational tempo would increase by approximately 10 percent.

Phases 2 and 3 are long-term upgrades and are conceptual in nature at this time; consequently, only Phase 1 is addressed in this Finding of No Significant Impact. Potential environmental effects associated with Phases 2 and 3 are addressed at a programmatic level of analysis in the EA; thus a focused or tiered NEPA analysis of such projects would be required prior to implementation of Phases 2 and 3, and a separate decision document would need to be prepared at that time.

Four Alternatives have been analyzed in the EA: the Proposed Action, Alternative Action 2, Alternative Action 3 and the No-Action Alternative. The Proposed Action is the upgrading of equipment and the increasing of the number and variety of trails and targets. The Proposed Action uses the existing trail, creates two new trails, and uses the existing main supply route (MSR) as a fourth trail. Alternative Action 2 is comprised of the same number of new trails, facilities, and targets as the proposed action; however, the configuration of the trails is slightly different. Alternative Action 3 is comprised of the same number of new trails, facilities, and targets as the proposed action and Alternative Action 2; however, the MSR would not be used as a fourth trail; rather, the fourth trail would be constructed west

of the existing trail. The No-Action Alternative is represented by current Range 500 configuration and continuation of current operations. The Proposed Action is the preferred alternative for this EA.

The EA presents a review and analysis of the potential environmental impacts associated with the four Alternative Actions. Resources analyzed include geological resources, water resources, biological resources, cultural resources, air quality, noise, land use, and public health and safety. No significant environmental impacts would result from implementation of Phase 1 of the proposed action. In coordination with the Natural Resources and Environmental Affairs Division (NREA) of the Marine Air Ground Task Force Training Command (MAGTFTC), the currently proposed project component locations were identified to minimize potential natural and cultural resource impacts. A project-specific, USFWS-protocol survey for desert tortoise (a federally threatened species) was conducted for Phase 1 components of the proposed Range 500 upgrades. Based upon the results of the survey, MAGTFTC has determined that the proposed Range 500 upgrades "may affect, but are not likely to adversely affect" the desert tortoise. Air quality impacts associated with proposed demolition and construction activities were evaluated and found to be below significance threshold criteria. A Record of Non-Applicability for Clean Air Act Conformity was prepared and included as an appendix to the EA.

Cumulative effects of the proposed action in combination with other past, present, or reasonably foreseeable future actions were also analyzed. Based on this analysis, cumulative impacts at MCAGCC Twentynine Palms would not be significant.

The EA prepared by the U.S. Marine Corps addressing this action is on file, and interested parties may obtain a copy from: Commanding General, Head NREA, Building 1451, Box 8110, Marine Air Ground Task Force Training Command, Twentynine Palms, CA, 92278. A limited number of copies of the EA are available to fill single copy requests. Telephone inquiries may be directed to Mr. Scott Kerr at (760) 830-7396, extension 270.

FINDING OF NO SIGNIFICANT IMPACT

After careful review of the EA prepared in accordance with the requirements of NEPA, CEQ regulations, and Department of Navy Procedures for Implementing NEPA (32 CFR 775) as described in Marine Corps Order P5090.2A, I have determined that implementation of Phase 1 of the proposed action would not have significant impacts on the natural and human environment; therefore, an EIS does not need to be prepared.

26 Sep 03

Date

C. B. COWDREY
Brigadier General, U.S. Marine Corps

ENVIRONMENTAL ASSESSMENT

Lead Agency for the EA: Department of the Navy; U.S. Marine Corps

Title of Proposed Action: Range 500 Upgrades at the Marine Corps Air Ground Combat Center Twentynine Palms, California

Affected Region: San Bernardino County

Designation: Environmental Assessment

Abstract

This environmental assessment (EA) has been prepared to evaluate the environmental impacts associated with proposed Range 500 upgrades at the Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms, California. The purpose of the proposed Range 500 upgrades is to increase armored vehicle training efficiency and to allow more training requirements to be satisfied at MCAGCC. The proposed upgrades are needed because the current range layout provides only 1 tank trail and thus allows units to accomplish only *crew-level* portions of their training requirements; *platoon-level* or *section-level* portions of their training requirements cannot be met without traveling to other locations.

The proposed action includes construction and installation of infrastructure upgrades (trails, targets, and facilities), as well as associated increases in operational tempo facilitated by these range upgrades. Upon full implementation of the proposed action, operational tempo would be approximately 15 percent greater than current conditions. The proposed action would occur in 3 phases. The 1st phase consists of the short-term priority equipment upgrades that are needed for basic range upgrades and that also have the possibility for funding in the short term. The 2nd and 3rd phases are long term, conceptual in nature, and are not currently funded at this time. As such, this EA provides a programmatic-level analysis of potential environmental effects associated with these 2 phases, based on the information currently available in the *Range 500 Master Plan.*

This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. § 4321 *et seq.*); the CEQ implementing regulations (40 CFR §§ 1500-1508); and procedures for implementing NEPA as described in the Marine Corps' Environmental Compliance and Protection Manual (Marine Corps Order P5090.2A). Potential impacts have been analyzed for geological resources, water resources, biological resources, cultural resources, air quality, noise, land use, and public health and safety. The preferred alternative (Alternative 1), 2 action alternatives (Alternatives 2 and 3), and the No-Action Alternative are addressed in the EA.

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SEPTEMBER 2003

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EXECUTIVE SUMMARY

This environmental assessment (EA) has been prepared to evaluate the environmental impacts associated with proposed Range 500 upgrades at the Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms, California. The EA has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S. Code § 4321 *et seq.*); the Council on Environmental Quality (CEQ) implementing regulations (40 Code of Federal Regulations §§ 1500-1508); and U.S. Marine Corps (USMC) procedures for implementing NEPA, as described in Marine Corps Order (MCO) P5090.2A *Environmental Compliance and Protection Manual*.

The purpose of the proposed Range 500 upgrades is to increase armored vehicle training efficiency and to allow more training requirements to be satisfied at MCAGCC. The proposed upgrades are needed because the current range layout provides only 1 tank trail and thus allows Tank and LAR units to accomplish only *crew-level* portions of their training requirements; *platoon-level* or *section-level* portions of their training requirements (for Tank units and LAR units, respectively) cannot be met without traveling to other locations.

The proposed action includes construction and installation of infrastructure upgrades, as well as associated increases in operational tempo facilitated by these range upgrades. Upon full implementation of the proposed action, operational tempo would be approximately 15 percent greater than current conditions. The proposed action would occur in 3 phases. The 1st phase consists of the short-term priority equipment upgrades that are needed for basic range upgrades and that also have the possibility for funding in the short term. The 2nd and 3rd phases are long term, conceptual in nature, and are not currently funded at this time. As such, this EA provides a programmatic-level analysis of potential environmental effects associated with these 2 phases, based on the information currently available in the *Range 500 Master Plan*. Each phase, or improvement stage, would support Tank and LAR training requirements by incrementally increasing the number and variety of trails and targets. Each phase would allow the units to satisfy more training requirements at MCAGCC. Total estimated ground disturbance (including buffer areas surrounding each construction component) would be approximately 27.8 acres (11.3 hectares) for Phase 1, 124.7 acres (50.5 hectares) for Phase 2, and 77.7 acres (31.4 hectares) for Phase 3.

Alternatives to the proposed action must be considered in accordance with NEPA, CEQ regulations for implementing NEPA, and MCO P5090.2A. However, only those alternatives determined to be reasonable relative to their ability to fulfill the purpose and need for the proposed action require detailed analysis. Three full buildout alternatives are presented in the *Range 500 Master Plan*. The proposed action is identical to Alternative 1 of the Master Plan. This is the preferred alternative for this EA. Alternative 2 is comprised of the same number of new trails, facilities, and targets as the proposed action; however, the configuration of the trails is slightly different. As with the proposed action, Alternative 2 involves using the existing trail, creating 2 new trails, and using the existing Main Supply Route (MSR) as a fourth trail. The difference is that under Alternative 2, 1 of the new trails would be situated between the existing trail and the proposed easternmost new trail. Alternative 3 is comprised of the same number of new trails, facilities, and targets as Alternative 2, although the configuration of the trails and targets is slightly different. The main difference, however, is that the MSR would not be used as a fourth trail; rather, the fourth trail would be constructed west of the existing trail. Operational tempo for Alternatives 2 and 3 are the same as for Alternative 1.

NEPA, CEQ regulations, and U.S. Marine Corps procedures for implementing NEPA specify that an EA should only focus on those resource areas potentially subject to impacts. In addition, the level of analysis should be commensurate with the anticipated level of environmental impact. Consequently, this EA

focuses on geological resources, water resources, biological resources, cultural resources, air quality, noise, land use, and public health and safety. Cumulative effects of the proposed action in combination with other past, present, or reasonably foreseeable future actions at MCAGCC were also analyzed.

No significant environmental impacts would result from implementation of the preferred alternative (Alternative 1) or from Alternatives 2 and 3 (Table ES-1). One cultural resource site could potentially be affected due to its proximity to 2 proposed targets. However, these target locations are conceptual and can be adjusted to minimize the potential for impacts to the site. Impacts associated with the No-Action Alternative would also not be significant. Phases 2 and 3 are analyzed on a programmatic level in this EA. Biological and cultural surveys would be required if projects from these phases were formally identified as proposed actions (under NEPA) in the future. A focused or tiered NEPA analysis of such projects would also be required. However, based on available information and the programmatic analysis contained herein, impacts of Phases 2 and 3 are not likely to be significant.

Table ES-1. Comparison of Potential Environmental Consequences

Resource Area	*Alternative 1*	*Alternative 2*	*Alternative 3*	*No-Action Alternative*
Geological Resources	○	○	○	○
Water Resources	○	○	○	○
Biological Resources	○	○	○	○
Cultural Resources	○	○	○	○
Air Quality	○	○	○	○
Noise	○	○	○	○
Land Use	○	○	○	○
Public Health and Safety	○	○	○	○

Notes: ○ = No significant impacts
● = Potentially significant impacts
\+ = Beneficial impacts

Final

ENVIRONMENTAL ASSESSMENT

RANGE 500 UPGRADES AT MARINE CORPS AIR GROUND COMBAT CENTER TWENTYNINE PALMS, CALIFORNIA

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CHAPTER 1
PURPOSE AND NEED FOR PROPOSED ACTION

1.1 INTRODUCTION

This environmental assessment (EA) analyzes the potential environmental effects associated with proposed Range 500 upgrades and associated increases in training operations at the Marine Corps Air Ground Combat Center (MCAGCC), Twentynine Palms, California. Range 500 (designated an Armor Multi-Purpose Range Complex) is a live-fire and maneuver range that provides the sites and support facilities for armor and anti-armor training. The individual components of the proposed action include construction and installation of infrastructure upgrades (such as new tank trails and targets), as well as associated increases in operational tempo facilitated by these range upgrades. These upgrades would allow the primary users (1st Tank Battalion [1TNK] and 3rd Light Armored Reconnaissance Battalion [3LAR]) and other units to train more efficiently and to satisfy more training requirements at MCAGCC.

The proposed action would occur in 3 phases, as outlined in the *Range 500 Master Plan* (Marine Air Ground Task Force Training Command [MAGTFTC] 2003a). The 1st phase consists of the short-term priority equipment upgrades that are needed for basic range upgrades and that also have the possibility for funding in the short term. The 2nd and 3rd phases are long term, conceptual in nature, and are not currently funded at this time. As such, this EA provides a programmatic-level analysis of potential environmental effects associated with these 2 phases, based on the information currently available in the *Range 500 Master Plan*. Phases 2 and 3 are not being formally proposed at this time; they represent instead a planning scenario for potential future upgrades at Range 500. Programmatic environmental analyses of this type are conducted when a federal agency plans or contemplates a broad action or program, the specific details of which have not yet been defined. The intention is to comply with Council on Environmental Quality (CEQ) guidance that recommends integration of the environmental process with other planning at the earliest possible time to ensure that planning and decisions reflect environmental value. Additional focused National Environmental Policy Act (NEPA) documentation and resource surveys would need to be completed at some future time if project specifics and funding become available for the 2nd and 3rd phases of the proposed Range 500 upgrades.

This EA has been prepared in compliance with:

- NEPA of 1969 (42 U.S. Code [USC] § 4321);
- CEQ Regulations for Implementation of the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [CFR] §§ 1500-1508); and
- The Marine Corps Environmental Compliance and Protection Manual (Marine Corps Order [MCO] P5090.2A).

1.2 LOCATION AND DESCRIPTION OF MCAGCC

MCAGCC is located in the Mojave Desert, 130 miles (211 kilometers [km]) east of Los Angeles and 54 miles (87 km) northeast of Palm Springs in San Bernardino County, California (Figure 1-1). The southern boundary of MCAGCC is adjacent to the City of Twentynine Palms and is approximately 6 miles (10 km) north of Highway 62. The northern boundary of MCAGCC is located south of Interstate 40. Other communities within the vicinity of MCAGCC include Joshua Tree, Yucca Valley, and Landers.

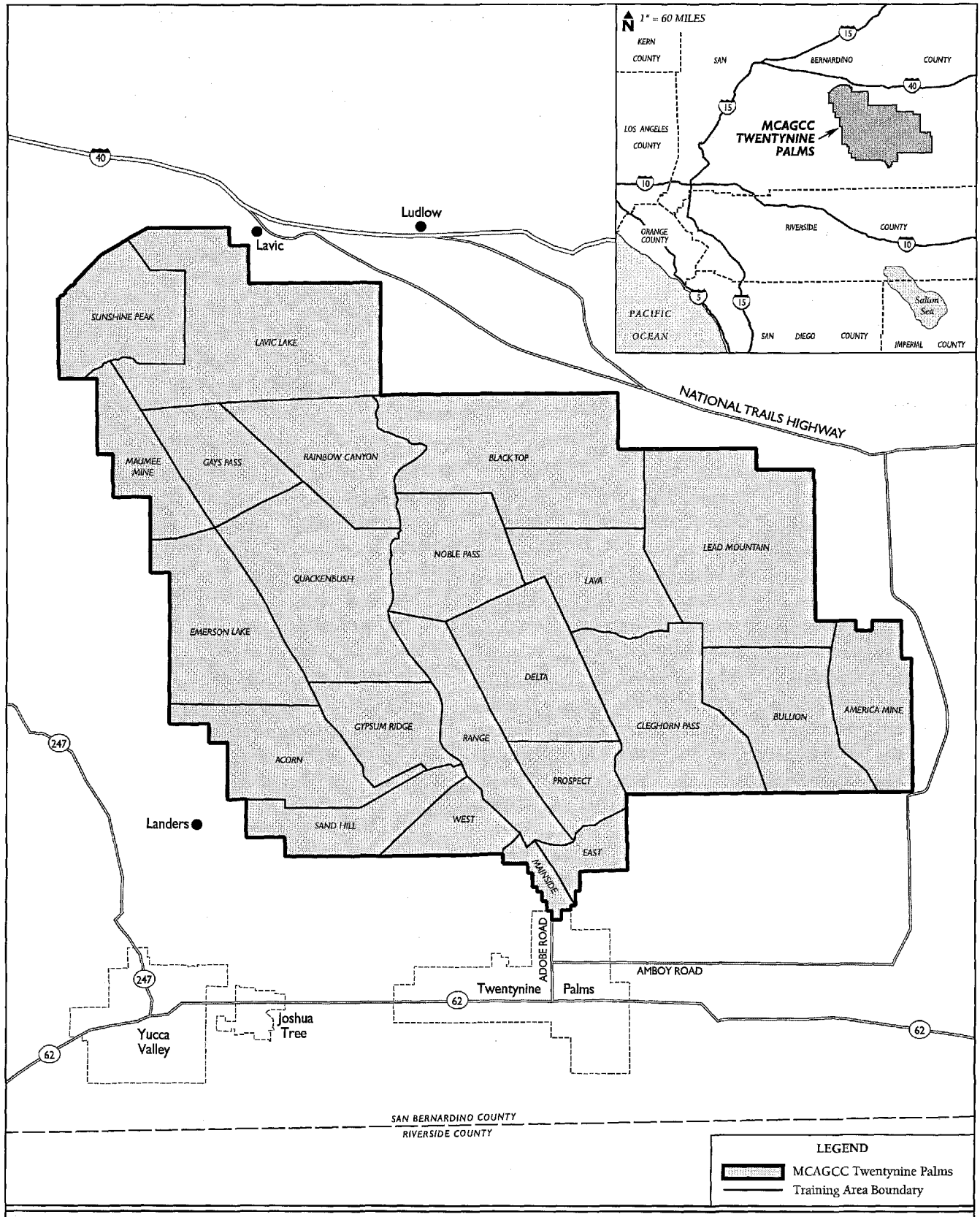


Figure 1-1
Location of MCAGCC Twentynine Palms

MCAGCC is the Marine Corps' largest live-fire training facility, encompassing 598,178 acres (242,075 hectares) and comprising 23 different Training Areas (Figure 1-2). The majority of the base is undeveloped and devoted to combined arms and live-fire training activities. The Mainside Area, located in the southernmost portion of the base, is the primary developed area on MCAGCC, providing an array of maintenance, storage, administration, and housing facilities. Range 500 is located in the central part of the Cleghorn Pass Training Area (see Figure 1-2). Cleghorn Pass is approximately 11 miles (18 km) northeast of the Mainside area, as accessed by the Main Supply Route (MSR).

All training and operational functions at MCAGCC are the responsibility of the MAGTFTC. The unique mission of the MAGTFTC is to develop, conduct, and evaluate the Marine Corps' Combined Arms Exercise (CAX) training program and to support the Marine Corps Communications Electronics School. The objectives of the CAX are to exercise and evaluate active duty and Fleet Reserve Marine Force units and Marine Air Ground Task Forces in the command, control, and coordination of combined arms within a live-fire environment. The CAX is the most realistic live-fire training exercise in the U.S. Marine Corps, and approximately 3,500 personnel participate in each of the ten CAX training cycles conducted annually.

1.3 PURPOSE AND NEED

The purpose of the proposed Range 500 upgrades is to increase armored vehicle training efficiency and to allow more training requirements to be satisfied at MCAGCC. The proposed upgrades are needed because the current range layout provides only 1 tank trail and thus allows Tank and LAR units to accomplish only *crew-level* portions of their training requirements; *platoon-level* or *section-level* portions of their training requirements (for Tank units and LAR units, respectively) cannot be met without traveling to other locations. Specifically, the current range configuration (i.e., 1 trail and its associated targets) allows units to conduct crew-level gunnery training and their twice-annual crew qualifications at Range 500 and meet the respective requirements in the Tank and LAR training manuals. However, 4 trails with additional moving and stationary targets are required to adequately support platoon-level training for Tank units. Two trails and supporting targets are required to adequately support section-level training requirements for LAR units, although having access to 4 trails would further enhance the quality of LAR training.

1.4 RANGE 500 BACKGROUND

1.4.1 Overview

Range 500 is situated in the central part of the Cleghorn Pass Training Area between 2 mountain ridges with peaks about 1,000 feet (300 meters [m]) above the central portion of the range. Range 500 boundaries are used for administrative and scheduling purposes only; range activities can occur outside these boundaries as well.

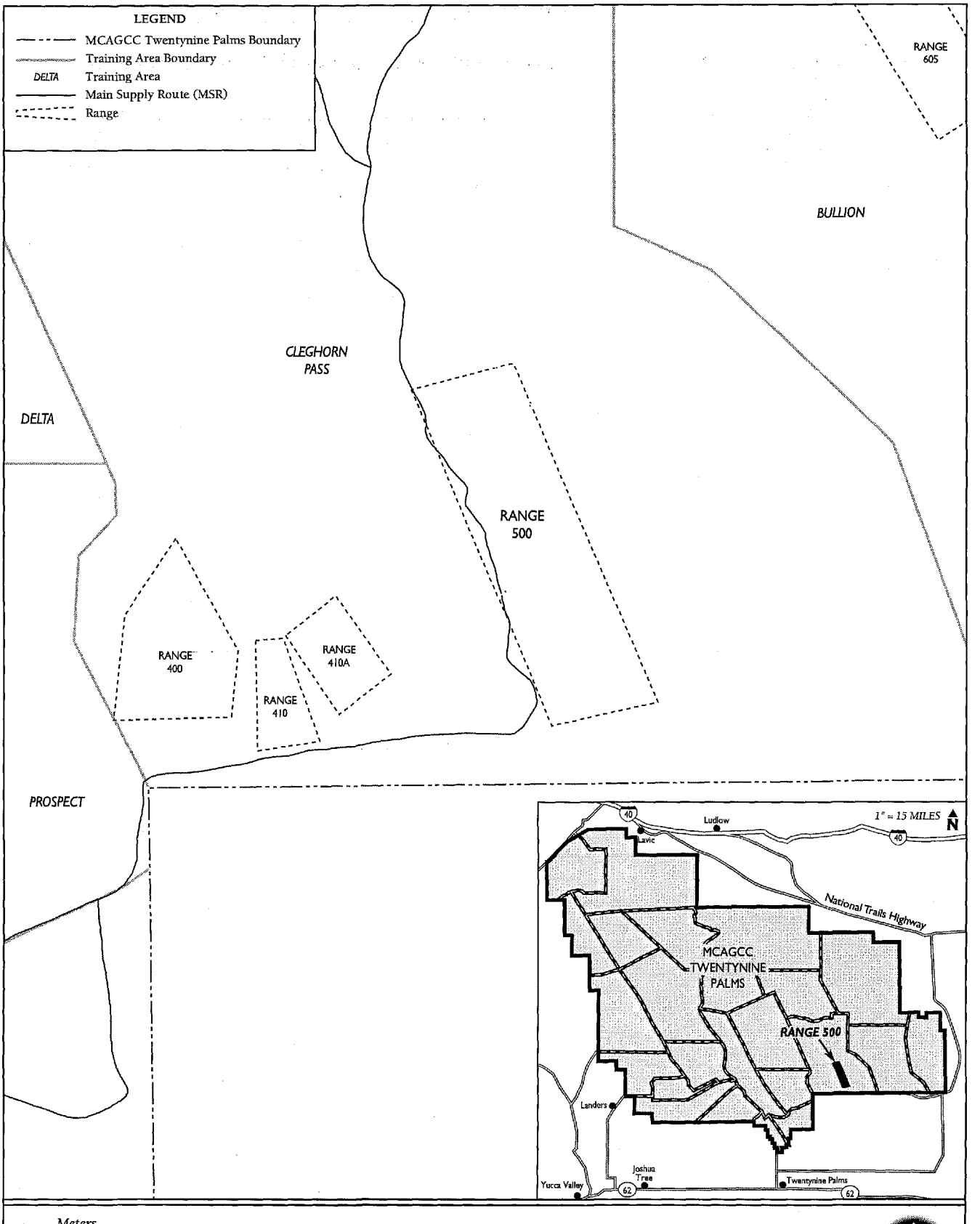


Figure 1-2
Proposed Project Location

The layout of range facilities is shown in Figure 1-3. Range 500 currently has 1 tank trail with various types of targets: 3 armor moving target carriers (AMTCs), 15 stationary armor targets (SATs), 21 stationary infantry targets (SITs), 10 infantry moving targets, and 66 Armor Target Kill Simulators and Hostile Fire Simulators. Support facilities consist of a Battle Sight Zero (BZO) Range in the southeastern portion of Range 500, a bivouac area, an aluminum-covered ammunition loading area, an administration/maintenance building, a control tower, 4 electric generators that provide power to the control tower and targets, fuel tanks that supply fuel to the generators, and 135 solar panels for the provision of electricity. This photovoltaic system presently provides power to lead-acid batteries that store power for inverter operation. Alternating current voltage is then sent to the targets where it is reduced to a lower direct current (DC) voltage. This allows individual solar panels to charge 12-volt DC batteries that provide 12-volt DC power to the target motors. In addition to the tank trail, a variety of other trails exist on the range. This includes the MSR, a gravel-based road that is the main access route from the west and the north, and a variety of maintenance trails accessing the various targets and facilities on the range.

1.4.2 Primary Users

Information on primary users of the range (1TNK and 3LAR) is summarized below and in Table 1-1. 1TNK and 3LAR use Range 500 to accomplish training requirements throughout the year. However, 1st, 2nd, and 4th LAR Battalions and 4th Tank Battalion also use the range during 1 CAX each year.

Table 1-1. Overview of 1TNK and 3LAR

Unit	*Personnel per Company*	*Companies per Battalion*	*Total Personnel*	*Vehicles per Company*	*Total Vehicles*
1TNK	86	4	344	14	56 [1]
3LAR	139	4	556	25	100 [2]

[1] 1TNK operates the M1A1 main battle tank.

[2] 3LAR operates the LAV-25. Only 56 of the LAV-25s require live-fire training at Range 500.

1.4.2.1 1TNK Battalion

The 1TNK mission is to provide combat power to 1st Marine Division in the form of amphibious and/or Maritime Preposition Forces and to conduct operations ashore utilizing maneuvers, armor-protected firepower, and shock action in order to close with and destroy the enemy. 1TNK is responsible to the Commanding General, First Marine Division for providing armored assets as well as anti-armor systems and staff expertise in their employment. 1TNK operates the M1A1 main battle tank.

1.4.2.2 3LAR

The 3LAR mission is to conduct reconnaissance, security, and limited offensive and defensive operations as directed by the division or supported commander. In addition, 3LAR conducts reconnaissance, security, and economy of force operations. Within its capabilities, 3LAR also conducts limited offensive and delaying operations that exploit the unit's mobility and firepower in order to support the supported unit's scheme of maneuver. 3LAR operates the Light Armored Vehicle-25 (LAV-25).

1.5 REGULATORY COMPLIANCE

Various federal and state laws, rules, regulations, and policies are pertinent to implementation of the proposed action. A description of the proposed action's consistency with these policies and regulations, as well as regulatory agencies responsible for their implementation, is presented in Chapter 6 of this EA.

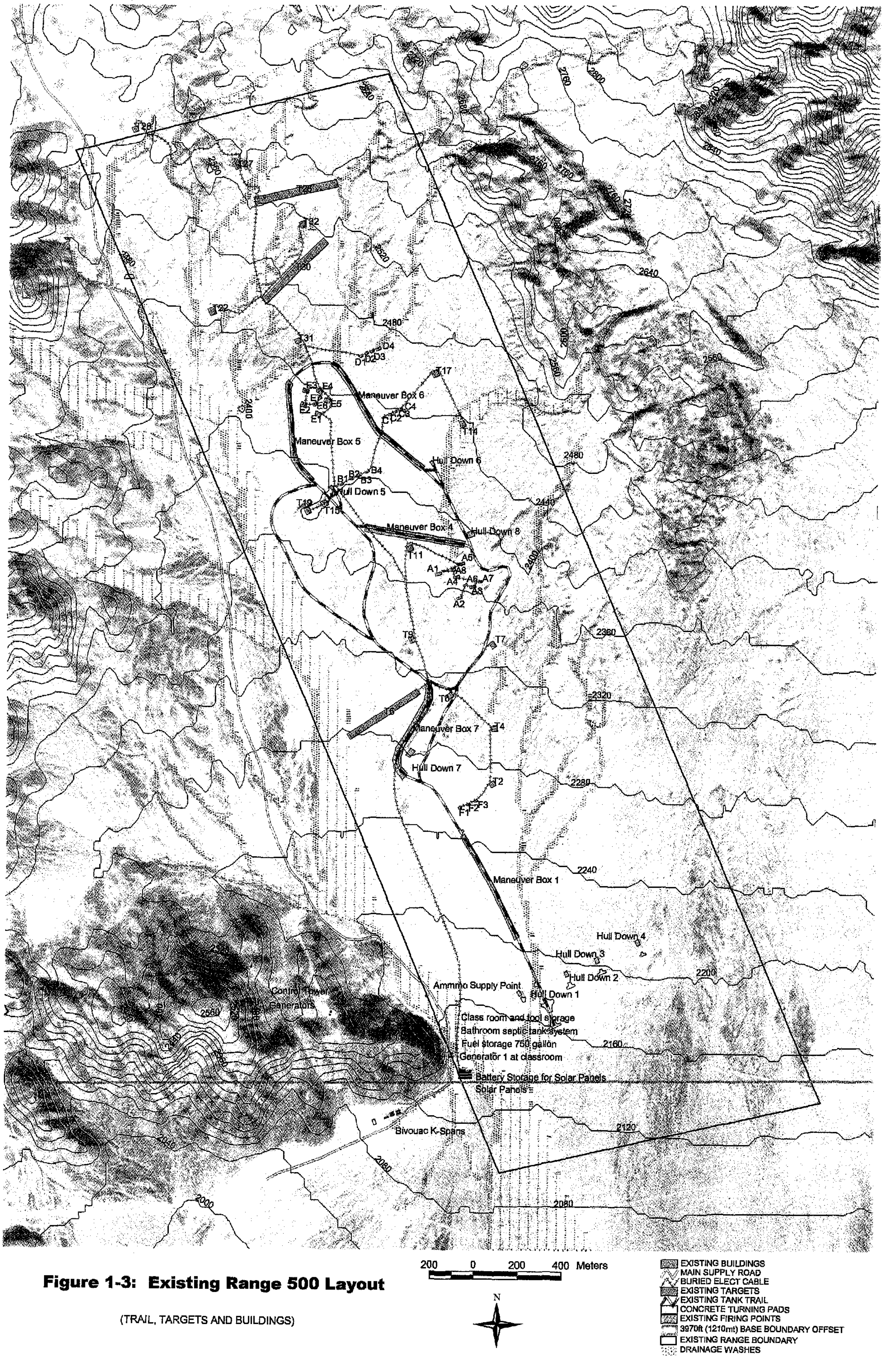


Figure 1-3: Existing Range 500 Layout

(TRAIL, TARGETS AND BUILDINGS)

CHAPTER 2
PROPOSED ACTION AND ALTERNATIVES

The proposed action includes construction and installation of infrastructure upgrades, as well as associated increases in operational tempo facilitated by these range upgrades. The proposed action would occur in 3 phases. Each phase, or improvement stage, would support Tank and LAR training requirements by incrementally increasing the number and variety of trails and targets. Each phase would allow the units to satisfy more training requirements at MCAGCC. Upon full implementation of the proposed action, operational tempo would be approximately 15 percent greater than current conditions beginning with an increase of 10 percent under Phase 1 and an additional 5 percent under Phase 2. Operational tempo would not increase under Phase 3, although the additional trails targets would enhance the quality and variety of training that can be conducted at Range 500.

This chapter is divided into 2 major subsections:

- Section 2.1 describes the specific Range 500 upgrades and associated increases in training operations associated with the proposed action. This is divided into subsections for Phase 1, Phases 2 and 3 (to be analyzed in this EA with a programmatic approach to analysis), and Special Conservation Measures.
- Section 2.2 describes alternatives, including the preferred alternative (Alternative 1), 2 action alternatives (Alternatives 2 and 3), and the No-Action Alternative (i.e., current Range 500 configuration and operations).

2.1 PROPOSED ACTION

2.1.1 Phase 1

The major components of Phase 1 are illustrated in Figure 2-1 and shown in Table 2-1. Specific construction and operational descriptions of these components are included below. Total estimated ground disturbance for Phase 1 would be approximately 27.8 acres (11.3 hectares).

2.1.1.1 Trails

One new trail would be constructed during Phase 1 of the proposed action. The existing trail is a single trail at the southern half of Range 500 which then forms a two-trail loop at its northern half. The new trail would be about 1,800 feet (549 m) to the east of the existing trail and would connect into the loop. A new hull down pad (a concrete area for a tracked vehicle to stop and shoot from) would be located about 4,300 feet (1,311 m) up the trail.

2.1.1.2 Targets

Stationary Armor Target

Three new SATs would be installed during Phase 1 of the proposed action; 2 would be near the existing AMTCs in the northern portion of the range, and 1 would be near the existing AMTC in the middle portion of the range. The SAT is a lifter mechanism that holds a target similar in size to a realistic vehicle. The target is protected by at least 57 feet (17 m) of earthen berm with concrete and/or railroad tie retaining walls.

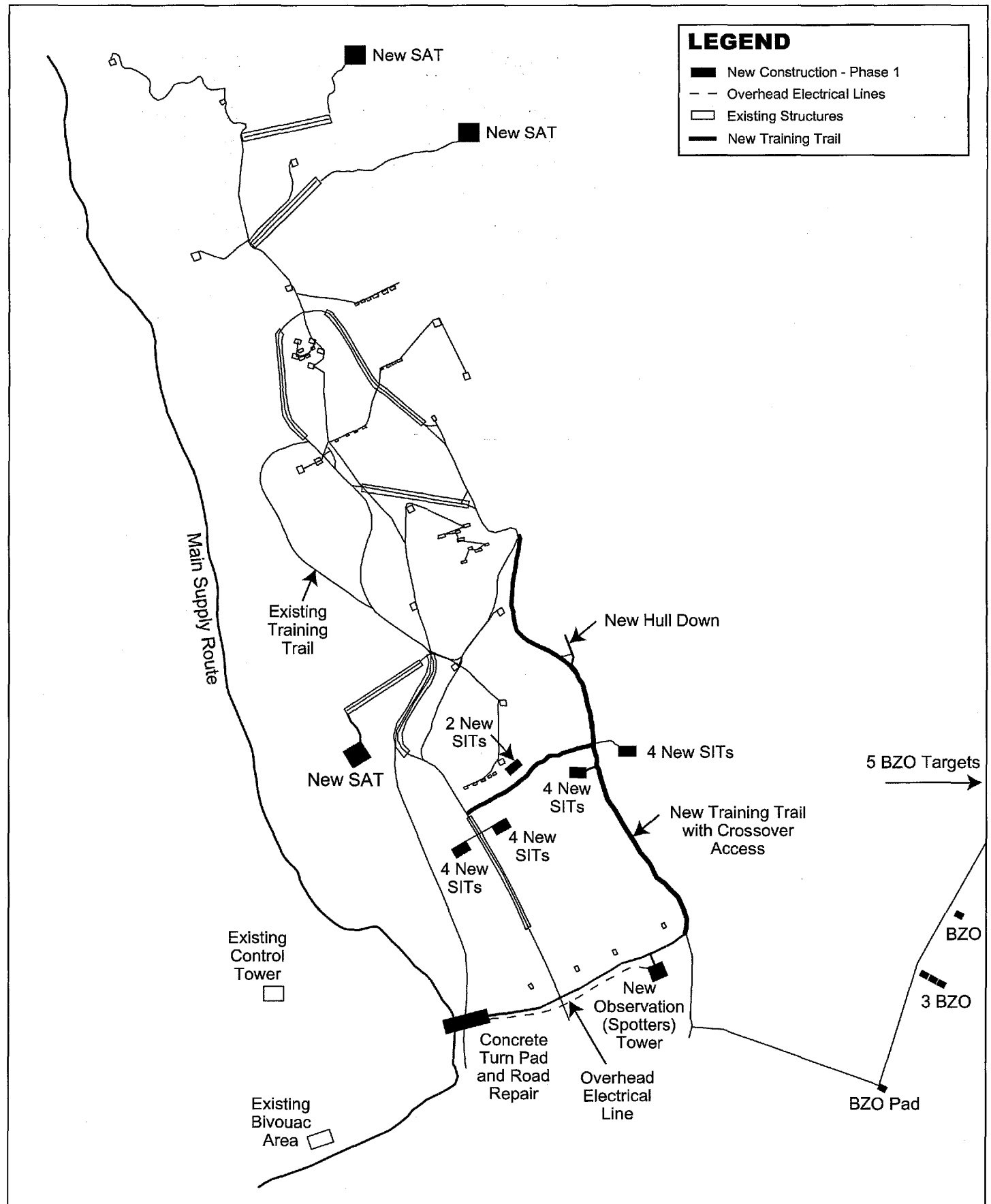


Figure 2-1: Phase 1 for Alternative 1

Table 2-1. Proposed Range 500 Upgrades, by Phase

		Phase 1		*Phase 2*		*Phase 3*	
Component	***Existing #***	**#**	***Disturbance Area (acres)***	**#**	***Disturbance Area (acres)***	**#**	***Disturbance Area (acres)***
Trails							
Tank Trail	1	1	5.3	2	5.3*	1	5.3
Maintenance Trail	-	1	1.9	1	0.8	1	0.7
Trail to ASP	-	-	-	1	1.6	-	-
BZO Trail	-	1	4.2	-	-	-	-
Targets							
AMTC	3	-	-	3	57.8	1	19.3
SAT	15	3	8.5	17	48.4	15	42.7
SIT	21	18	2.0	71	8.3	59	7.1
BZO	-	9	2.8	-	-	-	-
Concrete Pads							
Hull down Pad	-	1	0.6	11	5.7	-	-
BZO Pad	-	1	0.7	-	-	-	-
Maintenance Pad	-	-	-	1	0.7 (previously disturbed area)	-	-
Turn Pad	-	-	-	4	5.2 (previously disturbed area)	-	-
Turn pad (at entrance) & Road Repair	-	1	1.2 (previously disturbed area)	-	-	-	-
Facilities							
ASP	1	-	-	1	0.02 (relocation of existing ASP)	-	-
Spotters Tower	-	1	0.3	-	-	-	-
Road Guard Shelters	-	-	-	3	0.03	-	-
Pavilion (Combined Use Shelter)	-	-	-	1	0.08 (previously disturbed area)	-	-
Bathroom (1)	1	-	-	1	0.03 (previously disturbed area)	-	-
Solar Panels	-	-	Previously disturbed	-	Previously disturbed	-	-
Standby Generator	4	-	-	4	0.14 (replacement of old generators; previously disturbed area)	-	-
Aboveground Power Line	-	1	0.25 acres (7,306 linear feet, holes every 200 feet)	-	-	-	-
Totals							
Footprint			8.6		40.5		21.1
Buffer Area			19.2		84.2		56.6
Grand Total			**27.8**		**124.7**		**77.7**

*Note: The second trail under Phase 2 would consist of using the existing MSR as a tank trail.

Stationary Infantry Target

Eighteen new SITs would be installed during Phase 1 of the proposed action. The SIT is a lifter mechanism that holds a silhouette of a person and requires a 15-foot (5-m) thick protective berm. These would consist of 4 SIT clusters (4 targets each) and 1 SIT cluster (2 targets) in the central portion of the range.

Battle Sight Zero Target

Nine new BZO targets would be installed during Phase 1 of the proposed action. These targets are required to "boresight" or "zero" the guns to the device sight prior to commencing training on the range. A new BZO pad (a concrete area from which an LAV or Tank can shoot at the BZO targets) would be constructed, and the targets would be placed at prescribed distances from the pad.

2.1.1.3 Support Facilities

Additional proposed facilities to support the Range 500 upgrades include a concrete turn pad and road repair at the entrance of the range and a spotters tower. Proposed utility improvements include an aboveground power line (to the existing Control Tower and proposed spotters tower) and replacing the generators.

2.1.1.4 Operations

Upon full implementation of the proposed action (Phases 1, 2, and 3), operational tempo would be approximately 15 percent greater than current conditions. Specific operational elements are summarized in Table 2-2. In general, the additional trail and targets under Phase 1 would facilitate an operations increase of 10 percent.

Table 2-2. Proposed Annual Use of Range 500

		Increase [1]			
Use Category	***Existing*** [2]	***Phase 1***	***Phase 2***	***Phase 3***	***Total***
Munitions					
0.50-Caliber	77,210	7,721	3,861	0	88,792
0.762-mm	325,952	32,595	16,298	0	374,845
25-mm	37,854	3,785	1,893	0	43,532
120-mm	5,727	573	286	0	6,586
Subtotal	446,743	44,674	22,337	0	513,754
Vehicle Hours [3]					
Tanks	1,933	193	97	0	2,223
LAVs	1,412	141	71	0	1,624
Other	1,943	194	97	0	2,234
Subtotal	5,288	529	264	0	6,081
Personnel					
Total personnel at Range 500	19,089	1,909	954	0	21,952

Notes:
[1] Phase 1 - 10% increase; Phase 2 - 5% increase; Phase 3 - 0% increase.
[2] Based on 2002 operations tempo at Range 500.
[3] Vehicle hours correspond to the number of hours each vehicle type is operating or idling at Range 500.
Source: MAGTFTC 2003e.

Requirements

Tank and LAR crewmembers train throughout the year by following detailed instructions outlined in their gunnery training manuals. Each manual groups the training into 4 categories, each of which has 1 or more tables detailing the specific tasks the crewmember and platoon or section must perform to demonstrate proficiency. Some of the training requirements can be performed in a motor-pool area; however, many require a full-scale live-fire range.

Trails

The existing tank trail includes a single trail at its southern half and a 2-trail loop at its northern half. This single lane into and out of the course creates a bottleneck and creates inefficient range use. The first vehicle crew on the trail must run the course, and then travel back along the same entry lane to clear the range before the next crew can start. Another scenario is that a group of vehicles run together and 1 vehicle advances while the others wait. When the first crew has completed its run, it backs up to where the others were waiting and the next vehicle conducts the same set of tasks. The proposed addition of a new trail under Phase 1 would allow 2 vehicles to train simultaneously for efficient range use.

Firing Positions ("Hull Downs")

Firing positions (also referred to as "hull downs") are considered either defensive (partially exposed) or offensive (exposed).

Defensive: A hull down firing position is considered defensive because the hull of the vehicle is hidden behind a mound of dirt or rock and the turret is clear for firing. Hull downs at Range 500 are basically mounds of earth ramped up a few feet to provide the vehicle with a clear shot down range. Concrete turn pads are installed at the entry of the hull down to prevent the tank tracks from creating large holes and ruts. Existing hull down firing positions 1 through 4 are at the southernmost end of the range. Hull downs 5 through 8 are farther north along the trail and are used by vehicles as they progress along the trail. The proposed hull down location would be located in the central portion of the range and would be used to fire towards existing and proposed targets in the northern portion of the range.

Offensive: Firing from any position that leaves the hull of the vehicle exposed is considered an offensive firing position. When the vehicle is maneuvering along a road or trail and a target is encountered, the crew will fire on the target. The trail or road becomes the firing position and requires no improvements beyond being a navigable route. Targets are placed in locations such that they are visible for only short durations of time (based on the required speed of the vehicles) but long enough to meet the target exposure times listed in gunnery training tables. When targets are lifted, vehicle crews are expected to acquire them, lay the gun sight on it, fire on and hit the target all while the vehicle is moving at a prescribed speed. The area on the trail where the vehicle is moving and crews can see a target is called the "maneuver box." Depending on the vehicle and the Master Gunner for the Battalion, maneuver boxes can be identified at any segment of the new trail as needed to meet target distance requirements.

Targets

With the exception of the BZO targets, each of the target systems functions similarly in that a lifting mechanism (normally in the down position) tilts up a target when the control tower personnel send an electronic signal to the mechanism. The targets are electrically powered with the electricity provided either by cabling from a city grid, base source, batteries, or solar panels. Locating batteries with solar panels at the target with the signals being sent by radio from the control tower eliminates the need for

increased electrical supply along with the trenching to allow the cable to be extended. In general, the targets are sized similar to realistic vehicles and personnel.

The M1A1 tank is the most destructive in terms of long-term target use, with the main gun shots requiring protective earthen berms 57 feet (17 m) thick. The earthen berms protecting the smaller caliber targets are required to be 15 feet (5 m) thick. Typically concrete and/or railroad retaining walls are used to support the earthen berm in front of the target mechanism.

Munitions

A variety of munition types are used during training exercises at Range 500. Table 2-2 summarizes the major categories of munitions and their estimated annual usage on Range 500 and estimated increases associated with full implementation of the proposed action (Phases 1, 2, and 3). Gunners, loaders, drivers and tank commanders train at Range 500 in accordance with Conduct of Battle Procedures. Typical weapons used by these units at the range include the 7.62-millimeter (mm) machine gun, 50-caliber machine gun, 25-mm chain gun, 30-mm rapid-fire weapon, 120-mm tank main gun, and smoke grenades. "Fixed position fire" on fixed and moving targets and "moving armored vehicles fire" on fixed and moving targets are among the exercises conducted at Range 500. All rounds fired as part of vehicle crew gunnery training are non-explosive; the emphasis of training at Range 500 is to improve crew skills and accuracy but not the explosive capabilities of munitions. This in turn reduces safety hazards associated with unexploded ordnance on the training range surface.

Range Safety and Control

The Range Control Section of the Operations and Training (O&T) Directorate (Bearmat) coordinates all activities at Range 500 to ensure personnel safety. All range safety procedures described in Section 3.8 would continue to be implemented for the increase in operations associated with Phase 1.

2.1.2 Phases 2 and 3

The second and third phases of the proposed action are conceptual in nature and do not currently have identified funding sources. As such, this EA provides a programmatic-level analysis of potential environmental effects associated with these 2 phases, based on the information currently available in the *Range 500 Master Plan*. At the conceptual level, the additional components included under Phases 2 and 3 are summarized in Table 2-1 and shown graphically in Figures 2-2 and 2-3. Following implementation of Phases 2 and 3, Range 500 would have 4 suitable trails for vehicle maneuvers. Under Phase 2, the existing MSR would be converted for use as the third trail (see Figure 2-2). This phase also involves placing a considerable number of targets in the far western portion of Range 500 – along the MSR and also west of it (see Figure 2-2). Under Phase 3, a fourth trail would be added between the MSR and the existing trail (see Figure 2-3). Total estimated ground disturbance would be approximately 124.7 acres (50.5 hectares) for Phase 2 and 77.7 acres (31.4 hectares) for Phase 3.

Three new AMTCs and associated storage buildings would be installed during Phase 2 of the proposed action, and 1 would be installed under Phase 3. The AMTC is a collection of components, including a lifter mechanism that is carried on a cart that runs on steel rails. The cart is propelled by an electric motor, and the rails are similar to railroad tracks. The length of run for the AMTC is 1,161 feet (354 m). The rails require relatively flat ground to allow the cart to run quickly without coming off track; because one of the proposed locations is in steep terrain, fill material would be needed to keep the track relatively level. The targets are protected by at least 57 feet (17 m) of earthen berm with concrete and/or railroad tie retaining walls for protection against low tank shots.

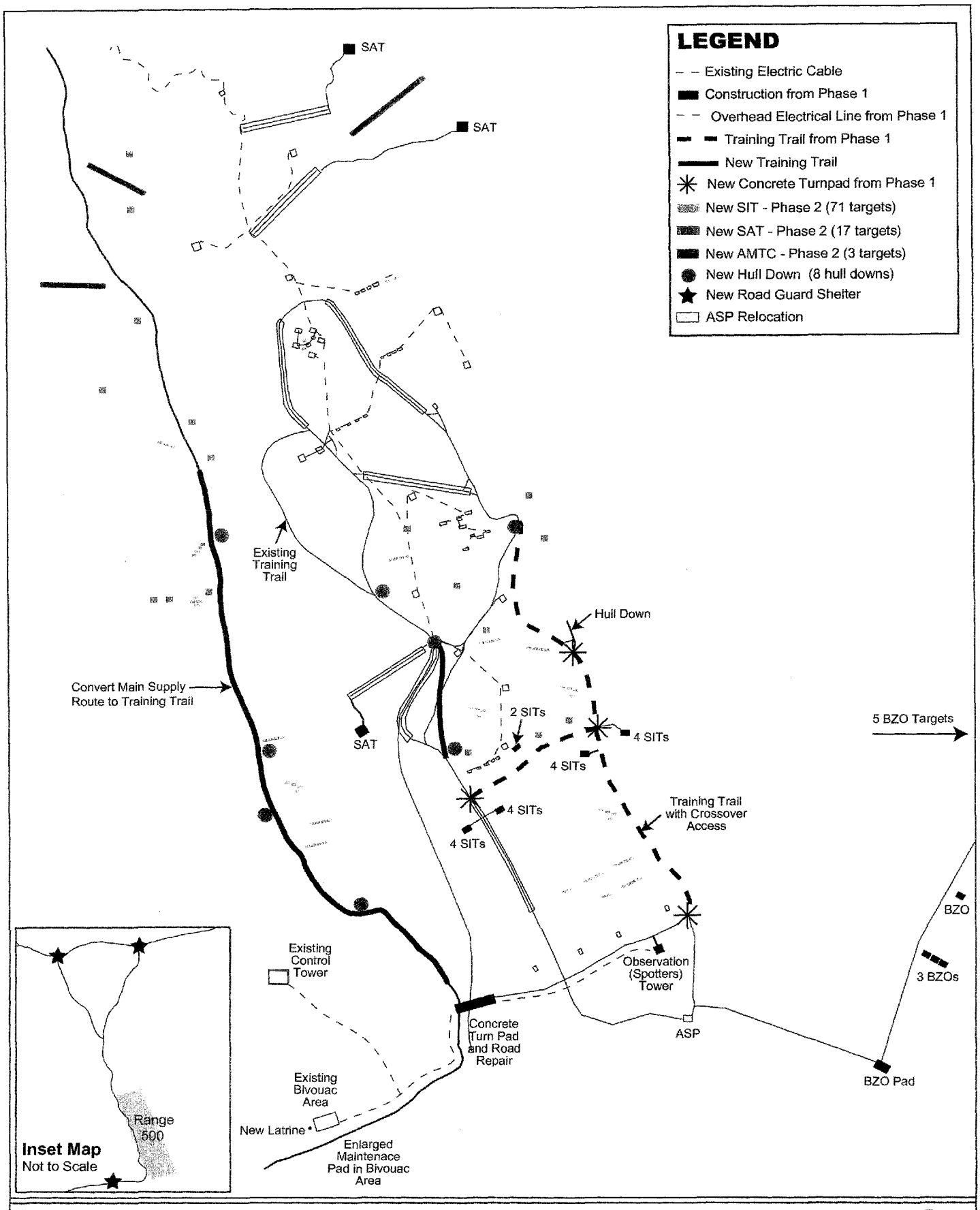


Figure 2-2: Phase 2 for Alternative 1

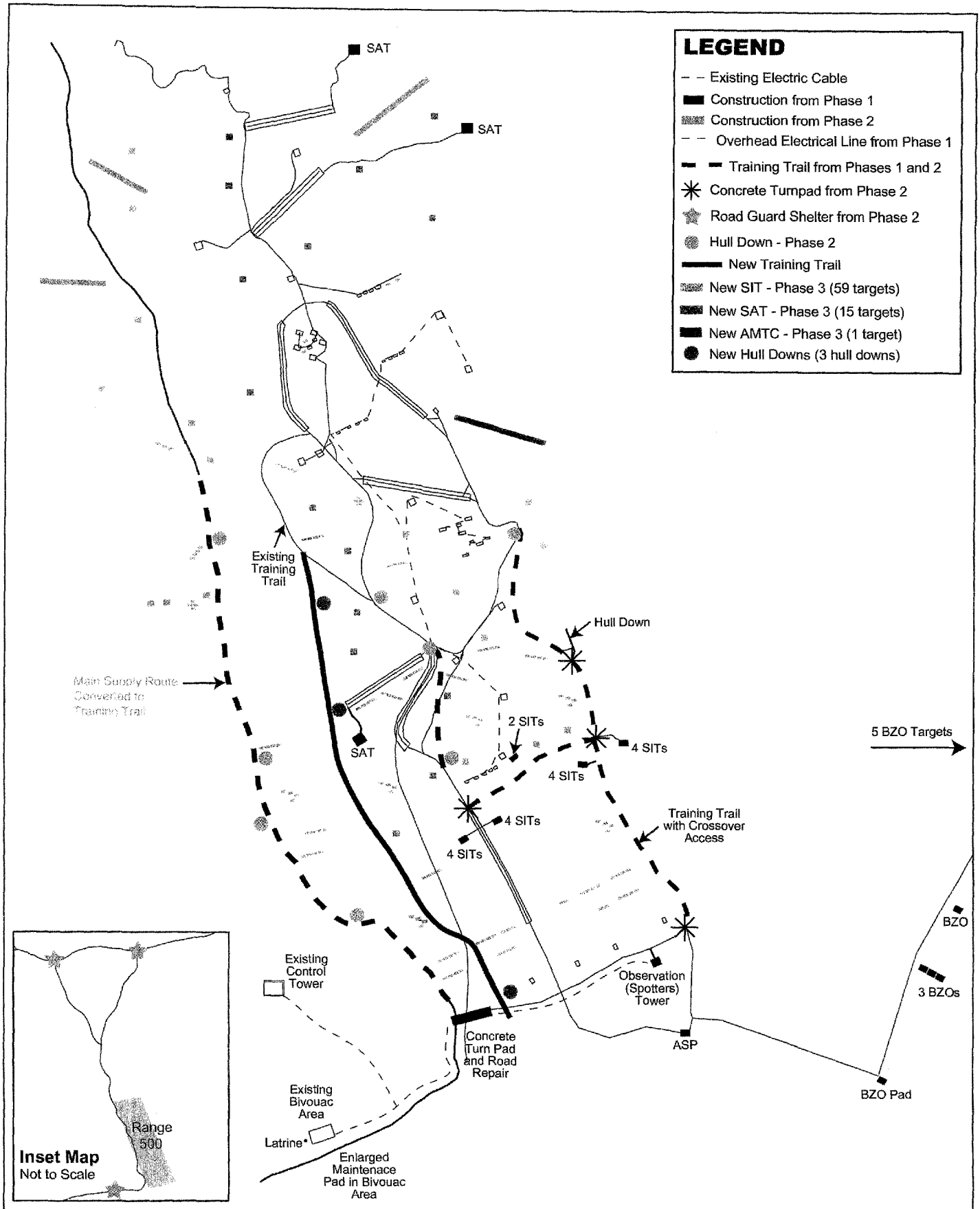


Figure 2-3: Phase 3 for Alternative 1

Proposed facilities to support the Range 500 upgrades under Phase 2 include 3 road guard shelters (at the access points leading into the range), a combined use shelter, a bathroom, and an expanded maintenance pad at the existing bivouac area. The ammunition supply pad would be relocated to the southern part of the range, behind the hull down firing points. The ASP provides a shaded concrete slab used to temporarily hold and distribute munitions to vehicles. The munitions placed on the pad have the potential to explode and thus must be stored a safe distance from personnel and facilities. There is no identified time limit regarding the length of time that ammunition can be stored on the ASP. Lighting would be provided at the new ASP location.

As summarized in Table 2-2, the additional trail and targets would facilitate an operations increase of 5 percent under Phase 2. Operational tempo would not increase under Phase 3, although the additional trails targets would enhance the quality and variety of training that can be conducted at Range 500.

2.1.3 Special Conservation Measures

The proposed action would include the implementation of the following Special Conservation Measures (SCMs) in order to minimize any potential impact to biological resources, particularly the federally threatened desert tortoise. Most of the following conservation measures would directly apply to this project; however, some may be removed from the project requirements based upon timing of construction and other factors, to be determined only by MAGTFTC Natural Resources and Environmental Affairs (NREA) Division personnel. The measures are based upon technical assistance from the U.S. Fish and Wildlife Service (USFWS); current Biological Opinion (BO) on base-wide training and maintenance operations (USFWS 2002), and accompanying terms and conditions (e.g., USFWS 2002); and the Integrated Natural Resources Management Plan (INRMP) for MCAGCC (MAGTFTC 2001a). In addition to the SCMs described below, desert tortoise protocol surveys were conducted in April 2003 for all Phase 1 project areas. Since these surveys are only valid for 1 year, additional surveys would be conducted if any of the identified Phase 1 projects are to be constructed after April 2004. Furthermore, since Phases 2 and 3 have been analyzed in a programmatic level for this EA, additional desert tortoise surveys would need to be conducted prior to the construction of any specific project associated with Phases 2 and 3.

1) Prior to the initiation of the proposed construction projects, a desert tortoise education briefing would be presented to all personnel who will be on site. In addition, the biological monitor (under contract to the construction contractor) would submit a written report concerning the desert tortoise that details well-defined operational procedures and worker-education briefings. The report would also include steps to be taken for desert tortoise pre-clearance surveys, monitoring during construction, and the course of action to be taken should a burrow or tortoise be encountered during construction. The following guidelines would be utilized in forming the procedures: (1) Guidelines for Handling Desert Tortoises During Construction Projects (Desert Tortoise Council [DTC] 1999), and (2) Procedures for Endangered Species Compliance for the Mojave Desert Tortoise, USFWS Regions 1, 2, and 6 (USFWS 1990). The desert tortoise education briefing would include but not be limited to the following:
    - The procedures to be implemented in case a desert tortoise is encountered (see below);
    - Information concerning the biology and distribution of the desert tortoise;
    - The legal status and occurrence of the desert tortoise on MCAGCC;
    - The definition of "take" and associated penalties. Personnel would be advised that handling, harming, or harassing a desert tortoise without specific authorization is a

violation of the Endangered Species Act (ESA) and punishable by a $25,000 fine and 6 months in prison;

- The measures designed to reduce the effects on the desert tortoise of training activities and mission-related construction activities; and
- The means by which MAGTFTC employees, military personnel, and construction contractors can help facilitate this process.

2) No pets or firearms would be allowed in the work area or on any Federal Government Property.

3) All organic and inorganic litter and garbage (including cigarette butts) would be disposed of properly, in covered, raven-proof containers. The construction contractor would dispose of all trash and debris off the job site daily in a systematic method and dispose of items in an approved manner.

4) All tortoises encountered by military personnel or construction workers within or immediately adjacent to the construction project where they may be killed or injured would immediately be reported to the construction supervisor and authorized biologist. If construction were to occur during the time of year when tortoises are active, an authorized biologist would be required on site for the entire project. Only biologists authorized by the USFWS would handle desert tortoises, except in circumstances in which the life of the tortoise is in immediate danger. All handling of desert tortoises and their eggs and excavation of burrows would be conducted by an authorized biologist in accordance with the protocols developed by the DTC (1999).

5) The authorized biologist would handle tortoises only when necessary. Tortoises would be moved solely for the purpose of moving the animals out of harm's way and would be moved into adjacent undisturbed desert tortoise habitat the minimum distance necessary to ensure their safety.

6) If tortoise burrows cannot be avoided, they would be examined and excavated by hand by the authorized biologist to determine whether they contain eggs of the desert tortoise. DTC (1999) protocols would then be followed.

7) Construction vehicles would observe all posted speed limits and not exceed 20 miles per hour (32 km per hour) on unpaved roads to, from, and within the construction area. Within undisturbed portions of the construction area, the authorized biologist would walk behind vehicles when they are backing up or turning around to inspect for tortoises and burrows.

8) Any time a vehicle is parked in desert tortoise habitat, the ground around and underneath the vehicle would be inspected for tortoises prior to moving the vehicle. If a tortoise is observed beneath a vehicle, the authorized biologist would be contacted immediately. If possible, the tortoise would be left to move on its own. Otherwise, the tortoise would be removed and relocated by the biologist in accordance with DTC (1999) protocols.

9) Prior to the beginning of any construction-related activities in areas of suitable habitat that support desert tortoises, the construction contractor would install USFWS-approved temporary tortoise fencing around work sites to prevent entry of tortoises. The tortoise fence would consist of 0.5-inch (1.3-centimeter [cm]) mesh hardware cloth fastened to stakes. The hardware cloth shall extend 18 inches (46 cm) above the ground and 12 inches (30 cm) below the surface of the ground. Where burial of the hardware cloth is not possible, the lower 12 inches (30 cm) shall be folded outward and fastened to the ground so as to prevent tortoise entry. Any tortoises within the fenced area would be relocated by an authorized biologist to nearby suitable habitat prior to the start of any ground-disturbing activities. The presence of authorized biologists on site would

substitute for temporary fencing; MAGTFTC NREA Division staff will determine which protective measure is appropriate, depending on the specific circumstances.

10) Any excavations associated with construction that would be left open in areas that are not being monitored would either be fenced temporarily (see item 8) to exclude tortoises, covered at the close of each working day, or provided with ramps so tortoises can escape. All excavations would be inspected by the authorized biologist prior to filling.

11) To the maximum extent practicable, all vegetation in the immediate vicinity of any construction area, utility access road, or staging area will be avoided and remain unharmed. All proposed staging areas would be inspected for desert tortoises and burrows and approved by the authorized biologist. The number of staging areas would be minimized to the maximum extent practicable. Each staging area would be fenced with a USFWS-approved tortoise barrier prior to use.

12) MAGTFTC NREA Division personnel would ensure that clearance surveys have been conducted in all work areas within appropriate habitat immediately prior to the onset of work. The clearance surveys would be timed to reduce, to the maximum extent practicable, the likelihood that a tortoise could move into a work area between the time the site is surveyed and the onset of construction-related activities. NREA staff would determine whether tortoises are likely to be active with consideration given to the time of year and weather conditions at the time and place where work is to be conducted. If tortoises are unlikely to be active, the clearance surveys would be conducted within 48 hours of ground disturbance. When tortoise burrows are found, they would be checked for tortoises; if tortoises are found, the burrows would be flagged. All unoccupied burrows would be flagged in a different manner than occupied burrows. During the construction period, an authorized biologist would re-check the burrows and remove any desert tortoises that would be endangered by the construction activity following DTC (1999) protocols.

2.2 ALTERNATIVES

Alternatives to the proposed action must be considered in accordance with NEPA, CEQ regulations for implementing NEPA, and MCO P5090.2A. However, only those alternatives determined to be reasonable relative to their ability to fulfill the purpose and need for the proposed action require detailed analysis. Each of the 3 alternatives carried forward for analysis meets the purpose and need of the proposed action by providing the additional trails, targets, and supporting facilities needed to increase armored vehicle training efficiency and to allow more training requirements to be satisfied at MCAGCC. The proposed range upgrades provide the capability for an increased tempo of training activities (an additional 15 percent), and would also enhance the quality and variety of training that can be conducted at Range 500.

2.2.1 Preferred Alternative (Alternative 1 in the Master Plan)

Three full buildout alternatives are presented in the *Range 500 Master Plan*. The proposed action is identical to Alternative 1 of the Master Plan. This is the preferred alternative for this EA and is discussed in detail earlier in this chapter (Section 2.1).

2.2.2 Alternative 2

Alternative 2 is comprised of the same number of new trails, facilities, and targets as the proposed action; however, the configuration of the trails is slightly different. As with the proposed action, Alternative 2 involves using the existing trail, creating 2 new trails, and using the existing MSR as a fourth trail. The

difference is that under Alternative 2, 1 of the new trails would be situated between the existing trail and the proposed easternmost new trail (Figure 2-4). Operational tempo would be the same as described under the proposed action.

2.2.3 Alternative 3

Alternative 3 is comprised of the same number of new trails, facilities, and targets as Alternative 2, although the configuration of the trails and targets is slightly different. The main difference is that the MSR would not be used as a fourth trail; rather, the fourth trail would be constructed west of the existing trail (Figure 2-5). Operational tempo would be the same as described under the proposed action.

2.2.4 The No-Action Alternative

Under the No-Action Alternative, Range 500 upgrades would not occur, and operational tempo at the range would continue at current levels. Under this alternative, only one tank or LAV can conduct training at a time due to the existence of only 1 trail. Training efficiency would not be optimal, and the Tank and LAR units would continue to travel to other locations than MCAGCC to satisfy their platoon-level and section-level requirements. However, as required by NEPA, the No-Action Alternative is carried forward for analysis in this EA.

2.2.5 Comparison of Alternatives

Table 2-3 presents a comparison of the potential environmental consequences resulting from implementation of the proposed action and alternatives.

Table 2-3. Comparison of Potential Environmental Consequences

Resource Area	*Alternative 1*	*Alternative 2*	*Alternative 3*	*No-Action Alternative*
Geological Resources	o	o	o	o
Water Resources	o	o	o	o
Biological Resources	o	o	o	o
Cultural Resources	o	o	o	o
Air Quality	o	o	o	o
Noise	o	o	o	o
Land Use	o	o	o	o
Public Health and Safety	o	o	o	o

Notes: o = No significant impacts
• = Potentially significant impacts
\+ = Beneficial impacts

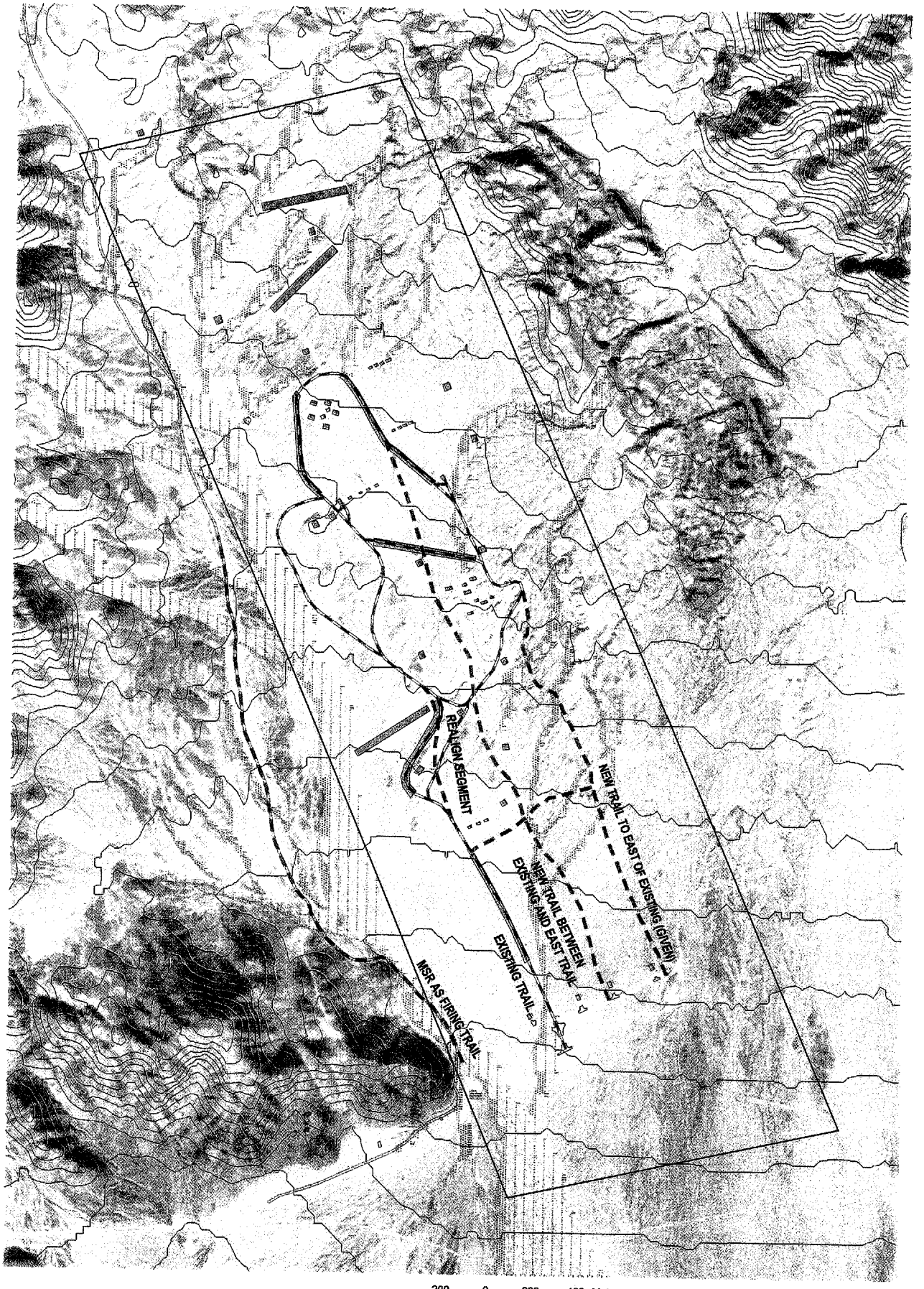


Figure 2-4: Alternative 2

(EXISTING TANK TRAIL, SECOND TRAIL TO EAST, MAIN SUPPLY ROAD (MSR) AS FIRING TRAIL, AND NEW TRAIL BETWEEN EXISTING TRAIL AND NEW TRAIL TO EAST)

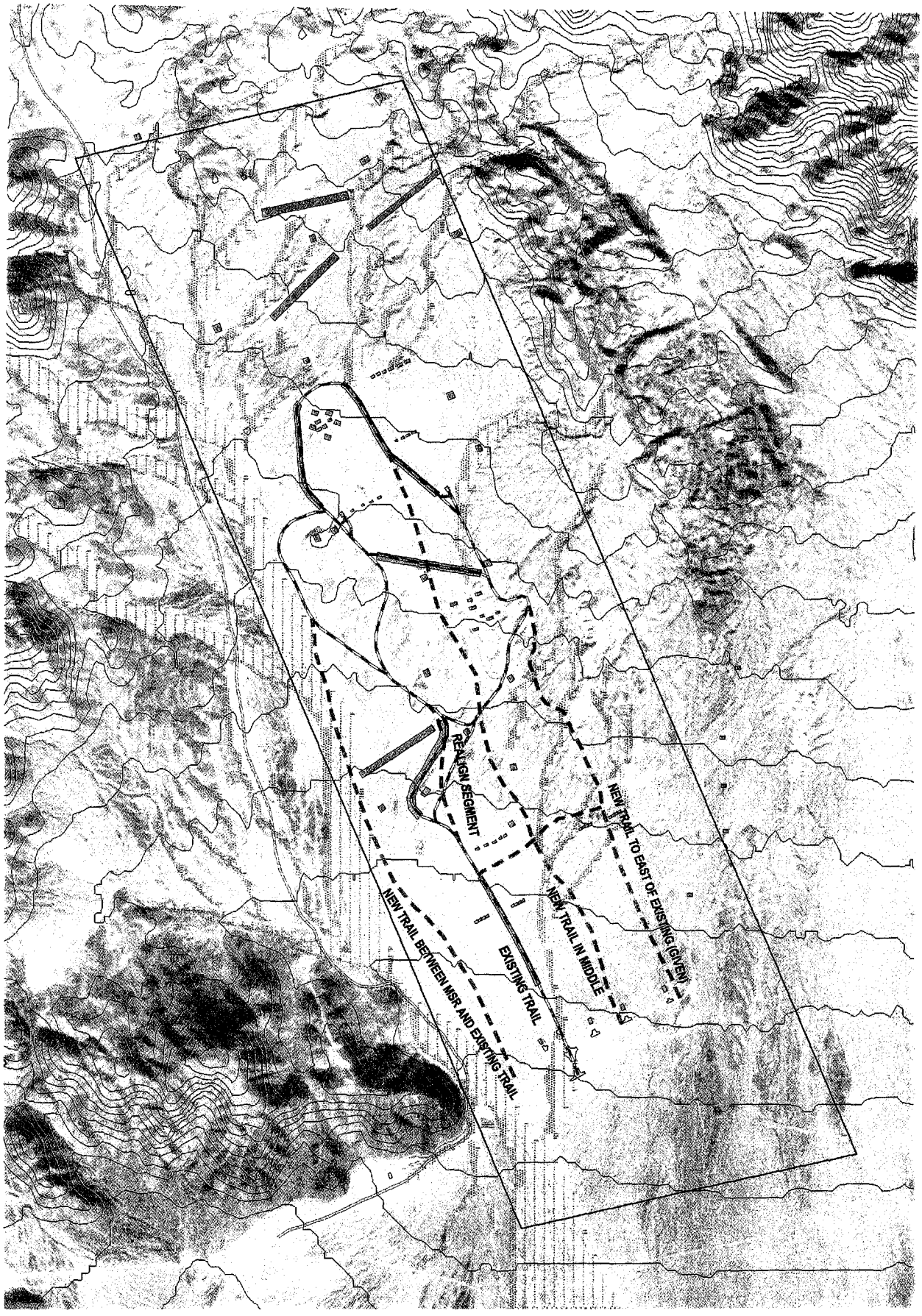


Figure 2-5: Alternative 3

(EXISTING TANK TRAIL, SECOND TRAIL TO EAST, NEW TRAIL BETWEEN MSR AND EXISTING TRAIL, AND NEW TRAIL BETWEEN HULL DOWN TWO AND HULL DOWN THREE)

CHAPTER 3
AFFECTED ENVIRONMENT

3.1 GEOLOGICAL RESOURCES

3.1.1 Definition of Resource

Geological resources are defined as the geology, soils, and topography of a given area. The geology of an area includes bedrock materials, mineral deposits, and fossil remains. The principal geologic factors influencing the stability of structures are soil stability and seismic properties. Soil refers to unconsolidated earthen materials overlying bedrock or other parent material. Topography is typically described with respect to the elevation, slope, aspect, and surface features found within a given area.

Soil structure, elasticity, strength, shrink-swell potential, liquefaction potential, and erodibility all determine the ability for the ground to support structures and facilities. Soils are typically described in terms of their type, slope, physical characteristics, and relative compatibility or limitations with regard to particular construction activities and types of land use. Long-term geological, seismic, erosional, and depositional processes typically influence the topographic relief of an area. The Alquist-Priolo Special Studies Zone Act of 1972 prohibits the construction of structures for human occupancy within 50 feet (15 m) of an active fault. The area of potential effect (APE) for geological resources includes the proposed project location at MCAGCC and its immediate vicinity.

3.1.2 Existing Conditions

MCAGCC is situated in the southwestern portion of the Mojave Desert geomorphic region of California. A geomorphic region is a naturally defined area that is characterized by distinct landforms. The Mojave Desert is described as a seismically-active, broad plain, enclosed by mountain ranges (U.S. Geological Survey 2003). Range 500 is positioned in the south-central region of the Cleghorn Pass Training Area, which is located in the southeastern portion of MCAGCC. Although there are no major faults within the Cleghorn Pass Training Area, the main faults in the vicinity of MCAGCC are the San Andreas, Pinto Mountain, and Garlock Faults, located to the southwest, south, and north, respectively (Norris and Webb 1990). Other smaller faults in the area include Lavic Lake, Surprise Spring, West Calico, Bullion Mountain, Mesquite Lake, Emerson, Galway, Deadman, Mesquite, and Quackenbush Lake. In addition, another 50 smaller faults, some of which are unnamed, are located within the boundaries of MCAGCC (MAGTFTC 2001a).

Range 500 is located at the western base of the Bullion Mountains, on a relatively flat portion of a gently inclined alluvial plain where elevations range between 2,165 feet (660 m) and 2,559 feet (780 m) above sea level (MAGTFTC 2001b). The Bullion Mountains run in a northwest/southeast direction and are composed of quartz monzonite and granite (MCAGCC 1996). Quartz monzonite consists of quartz (silicon dioxide), feldspar (crystalline alumniosilicate minerals), and minor ferromagnesian minerals (Humboldt State University 2003).

Soils in this area consist primarily of Tertiary Age (65 to 1.6 million years ago) bedrock overlain by Quaternary Age (1.6 million years ago to present) alluvial fan deposits and Holocene Age (8,000 years ago to present) eolian deposits (wind-deposited sand). The Tertiary Age bedrock is impermeable, except where fractures have been formed. The alluvial materials consist of sediment generated from weathering and erosion of local mountain ranges. The depositions derived from local mountains are generally coarsest in the high plains and finest in the valley floors.

Soils within Range 500 are classified as Arizo soils. Arizo soils are sandy-skeletal soils formed in mixed alluvium (U.S. Department of Agriculture 2000). Arizo soils are typically light brown to gray in color and have gravelly sandy loam surface layers up to about 8 inches (20 cm) thick, overlying very gravely sand to 60 inches (150 cm) or more. These soils have very low water capacity, are highly permeable, and have a moderate erosion potential (Hendricks 1985).

Previously disturbed areas at Range 500 include facilities, targets, the MSR, the main tank trail, and the access trails to facilities and targets. Table 3-1 shows previously disturbed areas at Range 500, totaling about 157 acres (64 hectares), including buffer areas. In addition to these areas, ordnance fired during training activities can land virtually anywhere throughout the range and disturb the soil. Since there is no regular pattern for where ordnance lands, these soil disturbances are not included in the area estimates.

Table 3-1. Range 500 Ground Disturbance Areas

Type	*Area (acres)*
Trails	97.7
Targets	42.6
Facilities	16.3
Total	156.6

3.2 WATER RESOURCES

3.2.1 Definition of Resource

This water resource analysis addresses surface water, groundwater, and floodplains. Surface water includes all lakes, ponds, rivers, streams, impoundments, and wetlands within a defined area or watershed. Subsurface water, commonly referred to as groundwater, is typically found in certain areas known as aquifers. Aquifers are areas of mostly high porosity soil where water can be stored between soil particles and within soil pore spaces.

The Clean Water Act of 1972 is the primary federal law that protects the nation's waters, including lakes, rivers, aquifers, and coastal areas. The primary objective of the Act is to restore and maintain the integrity of the nation's waters. Jurisdictional "waters of the U.S." are regulated resources and are subject to federal authority under Section 404 of the Clean Water Act. This term is broadly defined to include navigable waters (including intermittent streams), impoundments, tributary streams, and wetlands. Areas meeting the waters of the U.S. definition are under the jurisdiction of the U.S. Army Corps of Engineers. However, there are no areas at MCAGCC Twentynine Palms that meet the definition of jurisdictional waters of the U.S. (MAGTFTC 2001c). The APE for water resources includes the Cleghorn Pass Watershed.

3.2.2 Existing Conditions

Annual precipitation at MCAGCC averages approximately 4 inches (10 cm), the majority of which occurs during summer and early fall thunderstorms (MAGTFTC 2001a). Rainfall quickly percolates into the soil of dry washes (drainage channels that are generally dry, except after storm events) or temporarily collects on playas (dry or intermittently dry lake beds). Range 500 is situated within the Cleghorn Pass Watershed. Within Range 500, the majority of washes are located in the northern, eastern, and western portions of the range. No naturally occurring permanent water bodies exist at MCAGCC or within Range 500 (MAGTFTC 2001a). However, Range 500 is situated on alluvial fans west of the Bullion Mountains, which contain numerous shallow washes that convey runoff to the Cleghorn Lakes Wilderness Area to the southeast of the installation. The areas in the immediate vicinity of the drainage areas within Range 500 are subject to flash flooding during heavy rain events. Groundwater depths at Range 500 are at least 500 feet (152 m) below the ground surface (MAGTFTC 2003b).

3.3 BIOLOGICAL RESOURCES

3.3.1 Definition of Resource

Biological resources include native or naturalized plant and animal species and the vegetation communities within which they occur. Although the existence and conservation or management of biological resources are intrinsically valuable, these resources also provide aesthetic, recreational, and socioeconomic values to society. This analysis focuses on species or vegetation communities that are important to the functions of biological systems, of special public importance, or are protected under federal or state law. For purposes of this EA, these resources are divided into 3 categories: vegetation types, wildlife, and special-status species.

Vegetation types include all existing terrestrial plant communities as well as individual component species, with the exception of those identified as special-status species.

Wildlife includes all animals with the exception of those identified as special-status species. Wildlife includes invertebrates, mammals, birds, amphibians, and reptiles. Wildlife also includes those bird species protected under the federal Migratory Bird Treaty Act (MBTA). Assessment of a project's effects on migratory birds places an emphasis on "Species of Concern" as defined by Executive Order (EO) 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds.*

Special-status species are defined as those plant and animal species listed as threatened, endangered, or proposed as such, by the USFWS or California Department of Fish and Game (CDFG). The federal ESA protects federally listed threatened and endangered species. The State of California, under the California ESA, utilizes a classification system similar to the federal ESA for protected species. In addition, species of concern include those species formerly considered as candidates for federal listing, species of special concern to the State of California, and plant species that are regionally rare or of limited distribution and listed by the California Native Plant Society (CNPS). Federal species of concern, formerly Category 2 candidate species, are not protected by law; however, these species could become listed and, therefore, protected at any time. Their consideration early in the planning process may avoid future conflicts that could otherwise occur.

3.3.2 Existing Conditions

3.3.2.1 Vegetation Types

Three vegetation types occur within the project area at Range 500: Mojave creosote bush scrub, disturbed creosote bush scrub, and catclaw/desert willow woodland (Figure 3-1). Over 90% of the project area is Mojave creosote bush scrub and disturbed creosote bush scrub. Creosote bush scrub is characterized by a prevalence of creosote bush (*Larrea tridentata*) with common associates of white bursage (*Ambrosia dumosa*) and cheesebush (*Hymenoclea salsola*); other shrub species observed with low-to-moderate abundance within the project area are bladder pod (*Isomeris arborea*) and bush encelia (*Encelia frutescens*). Disturbed creosote bush scrub is similar in its plant assemblage to Mojave creosote bush scrub but is distinguished by high levels of disturbance, generally caused by vehicular activities. Catclaw/desert willow woodland covers less than 10% of the project area and is restricted to washes. In the project area this vegetation type is composed of catclaw acacia (*Acacia greggi*) and smoke tree (*Psorothamnus spinosus*). Smoke tree is typically found within larger washes, while catclaw acacia communities are found in smaller washes and wash fringes. Due to the nature of past and current training activities at Range 500, much of the vegetation within the project area is disturbed to some degree.

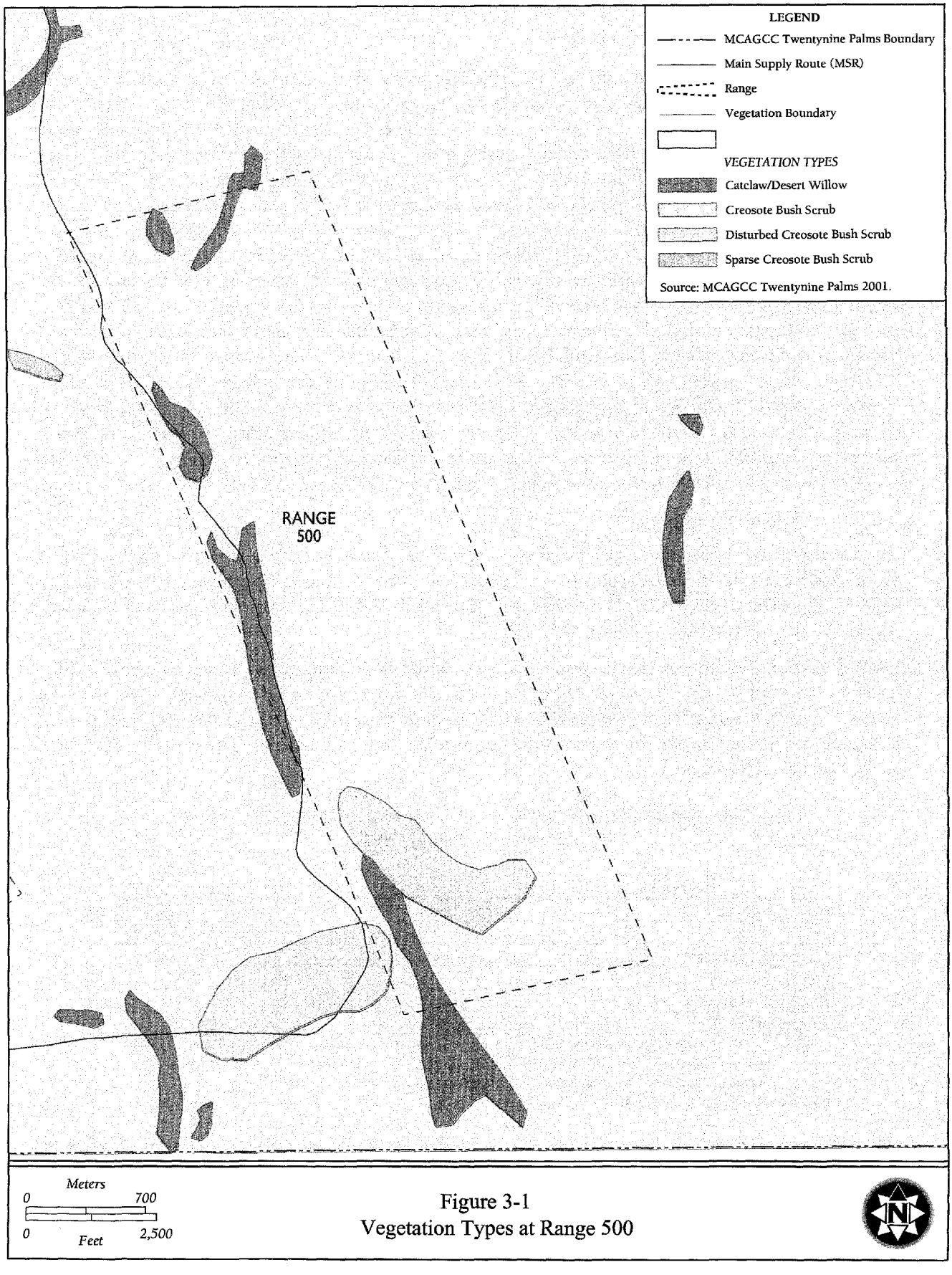


Figure 3-1
Vegetation Types at Range 500

3.3.2.2 Wildlife

Wildlife species found within the project are typical of those occurring in the Mojave Desert. During project-related field surveys conducted in April 2003, mammals observed within the project area included black-tailed jackrabbit (*Lepus californicus*) and white-tailed antelope squirrel (*Ammospermophilus leucurus*). In addition, scat, dens, middens, or burrows of coyote (*Canis latrans*), kit fox (*Vulpes macrotis*), and Merriam's kangaroo rat (*Dipodomys merriami*) were also observed. Birds observed included ash-throated flycatcher (*Myiarchus cinerascens*), black-tailed gnatcatcher (*Polioptila melanura*), black-throated sparrow (*Amphispiza bilineata*), common raven (*Corvus corax*), great-tailed grackle (*Quisicalus mexicanus*), horned lark (*Eremophila alpestris*), lesser nighthawk (*Chordeiles acutipennis*), mourning dove (*Zenaida macroura*), rock wren (*Salpinctes obsoletus*), turkey vulture (*Cathartes aura*), verdin (*Auriparus flaviceps*), and white-crowned sparrow (*Zonotrichia albicollis*), all of which are considered migratory birds and are protected under the MBTA. Reptiles observed included gopher snake (*Pituophis malanoleucus*), red coachwhip (*Masticophis flagellum*), western patch-nosed snake (*Salvadora hexalepis*), common chuckwalla (*Sauromalus obesus [=ater]*), desert collared lizard (*Crotaphytus bicintores [=insularis]*), desert horned lizard (*Phrynosoma platyrhinos*), desert iguana (*Dipsosaurus dorsalis*), desert spiny lizard (*Sceloporus magister*), long-nosed leopard lizard (*Gambelia wislizenii*), side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), and zebra-tailed lizard (*Callisaurus draconoides*) (The Environmental Company, Inc. [TEC] 2003).

3.3.2.3 Special-Status Species

No federally or state-listed plant species are known to occur within the project area (MAGTFTC 2001a). Scattered populations of foxtail cactus (*Coryphantha alversonii* [=*Escobaria vivipara* var. *alversonii*]), a CNPS List 4 species, have been recorded as occurring within Range 500 and were also observed during April 2003 surveys (MCAGCC 2000a, TEC 2003).

Six special-status wildlife species may potentially occur within the project area (Table 3-2) (TEC 2003). Only the loggerhead shrike (*Lanius ludovicianus*) and the desert tortoise (*Gopherus agassizii*) were observed during April 2003 surveys (TEC 2003). All other special-status bird species may occur within the Range 500 project area as transients, migrants, or while foraging; none are likely to nest in the area due to lack of suitable habitat.

Table 3-2. Special-Status Wildlife Species Potentially Occurring or Known to Occur within Range 500

Common Name	*Scientific Name*	*Status*[1] *Federal/State*
Cooper's hawk	*Accipiter cooperii*	- /CSC
Golden eagle	*Aquila chrysaetos*	BGEPA/CSC and FP
Loggerhead shrike	*Lanius ludovicianus*	FSC/CSC
Northern harrier	*Circus cyaneus*	- /CSC
Sharp-shinned hawk	*Accipiter striatus*	- /CSC
Desert tortoise	*Gopherus agassizii*	T/T

Notes: [1] BGEPA = protected under the Bald and Golden Eagle Protection Act; CSC = California Species of Special Concern; FP = Fully protected in accordance with Section 3511 of the California Fish and Game Code; FSC = federal species of concern; T = Threatened.
Sources: MAGTFTC 2001a, CDFG 2003.

The only federally and state-listed wildlife species known to occur within the project area is the threatened desert tortoise. Desert tortoises prefer habitats which possess substrates capable of supporting temporary to permanent burrows where much of their life is spent. This behavior protects the tortoise

from extreme summer and winter temperatures typical of the desert. An adult tortoise generally has a home range of 25-198 acres (10-80 hectares). The desert tortoise is active in the spring, summer, and fall seasons when daily temperatures are below 90 degrees Fahrenheit (32 degrees Celsius) and is most readily observed during the spring and early summer months during mating and immediately prior to and during rain events (MCAGCC 1999).

A base-wide study conducted in 1997 and 1999 at MCAGCC found that low (0-20 tortoises per square mile) desert tortoise densities exist within and in the vicinity of Range 500's western boundary, while moderate (20-50 tortoises per square mile) tortoise densities exist along the eastern boundary of Range 500 (Woodman et al. 2001). In April 2003, project-specific, USFWS-protocol desert tortoise surveys were conducted to determine the presence/absence of tortoises within the proposed project area of Range 500. Both live tortoises and sign (i.e., scat, burrows, and carcasses) were observed primarily within and adjacent to larger drainages with embankments in the eastern region of Range 500. Very little tortoise sign was found in the western portion of Range 500 (TEC 2003).

3.4 CULTURAL RESOURCES

3.4.1 Definition of Resource

The Department of the Navy defines cultural resources as buildings, structures, sites, districts, and objects eligible of listing in the National Register of Historic Places (NRHP) (SECNAVINST 4000.35a). Prehistoric resources are physical properties resulting from human activities that predate written records and are generally identified as archeological sites. Prehistoric resources can include village sites, temporary camps, lithic scatters, roasting pits/hearths, milling features, rock art (both petroglyphs and pictographs), rock features and burials. Traditional cultural properties are tangible places that are important in maintaining the cultural identity of a community or group. They must have been important for 50 years or more.

Historic resources include resources that postdate the advent of written records in the region. As the buildings and structures at MCAGCC have been evaluated for listing in the NRHP and were found to be ineligible, historic resources at MCAGCC are limited to those related to mining activities or homesteading. All of these resources are historic archaeological sites as they are now remnants of once extant mining sites or homesteads.

Historic properties are cultural resources that meet one or more criteria for eligibility for listing in the NRHP. Historic properties are considered primarily through the National Historic Preservation Act (NHPA) of 1966 (as amended), the Archaeological and Historic Preservation Act of 1974, Archeological Resources Protection Act of 1979, Native American Graves Protection and Repatriation Act of 1990, and the regulations (36 CFR 800) that implement Section 106 of the National Historic Preservation Act. Section 106 requires federal agencies to consider the effects of their undertakings on properties listed or eligible for listing in the NRHP and afford the Advisory Council on Historic Preservation the opportunity to comment on such undertakings.

3.4.2 Existing Conditions

Native Americans occupied the Twentynine Palms region for at least the past 12,000 years. At the time of European contact in the mid 1800s, two groups, the Chemehuevi and the Serrano, were documented as living at the Oasis of Mara in Twentynine Palms. The lands currently occupied by MCAGCC appear to have been used and occupied by the Serrano, Chemehuevi, and Mojave Indians as well as others during the prehistoric and early historic periods. Documentation indicates that Native Americans occupied reservation land near the Oasis of Mara until the early 1910s when they were relocated to the Indian Reservation at Morongo.

The Twentynine Palms region attracted miners beginning with the 1849 California Gold Rush and lasting until World War II. In the 1920s, homesteaders made their way to the desert community. The military presence in the Twentynine Palms area began in 1941 with the establishment of Camp Condor, a U.S. Army glider training base. The base was officially commissioned as a Marine Corps installation in 1957 and became known as the Marine Corps Air Ground Combat Center in 1979.

Range 500 is located in the southern portion of the Cleghorn Pass Training Area in a relatively level valley area. The western and eastern portions of the Training Area are mountainous. The mountains meet in the center of the Training Area, forming a pass and wide valleys open to the north and south of the pass. Approximately 5,580.5 acres (2,258 hectares) of the entire Cleghorn Pass Training Area, including all portions of Range 500, have been inventoried for cultural resources (MAGTFTC 2002a, MAGTFTC 2002b). All of the affected area of Range 500 has been surveyed, and 3 archaeological sites have been recorded within the APE. Two of the sites are segregated reduction locations, which are

cobble testing and reduction areas characterized by an accumulation of flaked stone debitage and/or cores. Neither site is considered eligible for listing on the NRHP. Attempts to relocate the 2 sites were undertaken by NREA personnel with no success. No historic resources or historic properties have been identified within Range 500. Only one NRHP-eligible site (a felsite quarry) was recorded, and it is located in the southern portion of the Cleghorn Pass Training Area (the western portion of Range 500). A 46.3-acre (18.75-hectare) area of the proposed BZO range was recently surveyed for cultural resources. This survey, which included a review of records, identified 1 archaeological occurrence – a segregated reduction locus. The locus consisted of more than 100 white quartz flakes and 2 small, exhausted quartz core fragments; this site is not considered eligible for listing in the NRHP (MAGTFTC 2003g). Additional surveys in Range 500 are unlikely to find NRHP-eligible sites.

Traditional Cultural Properties are now considered as being potentially eligible for listing in the NRHP. Native American Tribes who maintain a cultural affinity with the land currently occupied by MCAGCC include the Chemehuevi Indian Tribe, the Colorado River Indian Tribes, the Fort Mojave Indian Tribe, the Morongo Band of Mission Indians, the San Manuel Band of Mission Indians, and the Twentynine Palms Band of Mission Indians (MAGTFTC 2002a). Consultation with the Native American Tribes began in 1995, and one of the issues discussed is the presence of Traditional Cultural Properties. Although none of the tribes identified specific Traditional Cultural Properties, they all expressed a desire to be consulted regarding any prehistoric or Native American site located on MCAGCC.

3.5 AIR QUALITY

This section addresses existing air quality conditions in the vicinity of MCAGCC and includes a description of common air quality terminology. Regulatory requirements associated with air quality are introduced in Section 4.5. The APE for air quality includes the Mojave Desert Air Basin, which includes all of San Bernardino County and portions of Riverside, Los Angeles, and Kern counties.

3.5.1 Definition of Resource

3.5.1.1 Air Quality Standards

Air quality is defined as the ambient air concentrations of specific criteria pollutants determined by the U.S. Environmental Protection Agency (USEPA) to be of concern to the health and welfare of the general public. These criteria pollutants include ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than or equal to 10 microns in diameter (PM_{10}), and lead. Both California and the federal government have established ambient air quality standards (California Ambient Air Quality Standards and National Ambient Air Quality Standards, respectively) for several pollutants, often referred to as criteria pollutants (Figure 3-2). These standards identify the maximum allowable concentrations of criteria pollutants that are considered safe, with an additional adequate margin of safety to protect human health and welfare. Depending upon the type of pollutant, these maximum concentrations may not be exceeded at any time, or may not be exceeded more than once per year (USEPA 2002a). As depicted in Figure 3-2, the California standards are more stringent than federal standards.

The Clean Air Act (CAA), as amended, requires each state to develop, adopt, and implement a State Implementation Plan (SIP) to achieve, maintain, and enforce federal air quality standards throughout the state. SIPs are developed on a pollutant-by-pollutant basis whenever one or more air quality standards are being violated. Local governments and air pollution control districts have had the primary responsibility for developing and adopting the regional elements of the California SIP. In the San Bernardino County region, the Mojave Desert Air Quality Management District is responsible for governing air quality and reports to the California Air Resources Board.

3.5.1.2 Emissions

Air quality within a region is a function of the type and amount of pollutants emitted, size and topography of the air basin, and prevailing meteorological conditions. Criteria pollutants affecting air quality in a given region can be characterized as being either stationary or mobile sources. Stationary sources of emissions are typified by emissions from smokestacks. Mobile sources of emissions include emissions from vehicles and aircraft.

Emissions are often characterized as being "primary" or "secondary" pollutants. Primary pollutants are those emitted directly into the atmosphere such as CO, SO_2, and PM_{10}. Secondary pollutants are those formed through chemical reactions in the atmosphere such as O_3 and NO_2. Volatile organic compounds (VOCs) (also referred to as hydrocarbons or reactive organic gases) are precursors to the production of O_3. SO_2 and NO_2 are commonly referred to and reported as oxides of sulfur (SO_x) and oxides of nitrogen (NO_x), respectively, as SO_2 and NO_2 constitute the majority of their respective oxides.

POLLUTANT	AVERAGING TIME	CALIFORNIA STANDARDS[1]	NATIONAL STANDARDS[2]	
			Primary	Secondary
Ozone (O_3)	8 Hour[3]	•	0.08 ppm (157 µg/m^3)	Same as Primary Standards
	1 Hour	0.09 ppm (180 µg/m^3)	0.12 ppm (235 µg/m^3)	
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m^3)	9.0 ppm (10 mg/m^3)	•
	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	
Nitrogen Dioxide (NO_2)	Annual Average	•	0.053 ppm (100 µg/m^3)	Same as Primary Standard
	1 Hour	0.25 ppm (470 µg/m^3)	•	
Sulfur Dioxide (SO_2)	Annual Average	•	0.030 ppm (80 µg/m^3)	•
	24 Hour	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)	•
	3 Hour	•	•	0.50 ppm (1300 µg/m^3)
	1 Hour	0.25 ppm (655 µg/m^3)	•	•
Respirable Particulate Matter Less than or Equal to 10 Microns in Diameter (PM_{10})	Annual Arithmetic Mean	30 µg/m^3	50 µg/m^3	Same as Primary Standards
	24 Hour	50 µg/m^3	150 µg/m^3	
Respirable Particulate Matter Less than 2.5 Microns in Diameter ($PM_{2.5}$)[3]	Annual Arithmetic Mean	No Separate Standard	15 µg/m^3	Same as Primary Standards
	24 Hour		65 µg/m^3	
Sulfates	24 Hour	25 µg/m^3	•	•
Lead (Pb)	30 Day Average	1.5 µg/m^3	•	•
	Calendar Quarter	•	1.5 µg/m^3	Same as Primary Standard
Hydrogen Sulfide (H_2S)	1 Hour	0.03 ppm (42 µg/m^3)	•	•
Vinyl Chloride (chloroethene)	24 Hour	0.010 ppm (26 µg/m^3)	•	•
Visibility Reducing Particles	8 Hour (10:00 A.M. to 6:00 P.M.)	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent. Measurement in accordance with California Air Resources Board (CARB) Method V.	•	•

ppm – parts per million µg/m^3 – micrograms per cubic meter mg/m^3 – milligrams per cubic meter • – no standard established

(1) CO, SO_2 (1- and 24-hour), NO_2, O_3, PM_{10}, and visibility reducing particles standards are not to be exceeded. All other California Standards are not to be equaled or exceeded.

(2) Not to be exceeded more than once a year except for annual standards.

(3) The O_3 8-hour standard and the $PM_{2.5}$ standards are included for informational purposes only. Although the USEPA has been authorized to implement these standards, they are not final due to current litigations. In November 2001, the USEPA proposed a response to authorize the implementation of these standards (66 Federal Register 57267). Final implementation of these standards is still pending.

Sources: CARB 2002a; USEPA 2002a.

Figure 3-2
California and National Ambient Air Quality Standards

Areas that violate ambient air quality standards are designated as nonattainment areas. Nonattainment designations for O_3, CO, and PM_{10} include subcategories indicating the severity of the air quality problem (e.g., the classifications range from moderate to serious for CO and PM_{10}, and from marginal to severe for O_3). Areas that comply with federal air quality standards are designated as attainment areas. Areas that have been redesignated from O_3 nonattainment to attainment for the 1-hour O_3 standard are designated as maintenance areas. Areas that lack monitoring data to demonstrate attainment or nonattainment status are designated as unclassified and are considered to be in attainment for regulatory purposes.

3.5.2 Existing Conditions

Sources of emissions at MCAGCC include various stationary sources, aircraft operations, ground support equipment, and mobile sources, including personal and government owned vehicles. Stationary sources include stationary engines used for generators and compressors (there are 4 generators at Range 500), fuel storage and handling facilities (there are 2 fuel tanks at Range 500), boilers, and gasoline stations. Emissions from motor vehicles (i.e., heavy wheeled and tracked vehicles) used during training operations represent the primary source of all emissions at MCAGCC. In addition, fugitive dust (PM_{10}) emissions generated during training events and as a result of vehicle activity on nearby unpaved roads or directly blown from exposed soil surfaces also affect air quality in the area. These types of activities occur regularly on Range 500.

The entire Mojave Desert Air Basin is in severe nonattainment for the federal and state O_3 standards and in moderate nonattainment for the federal and state PM_{10} standards (California Air Resources Board 2002b, USEPA 2002b). Table 3-3 summarizes representative O_3, PM_{10}, CO, SO_2, and NO_2 air quality data from a monitoring station operated by the Mojave Desert Air Quality Management District and located in the Mainside Area at MCAGCC (8 miles [13 km] southwest of Range 500) for October through December 2002 (the most recent months for which data were available).

Table 3-4 summarizes representative PM_{10} air quality data for each of the six monitoring stations at MCAGCC for October through December 2002 (the most recent months for which data were available). The PM_{10} monitoring stations developed as part of MCAGCC's PM_{10} monitoring network have not recorded a violation of the federal PM_{10} standard (under the Air Quality Management District's Rule 403) over the history of monitoring activities (i.e., at least 6 years) (MAGTFTC 2002g, Naval Facilities Engineering Service Center 2003). The measured PM_{10} concentrations exceeded the state standard (50 micrograms per cubic liter [$\mu g/m^3$]) once during the October – November 2002 period (see Table 3-3).

3.5.2.1 Range 500 Emissions

Sources of emissions at Range 500 include the use of military vehicles and 4 generators for power supply. Baseline emissions have been estimated in order to analyze the potential impacts of the proposed 15 percent increase in Range 500 operations (Table 3-5). The following assumptions were used for estimating the baseline emissions from current Range 500 operations.

- The LAV-25 vehicle is in use for 1,412 hours per year and travels 85 vehicle miles per day for 73 days out of the year.
- The M1A1 Main Battle Tank is in use for 1,933 hours per year and travels approximately 85 vehicle miles per day for 102 days out of the year.
- Support trucks are in use for 1,943 hours per year and travel approximately 85 miles per day for 7 days out of the year; typically, support vehicles are stationary at Range 500 and are typically not involved in routine training activities.

- Four generators are used at Range 500, and assumptions were generated based on annual usage between 2000-2002. Assumptions for the 250-kW generators are 6,938 gallons and 488 hours per year. Assumptions for the 15-kW generators are 3,374 gallons and 1,650 hours per year.

Table 3-3. Representative Air Quality Data for the Mainside Area (2002)

Air Quality Indicator	*October*	*November*	*December*
Ozone (O_3)[a]			
Peak 1-hour value (ppm)	0.070	0.051	0.044
Days above federal standard (0.12 ppm)	0	0	0
Days above state standard (0.09 ppm)	0	0	0
Particulate Matter less than 10 microns in diameter (PM_{10})[b]			
Average 24-hour value ($\mu g/m^3$)	30.8	30.2	14.3
Days above state standard (50 $\mu g/m^3$)	0	1	0
Carbon Monoxide (CO)			
Peak 8-hour value (ppm)	0.2	0.3	0.3
Days above federal standard (9.0 ppm)	0	0	0
Days above state standard (9.0 ppm)	0	0	0
Sulfur Dioxide (SO_2)			
Peak 24-hour value (ppm)	0.001	0.001	0.001
Days above federal standard (0.14 ppm)	0	0	0
Days above state standard (0.04 ppm)	0	0	0
Nitrogen Dioxide (NO_2)			
Peak 1-hour value (ppm)	0.028	0.029	0.025
Days above state standard (0.25 ppm)	0	0	0

Notes: [a] The APE is in severe nonattainment for the federal and state O_3 standards.
[b] The APE is in moderate nonattainment for the federal and state PM_{10} standards.
Ppm = parts per million by volume, $\mu g/m^3$ = micrograms per cubic meter.
Source: Naval Facilities Engineering Service Center 2003.

Table 3-4. Representative PM_{10} Air Quality Data for the Six Monitoring Stations at MCAGCC (October – December 2002)

Air Quality Indicator	*Average Value ($\mu g/m^3$) [1]*	*Peak Value ($\mu g/m^3$) [1]*
Bristol Perimeter Station	9.9	30.0
East Perimeter Station[2]	16.4	36.9
Emerson Perimeter Station	8.1	18.8
Lavic Perimeter Station	10.6	26.2
Mainside Perimeter Station	27.6	54.2
Sandhill Perimeter Station	11.3	23.7

Notes: [1] These average and maximum readings do not include the 2 days of measurements when winds gusted above 25 mph.
[2] The East Perimeter Station is the closest to Range 500.
Source: Naval Facilities Engineering Service Center 2003.

Table 3-5. Estimated Baseline Vehicle Emissions for Range 500 Operations

	Emissions (tons/year [metric tons/year])				
Category	***VOC***	***NO_X***	***CO***	***SO_X***	***PM_{10}***
Baseline vehicle emissions	1.2 (1.1)	12.2 (11.1)	7.3 (6.6)	0.5 (0.45)	3.4 (3.1)
Baseline generator emissions	0 (0)	3 (3)	1 (1)	0 (0)	0 (0)

Note: Emission factors were derived from the Military Vehicle Database – Emissions Factors for Military Tactical and Support Vehicles.
Source: MAGTFTC 2003f.

3.6 NOISE

3.6.1 Definition of Resource

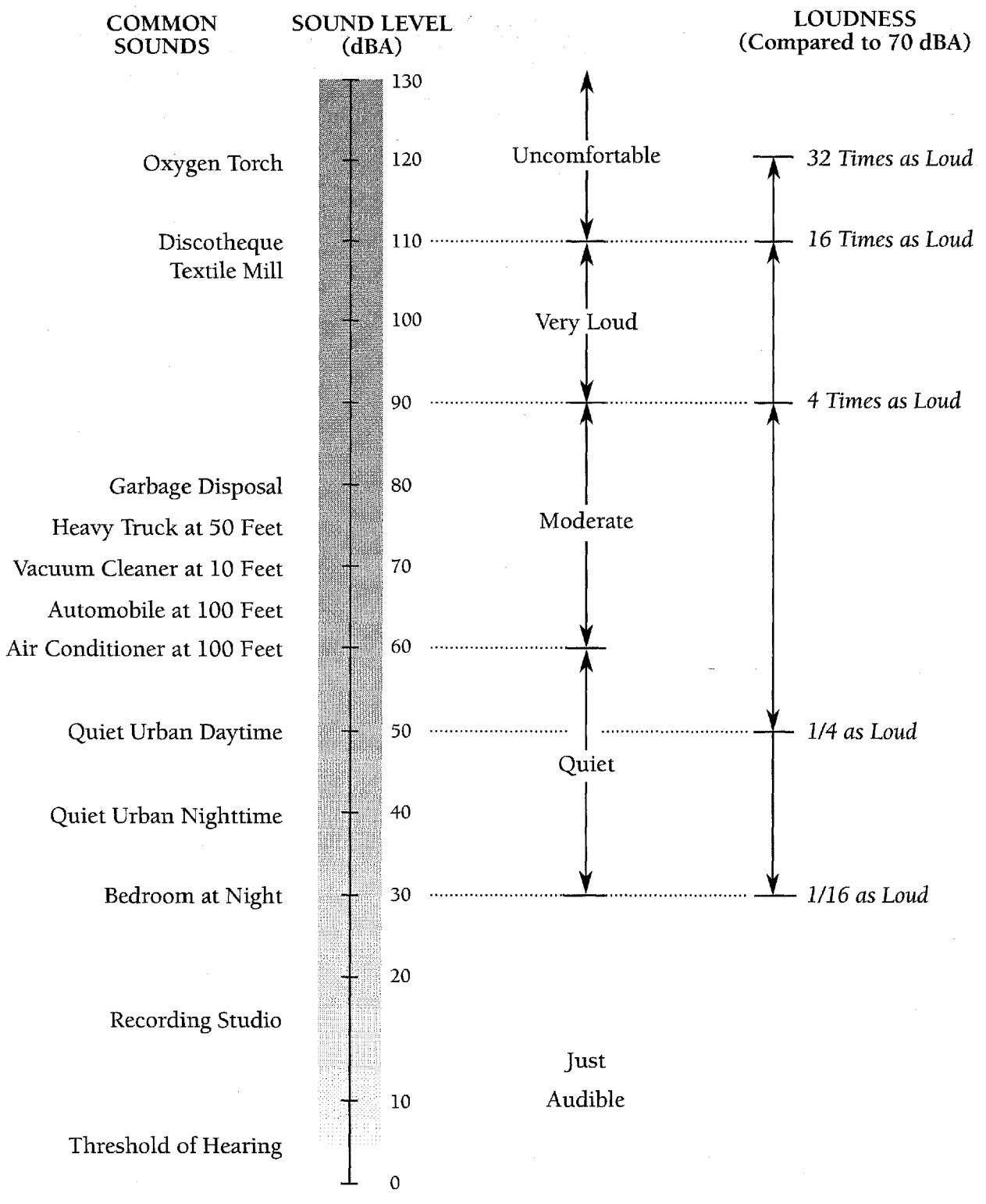
Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying (Federal Interagency Committee on Noise [FICON] 1992). Human response to noise can vary according to the type and characteristic of the noise source, the distance between the noise source and the receptor, the sensitivity of the receptor, and the time of day.

The physical characteristics of sound include its level, frequency, and duration. Sound is commonly measured with instruments that record instantaneous sound levels in decibels (dB), which are based on a logarithmic scale (e.g., a 10-dB increase corresponds to a 100 percent increase in perceived sound). Under most conditions, a change of 5 dB is required for humans to perceive a change in the noise environment (USEPA 1973). While the range of frequencies across which humans hear extends from 20 to 20,000 Hertz (Hz), the human ear is most sensitive to sounds in the range of 1,000 to 8,000 Hz, with sensitivity diminishing at lower and higher frequencies. Therefore, A-weighted sound level measurements (dBA), which de-emphasize low and high frequencies and emphasize mid-range frequencies, are used to characterize sound levels that are heard especially well by the human ear. As shown in Figure 3-3, human hearing ranges from approximately 20 dBA (the threshold of hearing) to 120 dBA (the threshold of pain). A-weighting is used to describe transportation noise (e.g., aircraft), while C-weighting is used to describe impulsive noise events such as a blast from a gun or detonation of high explosive ordnance.

Average noise exposure over a 24-hour period is often presented as a community noise equivalent level (CNEL). The CNEL is the energy-averaged sound level of all sound exposure level values within a 24-hour period, with a 10-dB penalty assigned to noise events occurring between 10:00 P.M. and 7:00 A.M. to compensate for the increased annoyance associated with the occurrence of nighttime noise events. In addition, applications of the CNEL metric to measure noise levels in California include an additional 5-dB annoyance penalty for evening (10:00 P.M. and 7:00 A.M.) noise events. The C-weighted Community Noise Equivalent Level (CCNEL) is used for estimating average sound levels and community annoyance associated with high-amplitude noise resulting from artillery or demolition firing. CCNEL is similar to CNEL except that the sound level is weighted by the C-scale. The 62 CCNEL contour is equivalent to the compatibility level of 65 CNEL (A-weighted) typically used for aircraft and other non-impulsive noise (Table 3-6).

Table 3-6. Noise Zone Definitions

CRITERIA	NOISE ZONE		
	I	II	III
Percent of Population Highly Annoyed	≤ 15 %	15% - 39%	> 39%
A-Weighted Average Noise Levels (Continuous Noise)	≤ 65 dBA	65-75 dBA	> 75 dBA
C-Weighted Average Noise Levels (Impulsive Noise)	≤ 62 dBC	62-70 dBC	> 70 dBC



Source: Harris 1979.

Figure 3-3
Examples of Typical Sound Levels in the Environment

3.6.1.1 Noise Level Criteria and Standards

Land use guidelines identified by the Federal Interagency Committee on Urban Noise (FICUN) are used to determine compatible levels of noise exposure for various types of land use surrounding airports (FICUN 1980) (Figure 3-4). Most people are exposed to sound levels of 50-55 dB (CNEL) or higher on a daily basis. Studies conducted to determine noise impacts on various human activities have revealed that approximately 87 percent of the population is not significantly bothered by sound levels below 65 dB (CNEL) (FICON 1992). The 65-dB (CNEL) noise level is the normally acceptable limit for residential and other noise-sensitive land uses (Figure 3-4).

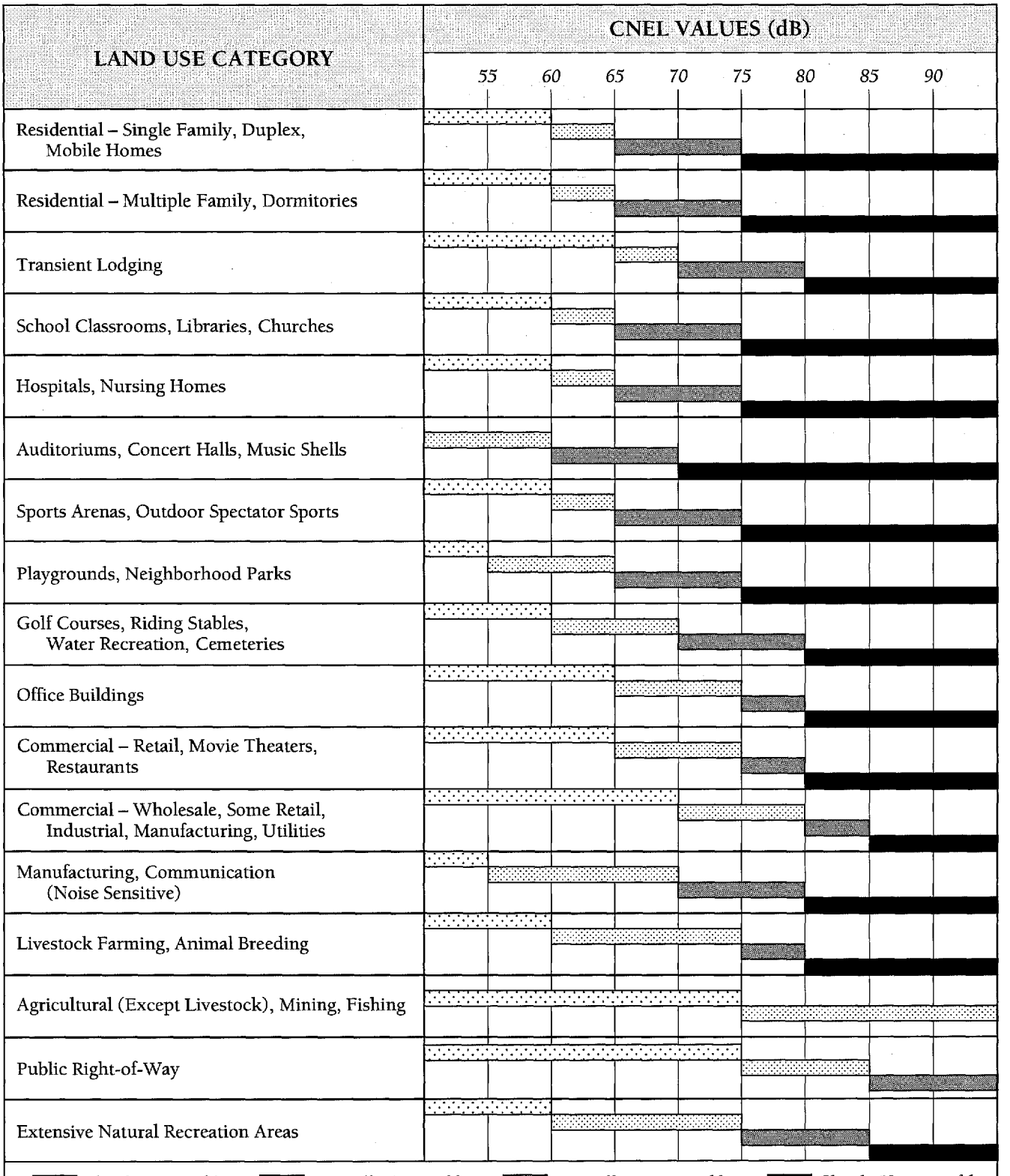
3.6.2 Existing Conditions

3.6.2.1 Training Areas and Fixed Ranges

There are many activities that contribute to the noise environment at MCAGCC, but the primary noise sources are aircraft operations and detonation of high explosive ordnance (Wyle Laboratories 2003). Range 500 is exposed to noise mostly from vehicular maneuvers and ordnance delivery. Aircraft operations are a lesser contributor to the overall noise environment in this area; noise levels at Range 500 as a result of aircraft operations are about 55 CNEL (Wyle Laboratories 2003). The main sources of vehicular noise are the tanks and LAVs transiting to the range and conducting their training there. General traffic noise from maintenance and other activities is a lesser contributor to the noise environment. Ordnance noise generated during training activities includes munitions fired from the tanks and LAVs.

The *Draft Airspace and Blast Noise Study for MCAGCC Twentynine Palms* (Wyle Laboratories 2003) included the noise contours resulting from ordnance and aircraft activities on base. The results of this study will be incorporated into the updated MCAGCC Range Air Installation Compatible Use Zone study. The combined noise contours for ordnance noise exposure show the 62-dB CCNEL contour associated with Range 500 activities currently extends to base boundaries (Figure 3-5).

Ordnance activities are audible off base, but the closest off-base noise sensitive receptors are located in the City of Twentynine Palms about 8 miles (13 km) southwest of Range 500. These noise sensitive receptors include residences, schools, and libraries. However, the majority of the dozen or so noise complaints received by MAGTFTC each year are associated with aircraft flying to or from MCAGCC along the Federal Aviation Administration-controlled airspace corridors connecting MCAGCC to other military installations (MAGTFTC 2003c). Rarely are there any noise complaints associated with training activities being conducted within the installation.



Source: FICON 1992.

Figure 3-4
Land Use Compatibility Guidelines

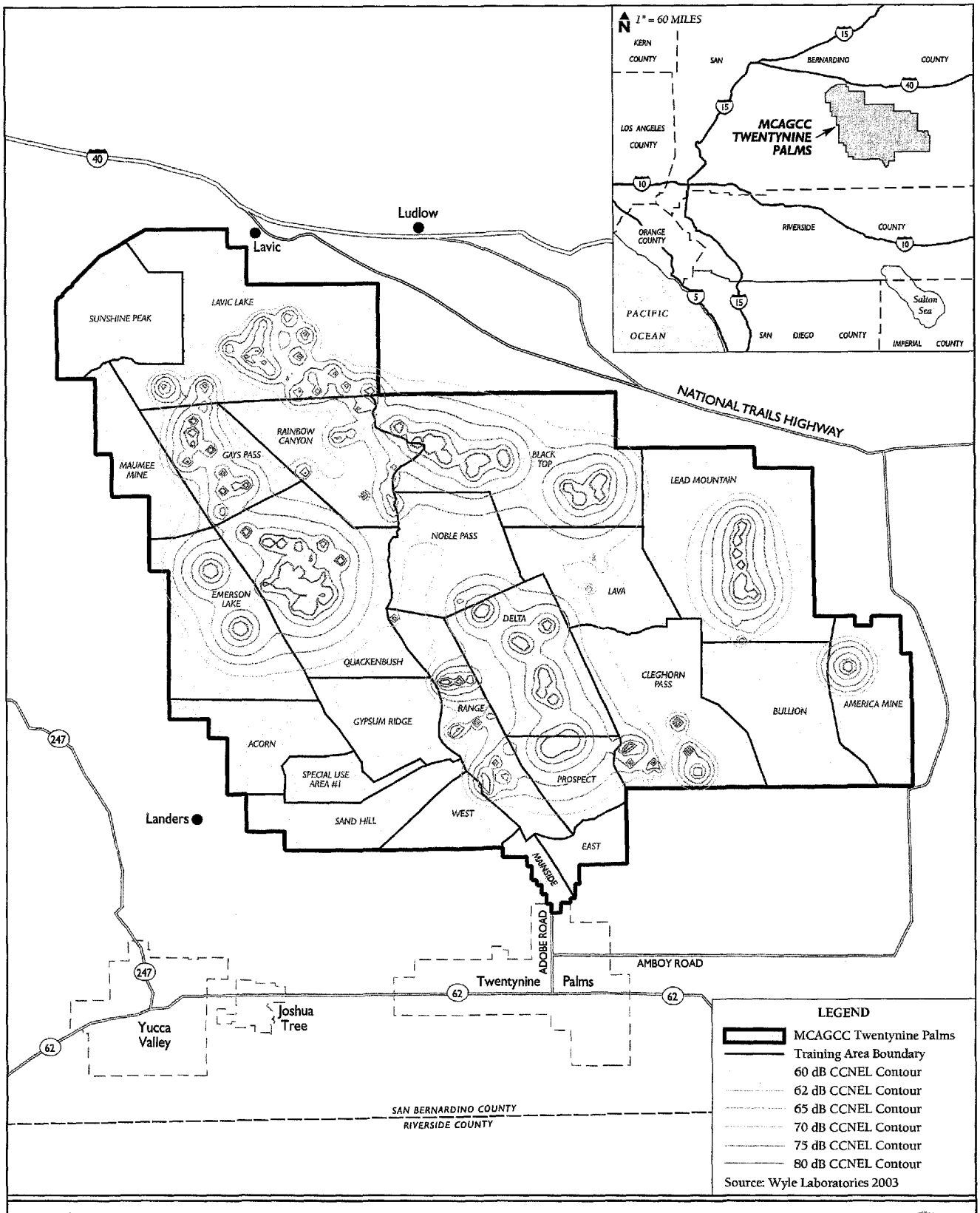


Figure 3-5
CY01/CY02 CCNEL Noise Contours at Cleghorn Pass
Resulting From Live Ordnance Events

3.7 LAND USE

3.7.1 Definition of Resource

For purposes of this analysis, land use is defined as the natural conditions and/or human-modified activities occurring at a particular location. Human-modified land use categories typically include residential, commercial, industrial, transportation, communications and utilities, agricultural, institutional, recreational, and other developed use areas. Management plans and zoning regulations determine the type and extent of land use allowable in specific areas and are often intended to protect specially designated or environmentally sensitive areas. The APE for land use includes Range 500 and areas within a 10-mile (16-km) distance from the southern base boundary.

3.7.2 Existing Conditions

3.7.2.1 Regional Conditions

MCAGCC is located in southern San Bernardino County and is bounded by Interstate 40 to the north and Highway 62 to the south (see Figure 1-1). Neighboring federal land uses in the vicinity of Range 500 include Joshua Tree National Park to the south and the Cleghorn Lakes Wilderness Area on the southeastern border of MCAGCC (MAGTFTC 2001a). On the southern boundary of the installation, although the Bureau of Land Management retains control of large areas of land, most land is privately owned. The predominant land use designations north of Highway 62 and south of MCAGCC are Rural Living and Resources Conservation. Rural Living land use areas are characterized by partial public services and limited public improvements, and are intended to prevent high demand for public services. This area is characterized by scattered low-density residential development. Much of the area consists of minimum parcel sizes of 2.5 acres (1 hectare) or 5 acres (2 hectares) per dwelling unit.

Wonder Valley is an unincorporated community and is the nearest residential population to Range 500. The City of Twentynine Palms is the closest incorporated city to MCAGCC and is located south of the Main Gate. From MCAGCC, the City of Twentynine Palms can be accessed via Adobe Road which includes various commercial, industrial, open spaces, and some residential areas along its path. Twentynine Palms is characterized by low-density residential areas and some commercial, recreational, public facilities, and agricultural zones. The offbase area immediately south of the Cleghorn Pass Training Area consists of unoccupied land.

3.7.2.2 Range 500

Range 500 is an Armor Live Fire and Maneuver Range within the Cleghorn Pass Training Area, directly east of Ranges 400, 410, and 410 A. Range 500 is used to simulate military maneuvers in desert terrain; it is mostly undeveloped with the exception of targets, trails, and some support facilities. Range 500's southern boundary is approximately 2,635 feet (802 meters) from MCAGCC's outer boundary. Physical constraints at Range 500 include steep drainage swales and washes, as well as the Bullion Mountain Range to the west, north and east. The main area of the range slopes upward from the south edge to the middle and northern portions of the range.

Range 500 was designed to provide site and supporting facilities to allow armor and anti-armor training. Moving and stationary targets, hostile fire simulators, and computer scoring facilitate training at Range 500 (MCAGCC 1996). The primary users of range 500 are 1TNK and 3LAR. These units use the range to conduct crew-level gunnery training and bi-annual crew qualifications. Range 500 is equipped with 1 trail, 15 SATs, 3 AMTCs, 20 SITs, 10 infantry moving targets, and 66 Armor Target Kill Simulators and Hostile Fire Simulators (see Figure 1-3). Other land use at Range 500 includes support facilities for

training units and range operations. The support facilities consist of a bivouac area, an aluminum-covered ammunition loading area, an administration/maintenance building, a control tower, four electric generators which provide power to the control tower and targets, fuel tanks which supply fuel to the generators, 135 solar panels for the provision of electricity, and photovoltaic batteries to provide power to battery-powered targets. The only paved areas within Range 500 are seven concrete pads used for repositioning of tanks and in fueling and maintenance areas. Table A-1 in Appendix A lists and further describes the above-mentioned facilities.

3.8 PUBLIC HEALTH AND SAFETY

3.8.1 Definition of Resource

This section includes a description of issues related to public health and safety in and around Range 500. These issues include range safety and control, Explosive Ordnance Disposal (EOD) operations and Unexploded Ordnance (UXO), storage and handling of ammunition and explosives, hazardous materials and wastes, non-hazardous wastes, installation restoration (IR) sites, electromagnetic hazards, and laser safety. The APE for safety includes Range 500 and any surrounding areas that could potentially be affected by hazards associated with ongoing training activities.

In 1997, EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (Protection of Children), was issued to identify and address issues that affect the protection of children. Socioeconomic data specific to the distribution of population by age and the proximity of youth-related facilities (e.g., day care centers and schools) are used to analyze potentially incompatible activities associated with a proposed action. Data generally used for the Protection of Children analysis are collected from the *2000 Census of Population and Housing* (U.S. Census Bureau 2002). There are no schools, parks, residences, or other areas where children would congregate located in the vicinity of the APE. All onbase housing and school or playground locations are located in the Mainside Area of MCAGCC, well removed from any training activities at Range 500.

3.8.2 Existing Conditions

3.8.2.1 Range Safety and Control

The Range Control Section of the O&T Directorate (Bearmat) maintains communication with all training units and provides oversight of all activities being conducted at MCAGCC's ranges, both on the ground and in associated airspace. Training operations are controlled by a combination of radio coordination with Bearmat and range inspectors who monitor all training activities. Training units continually use cell phones and/or radios to coordinate with Bearmat personnel while training maneuvers are being conducted.

All field work or construction onboard MCAGCC is scheduled around range activities and coordinated with the O&T Directorate. In addition, all persons involved in field work or construction are required to attend a safety briefing to minimize potential injuries. When out in the field, workers use cell phones and/or radios to stay in contact with Bearmat. To minimize potential conflicts with ongoing training activities at MCAGCC, training maneuvers at Range 500 begin only when authorized to proceed by Bearmat.

All units using Range 500 are required to submit a Surface Danger Zone (SDZ) diagram to Bearmat. The SDZ provides Bearmat the physical limits of danger the unit will create with live-fire training activities. It allows Bearmat to map out locations of people and assets at any given time to eliminate injury to personnel while maximizing use of the ranges. All of Range 500 is considered an SDZ, with a ricochet fan extending left and right of the range and partially limited by the mountains. This generalized SDZ for Range 500 defines the areas from which the training units can fire and the direction that they can fire. Currently, all shots fired on Range 500 are directed either east on the BZO Range, down range in a northerly direction, or from the west half of the range aiming toward the east (left to right). Few if any shots are fired from the east side of the range aiming west (towards the saddle with Range 410A behind).

Unauthorized public access is not permitted at MCAGCC. The boundaries of the installation are posted with bilingual signs that warn of potential hazards, but there is no perimeter fence installed around the

installation. Trespassers may include hikers and off-road vehicle users who inadvertently cross the installation boundary, or "scrappers" who purposely enter known training areas to mine for scrap metal from range residue. However, unauthorized trespassers are unlikely to enter the base in the vicinity of Range 500. Most unauthorized access by trespassers occurs on the west side of the installation because of the nearby Johnson Valley off-road vehicle area. Instances of unauthorized access have also been documented on the east and north sides of the installation. If trespassers are encountered at any time they are escorted out of the area and placed in the custody of Military Police prior to initiation or continuation of training activities. Range guards with radios are posted at each of the access points to the range to further prevent unauthorized access during a training event. No injuries to unauthorized personnel have been documented as a result of operation of Range 500 (MAGTFTC 2003d).

3.8.2.2 EOD Operations and UXO

Range clearance operations conducted by EOD teams play a crucial role in creating and maintaining a safe training environment at MCAGCC. The mission of the EOD unit is to (1) reduce the hazard from UXO, (2) remove ordnance residue from training areas, and (3) provide a safe and constructive training area for all training units. All range clearance operations are conducted in accordance with the UXO Range Management Plan (MAGTFTC 2001e) and with Combat Center Order P3500.4F (MCAGCC 2000b) and Combat Center Order P3120.4C (MCAGCC 1993). These plans and operating procedures define the scope and procedural requirements associated with EOD and range clearance operations.

Prior to a training exercise or operation at Range 500, a Combat Center Order, Operation Order, or Letter of Instruction is prepared by the training unit. The type of guidance document required depends upon the magnitude and complexity of the exercise. These documents stipulate the level of range policing and maintenance activity that is required after completion of the exercise. Regulations require that if a 10,000-pound (4,536-kilogram) threshold of net explosive weight of UXO is surpassed, then a specific range clearance operation is conducted by EOD. However, if this threshold is not reached, the range is scheduled under a routine clearance cycle. The MAGTFTC EOD Unit performs surface range clearance by systematically sweeping each Training Area and Fixed Range throughout the year (MAGTFTC 2001e). The Director of O&T also requires the EOD Unit to biannually conduct range clearance operations in each range training area. However, if training personnel encounter UXO that has not been cleared by EOD personnel, the incident is reported and action is taken.

The area of the proposed BZO targets (see Figure 2-1) is a former sensitive fuse area (MAGTFTC 2003d). This area was the impact area for tank training 30 years ago. Although the ordnance used at this location was not "live," fuses for the ordnance contained High Explosives. Since many activities have been conducted since that time, many EOD sweeps have been conducted in this area. However, there is still a potential for UXO to occur. However, training maneuvers do not occur within sensitive fuse areas, within ESQD arcs surrounding munitions magazines, or in areas known to contain high densities of UXO.

3.8.2.3 Storage and Handling of Ammunition and Explosives

The ASP provides a shaded concrete slab used to temporarily hold and distribute munitions to vehicles. Since the munitions stored on the pad have the potential to explode, they must be set a safe distance from personnel and facilities. According to the *NAVSEA OP 5 Volume 1, Ammunition and Explosives Safety Ashore, Seventh Revision*, the maximum allowable net explosive weight is 500,000 pounds (226,796 kilograms) with a minimum distance of 1,430 feet (436 m) between the pad and any other operational facility or supporting personnel. This safety distance encompasses explosives, creating a circle with radius 1,430 feet (436 m), and is referred to as an Explosives Safety Quantity Distance (ESQD) arc.

To prevent an accidental explosion of the munitions, two lightning arrestors have been installed at the ammunition loading dock in order to ground any excessive voltage caused in the event of lightning events. Currently, there is no identified limit regarding the length of time that ammunition can be set on the ASP. Ammunition is brought to the range in small quantities to support the training schedule and is generally entirely spent on the range.

3.8.2.4 Hazardous Materials and Wastes

Hazardous materials include, but are not limited to, hazardous substances, hazardous wastes, or any materials that pose a potential hazard to human health and safety or the environment due to their quantity, concentration, or physical and chemical properties. A variety of hazardous materials are used and stored at MCAGCC for daily training operations. The primary hazardous materials used during typical Range 500 operations are fuels, batteries, petroleum, oils, and lubricants (POLs), hydraulic fluid, antifreeze, and cleaning products.

Hazardous wastes are products characterized by their ignitability, corrosiveness, reactivity, and toxicity. Hazardous wastes include any waste which, due to its quantity, concentration, or physical, chemical, or infectious characteristics may either 1) cause or significantly contribute to an increase in mortality, serious irreversible illness, or incapacitating reversible illness, or 2) pose a substantial threat to human health or the environment. Typical hazardous wastes generated at Range 500 include alkaline batteries, fuels, used oil, and POLs. Hazardous waste is inventoried and managed by the Defense Reutilization and Marketing Office prior to disposal off-site by a certified contractor to a permitted landfill that accepts hazardous waste.

Management and control of hazardous materials and wastes at MCAGCC is guided by the *Integrated Contingency and Operations Plan* (ICOP) (MAGTFTC 2002e). This comprehensive plan consolidates a number of related management action plans and policies into one central source, which is made available to all appropriate personnel and is posted on the installation's Internet site. Among the many components of the ICOP are an Oil and Hazardous Substance Spill Contingency Plan, a Spill Prevention, Control, and Countermeasures Plan, a Business Emergency and Contingency Plan, a Storm Water Pollution Prevention Plan, a Hazardous Waste Management Plan, and a Hazardous Waste Minimization Plan. The ICOP clearly defines all responsibilities, procedures, requirements, and responses associated with hazardous material and waste management. These procedures apply to activities at Range 500.

3.8.2.5 Non-Hazardous Waste

A wide variety of non-hazardous waste is generated during training events at Range 500. These wastes include artillery shells and casings, ammunition cans, wood, cardboard, scrap metal, paper products and food wrappers. Management and control responsibilities and procedures associated with these types of wastes are defined in Combat Center Order P3500.4F (MCAGCC 2000b) and Combat Center Order P3120.4C (MCAGCC 1993). Waste generated during training exercises is collected by each unit at the conclusion of training and is taken to the Range Residue Processing Center (RRPC), which is responsible for safely managing, inspecting, processing, and certifying all ordnance-derived materials and range residue generated at MCAGCC. Once the process of certifying the material is completed, the RRPC offers those materials to the Qualified Recycling Program or the Defense Reutilization and Marketing Office for sale (MAGTFTC 2001e).

3.8.2.6 Installation Restoration Sites

To facilitate the investigation and cleanup of contaminated sites (i.e., IR Sites) at military bases, the Department of Defense has developed the Installation Restoration Program (IRP). The IRP is the process

by which contaminated sites and facilities are identified and characterized and existing contamination is contained, removed, and disposed of to allow for the future beneficial use of the property. No IR sites are located within Range 500 (MAGTFTC 2002f).

3.8.2.7 Hazards of Electromagnetic Radiation to Ordnance

Electromagnetic radiation emitted from communications, radar, and similar systems has the potential to create a hazard to ordnance systems containing sensitive electro-explosive devices, which can result in degradation of these devices as well as premature device actuation causing propellant ignition and/or warhead detonation. Safety measures, responsibilities, and SOPs associated with hazards of electromagnetic radiation to ordnance (HERO) are contained in Combat Center Order 3565.1 (*Hazards of Electromagnetic Radiation Emissions Control Bill*), which is incorporated here by reference (MAGTFTC 2000).

Even though there are certain types of ordnance used on board MCAGCC that are designated HERO Unsafe, this type of ordnance is not generally used at Range 500. Also, antenna placement of radiation sources and/or the relatively low operating power are such that the distance to ordnance storage, handling, loading, and arming locations, or transportation routes, preclude the need for permanent radio frequency emission control procedures. Therefore, the primary focus of Combat Center Order 3565.1 is on procedures for mobile equipment (stationary, vehicular and aircraft) that may affect personnel working around transmitters, refueling operations, and other HERO sensitive ordnance. The strongest radio-transmitter is a 35-Watt very high frequency (VHF) transmitter at the Control Tower, which requires a minimum separation of 312 feet (95 m) from electro-explosive devices; the Control Tower is 2,887 feet (880 m) from the ASP (MAGTFTC 2003d).

3.8.2.8 Laser Safety

Training operations involving the use of laser-based weapons systems occur at designated laser ranges and laser target areas distributed throughout 16 different Training Areas at MCAGCC. Laser ranges include Ground Laser Ranges, Aerial Laser Ranges (fixed wing and rotary wing), Armor Maneuver Ranges (tanks), and Composite Ranges. The primary hazard associated with laser use is eye damage. This damage can vary from a small burn, undetectable by the injured person, to severe impairment. Range control procedures and safety precautions associated with laser training are described in Combat Center Order P3500.4F (MCAGCC 2000b). The regulations and guidelines listed therein are designed to prevent exposure to hazardous levels of laser radiation.

Laser targeting is conducted for virtually all of the munitions fired at Range 500 (MAGTFTC 2003d). Prior to conducting any laser operations, training units must establish laser safety programs that address such issues as laser regulations and SOPs, safety training for all relevant personnel, laser protective goggles and equipment, and medical surveillance. All personnel within the target area or danger area along the laser-target line must wear appropriate eye protection when laser firing is in progress. Range guards with radios are posted at each of the access points to a ground laser range and all laser operations are halted if communication is lost with any of the personnel participating in the laser training (including Bearmat, which maintains control of the training at all times).

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CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

This chapter describes potential environmental consequences associated with the preferred alternative (Alternative 1), the 2 action alternatives (Alternatives 2 and 3), and the No-Action Alternative. This discussion addresses all resource areas described in Chapter 3. The analyses for Alternative 1 are divided into separate subsections for Phase 1 and for Phases 2 and 3. Phases 2 and 3 are not being formally proposed at this time; they represent instead a planning scenario for potential future upgrades at Range 500. As such, this chapter provides a programmatic-level analysis of potential environmental effects associated with these 2 phases, based on the information currently available in the *Range 500 Master Plan*. Biological and cultural resource surveys would be required if projects from these phases were formally identified as proposed actions (under NEPA) in the future. A focused or tiered NEPA analysis of such projects would also be required.

4.1 GEOLOGICAL RESOURCES

4.1.1 Approach to Analysis

This section evaluates potential impacts to geological resources associated with the proposed action. The analysis focuses exclusively on soil disturbance resulting from training activities and proposed upgrades to the range because of the tendency of such disturbance to increase susceptibility to wind and water erosion. While the potential also exists for training activities to damage unique geological or topographical features at Range 500, the uniqueness of such features is subjective and areas that may be considered unique tend to be subject to little or no training activity. In general, mountainous areas and other locations that might contain such features are avoided during training because of topography and potential damage to vehicles. Proposed upgrades to Range 500 would occur on the alluvial plains west of the Bullion Mountains. Seismic features and characteristics are not addressed in this section, as there are no major seismic features within Range 500.

The following analysis of potential impacts from training-induced and construction soil disturbance is qualitative in nature, based largely on the INRMP (MAGTFTC 2001a) and the results of a Land Condition Trend Analysis (LCTA) developed as part of an ongoing Land Condition Trend Monitoring Program conducted by MAGTFTC. These documents describe how training operations disturb different types of soils at MCAGCC and, therefore, are incorporated here by reference. The information is summarized below as necessary to support the following impact analysis.

4.1.2 Impacts

4.1.2.1 Alternative 1

Phase 1

The training at Range 500 involves the use of military and support vehicles that are sources of soil disturbance. Training at Range 500 also involves the use of various munitions, as outlined in Table 2-2, which contribute to soil disturbance at Range 500. Training operations can disturb soils in two primary ways: soil compaction and the disruption of surface crusts to expose underlying soil. Soil compaction reduces soil aeration and root growth of vegetation, and contributes to increased stormwater runoff and flash flooding because of reduced water infiltration. Loosening of surface crusts leaves soils and subsoils more susceptible to wind and water erosion. Gillette et al. (1982) found that for undisturbed soils, even a weak surface crust protects the soil from wind erosion and that disturbed soils were readily erodible.

However, the crust can seal itself after one or two significant rainstorms. In general, the severity of disturbance to soils is dependent upon the type and frequency of disturbance, soil type and texture, grain size, and soil moisture at time of impact. Soils at Range 500 are susceptible to wind erosion when the surface is disturbed, as they are mostly sandy with little or no rock content. Although erosion by water could also be problematic, it is less of a concern than wind erosion because storm events are rare and transported soil tends to remain within the boundaries of MCAGCC.

Soil disturbance and resulting erosion at MCAGCC is not a compliance issue associated with any federal, state, or local regulations. However, soil erosion can become a compliance issue to the extent that it contributes to sedimentation or pollution of water bodies, depletion of sensitive vegetation and habitat for special-status species, or degradation of air quality (PM_{10}) beyond allowable thresholds. Erosion-related impacts to water resources, biological resources, and air quality are described in Sections 4.2, 4.3 and 4.5, respectively.

Construction

Proposed upgrades and construction activities would require some excavation, grading, and placement of fill material, but such activities would not be excessive. Estimated ground disturbance associated with Phases 1, 2, and 3 are shown in Table 4-1 in comparison with existing disturbance areas at Range 500. These disturbance areas include the physical footprints of each category plus the surrounding buffer areas. Potential impacts resulting from erosion during construction activities would be controlled through the use of standard erosion control measures as identified in the Erosion Control Plan (e.g., sandbags, silt fencing, earthen berms, and temporary sedimentation basins). The soils in the vicinity of the proposed Phase 1 project areas are mostly sandy. Therefore, there would be no impact or structural damage to the proposed facilities due to shrink-swell soils (i.e., clayey soils). Although the proposed construction activities would impact soils, with the proper construction and erosion control measures, such impacts would be minimized and would not be significant.

Table 4-1. Existing and Proposed Ground Disturbance Areas

Type	*Existing*	*Phase 1*	*Phase 2*	*Phase 3*
Trails	97.7	13.9	10.0	8.6
Targets	42.6	13.3	114.4	69.1
Facilities	16.3	0.6	0.3	0
Total	**156.6**	**27.8**	**124.8**	**77.7**

Vehicle Maneuvers

Tank, LAV, and other vehicle use at Range 500 would continue to be focused on established roads and tank trails, thereby minimizing impacts to soils. The installation of concrete turn pads at the entry of hull down areas would also prevent the tank tracks from creating large holes and ruts in the ground. Accordingly, impacts associated with vehicle maneuvers at Range 500 would not be significant.

Munitions Use

The training at Range 500 requires the use of various munitions as summarized in Table 2-2. Land-based weaponry and munitions use can result in adverse impacts to soils by creating small craters, shearing of soil profiles, and dispersing soil particles as dust via contact. Though ordnance fired during training activities can land virtually anywhere throughout the range and disturb the soil, effects from munitions use at Range 500 are generally concentrated in designated areas (i.e., fixed targets). The disturbance areas estimated in Table 2-1 account for a 50-foot (15-m) buffer zone around each target, which would

account for most of the disturbance associated with munitions aimed at the proposed SAT, SIT, and BZO targets. These areas of disturbance would not be extensive and would largely coincide with previously disturbed areas. Therefore, the use of munitions at Range 500 would result in adverse, but not significant effects to geological resources.

Phases 2 and 3

The amount of ground disturbance estimated for Phases 2 and 3 are shown in Table 4-1. Phases 2 and 3 involve larger areas of disturbance associated with construction of additional tank trails and targets. The greatest amount of cut and fill would be associated with the 3 proposed AMTC targets under Phase 2. There is a maximum slope allowable for the rail that contains the moving target, so a substantial amount of cut and fill would need to be conducted to compensate for the varying terrain in the northern portion of the range. However, it is assumed that for the longevity of these targets, construction design and techniques would be incorporated in order to minimize the potential for future erosion at these locations. Since the types of operational soil disturbance are the same for all 3 phases, impacts to geological resources resulting from implementation of the Phases 2 and 3 would be similar to those described above for Phase 1. Moreover, the installation of concrete turn pads at the entry of hull down areas prevent the tank tracks from creating large holes and ruts in the ground, which helps to lessen soil disturbance at Range 500. The activities proposed for Phases 2 and 3 would not raise these impacts to a level of significance, due to continued concentration of activities in disturbed areas, protection or avoidance of undisturbed areas, and continued application of monitoring, conservation, and environmental awareness programs.

4.1.2.2 Alternative 2

Alternative 2 comprises the same number of new trails, facilities, and targets as the proposed action, although the configuration of the trails is slightly different. The overall amounts and types of soil disturbance would be the same as Alternative 1. Therefore, impacts to geology and soils would not be significant.

4.1.2.3 Alternative 3

The main difference between Alternatives 2 and 3 is that the MSR would not be used as a fourth trail; rather, the fourth trail would be constructed west of the existing trail (see Figure 2-5). Therefore, Alternative 3 would result in a marginally greater level of ground disturbance (about 5.3 acres [2.1 hectares] more) than Alternatives 1 or 2. However, this additional area is not excessive and the overall intensity of soil disturbance would be the same. Therefore, impacts to geology and soils would not be significant.

4.1.2.4 No-Action Alternative

Under the No-Action Alternative, Range 500 upgrades would not occur, and operational tempo at the range would continue at current levels. Therefore, implementation of the No Action Alternative would not result in significant impacts to geological resources.

4.2 WATER RESOURCES

4.2.1 Approach to Analysis

This section evaluates potential impacts to water resources associated with the proposed action. The analysis focuses only on impacts to surface water resources, as area groundwater resources are located at sufficient depth to be unaffected by the proposed action (see Section 3.2). Of the various types of surface water resources, playa lakes and dry washes are the most impacted by military training activities. Though there are no playas within Range 500, dry washes are abundant, as discussed in Section 3.2.

The following analysis of potential impacts to surface water resources is qualitative in nature, and based largely on the INRMP (MAGTFTC 2001a). Several sections of the INRMP address water resource issues, including Wet Area Management, Water Resources Management, Training Land Management, and Mainside Grounds Maintenance. These sections contain numerous environmental protection measures that have become Standard Operating Procedures (SOPs) to help manage and protect surface water resources. For example, Combat Center Order 5090.1B includes measures to be taken by Marines and other forces training on MCAGCC to conserve and protect water resources. Other measures intended to reduce the effects of soil disturbance and erosion (as described in the INRMP) also indirectly protect water resources. These measures help minimize potential impacts to water resources associated with the proposed action.

4.2.2 Impacts

4.2.2.1 Alternative 1

Phase 1

Construction

Proposed construction activities would temporarily increase the potential for local erosion in the event of rain. However, as described in Section 4.1, an Erosion Control Plan would be prepared and followed during construction activities. Phase 1 facilities would result in an increase in impervious surfaces and a slight increase in storm water discharge intensities and volumes within Range 500. However, the additional impervious surface area is still only a small portion of the Range 500 surface area, so potential increases in storm water discharge and volumes would be insignificant. Therefore, implementation of construction activities under the proposed action would not result in significant impacts to water resources.

Vehicle Maneuvers

Vehicle maneuvers have the potential to impact surface water resources, particularly in dry washes and other drainages. Several proposed facilities (i.e., a proposed tank trail extending between the eastern and southern section of Range 500) would cross existing washes. Vehicular activity in washes could create compacted and rutted surfaces that can reduce water absorption into the soil and otherwise alter stormwater flow. Environmental protection measures used to minimize impacts to washes include: 1) identifying washes that are not critical to military vehicular maneuvers and excluding all but necessary traffic from these locations (MCAGCC 1996), 2) avoiding such areas when wet, and 3) evaluating and implementing recommendations for repair of disturbed washes, while observing military mission requirements (MAGTFTC 2001a). Impacts to water resources due to vehicle maneuvers are further minimized by MAGTFTC requirements that troops use existing, well-defined roads when not in conflict with training objectives. In summary, given the lack of permanent surface water resources in the absence

of storms, and MAGTFTC policies and programs designed to manage and protect existing dry washes, Phase 1 of the proposed action would not result in significant impacts to surface water resources.

Munitions Use

Munitions use can impact dry washes by disturbing soil crusts, causing compaction of the soil, and creating small craters that may then trap or impede stormwater flow. However, Range 500 is an already disturbed area and with continued application of monitoring, conservation, and environmental awareness programs directed at the protection of surface water resources (as described in the INRMP and the Multiple Land Use Management Plan), munitions use under the proposed action would not result in significant impacts to surface water resources.

Phases 2 and 3

Since Phases 2 and 3 would involve the same types of disturbance as discussed above, impacts to water resources resulting from implementation of the proposed action would be similar to those described above for Phase 1. The total amount of impervious surface would still represent only a small portion of the Range 500 surface area, so potential increases in storm water discharge and volumes would be insignificant. The proposed activities would continue to be concentrated in previously disturbed areas, and monitoring, conservation, and environmental awareness programs would continue to be in effect. Therefore, Phases 2 and 3 of the proposed action would not result in significant impacts to surface water resources

4.2.2.2 Alternative 2

Alternative 2 comprises the same number of new trails, facilities, and targets as the proposed action, although the configuration of the trails is slightly different. The overall amounts and types of disturbance would be the same as Alternative 1. Therefore, impacts to water resources would not be significant.

4.2.2.3 Alternative 3

The main difference between Alternatives 2 and 3 is that the MSR would not be used as a fourth trail; rather, the fourth trail would be constructed west of the existing trail (see Figure 2-5). Therefore, Alternative 3 would result in a marginally greater level of ground disturbance (about 5.3 acres [2.1 hectares] more) than Alternatives 1 or 2. However, this additional area is not excessive and the overall intensity of disturbance would be the same. Therefore, impacts to water resources would not be significant.

4.2.2.4 No-Action Alternative

Under the No-Action Alternative, Range 500 upgrades would not occur, and operational tempo at the range would continue at current levels. Therefore, implementation of the No Action Alternative would not result in significant impacts to water resources.

4.3 BIOLOGICAL RESOURCES

4.3.1 Approach to Analysis

This section discusses the potential impacts to biological resources associated with the action alternatives and No-Action Alternative. Because the proposed alternatives are scheduled to occur in 3 phases spanning many years, analysis of impacts is presented in a programmatic fashion. Thus, future impacts beyond the initial phase of construction are anticipated and evaluated within this section. Potential impacts due to current and future military operations (i.e., construction impacts, vehicle maneuvers, and munitions use) would be minimized through implementation of SCMs (see Chapter 2), the goals and objectives in the INRMP, and the Terms and Conditions of the 2002 BO (USFWS 2002). These SCMs and Terms and Conditions are incorporated within this impacts analysis discussion by reference.

Determination of the significance of potential impacts to biological resources is based on: 1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource; 2) the proportion of the resource that would be affected relative to its occurrence in the region; 3) the sensitivity of the resource to proposed activities; and 4) the duration of ecological ramifications. Impacts to biological resources are considered significant if species or habitats of concern are adversely affected over relatively large areas or disturbances result in reductions in the population size or distribution of a special-status species.

4.3.2 Impacts

4.3.2.1 Alternative 1

Phase 1 Construction Activities

Vegetation Types. Although Phase 1 construction activities would remove vegetation during site preparation (i.e., grading and clearing), the majority of the project area is comprised of previously disturbed creosote bush scrub and no sensitive vegetation types are known to exist within the project area. Therefore, no significant impacts would occur to vegetation types would occur as a result of Phase 1 construction activities.

Wildlife. Phase 1 Construction activities would temporarily displace wildlife (including migratory birds) from suitable habitat within the vicinity of the project areas. To minimize potential impacts to migratory birds, particularly those potentially nesting within the APE, initial grading and clearing of the APE would occur during the fall and winter months if possible. Smaller, less mobile species and those seeking refuge in burrows (e.g., ground squirrels) could inadvertently be killed during construction activities. However, long-term, permanent impacts to populations of such species would not result. Therefore, no significant impacts to wildlife, including migratory birds, would occur as a result of Phase 1 construction activities.

Special-Status Species. No federally listed plant species are known to occur within the project area. However, one CNPS List 4 species, the foxtail cactus (*Coryphantha alversonii* [=*Escobaria vivipara* var. *alversonii*]) is known to occur within the project area (TEC 2003). To minimize potential impacts to foxtail cactus, individuals would be avoided as much as possible or translocated to adjacent areas outside of the project area.

The threatened desert tortoise is the only federally listed species that occurs within the project area. Extensive base-wide surveys conducted in 1997 and 1999 found low (0-20 tortoises per square mile) tortoise densities in the western portion of Range 500 and moderate (20-50 tortoises per square mile) tortoise densities in the eastern portion (Woodman et al. 2001). In April 2003, a project-specific, USFWS-protocol tortoise survey was conducted for Phase 1 components of the proposed Range 500

upgrades (TEC 2003). The eastern region of Range 500 was found to contain a higher amount of tortoise sign (e.g., scat, burrows) and live tortoises than the western portion. Live tortoises were found primarily in the northeastern corner of Range 500 and along the eastern boundary.

Based upon the results of the survey, MAGTFTC has determined that the construction of the proposed Range 500 upgrades "may affect, but is not likely to adversely affect" the desert tortoise. However, implementation of standard MCAGCC SCMs (see Chapter 2) would serve to meet the terms and conditions of the 2002 BO for base-wide training operations and maintenance program at MCAGCC (USFWS 2002). In addition, as required under the Terms and Conditions of the 2002 BO, desert tortoise clearance surveys would be conducted by a USFWS-permitted biologist immediately prior to any construction activities associated with Alternative 1. Implementation of the SCMs and pre-construction surveys would ensure that implementation of Alternative 1 would not significantly impact desert tortoises.

Phase 1 Operations

Vegetation. Total estimated ground disturbance (including buffer areas surrounding each construction component) for Phase 1 would be approximately 27.8 acres (11.3 hectares). The INRMP provides measures to protect and conserve vegetation and habitats (including soils) on MCAGCC, including requiring units to utilize existing travel corridors (e.g., MSRs, secondary roads, and off-road routes) (MAGTFTC 2001a). Therefore, all vehicle maneuvers would be restricted to existing and proposed tank trails. All munitions used during training activities within Range 500 are inert (non-explosive) or blank munitions which do not produce a significant ground disturbance upon impact or excessive fire-potential. Targets and surrounding areas would be maintained or cleared of vegetation upon completion of construction. Therefore, no significant impacts would occur to vegetation types as a result of Phase 1 operations.

Wildlife. Impacts to wildlife during vehicle maneuvers are unavoidable. Wildlife may be temporarily displaced due to noise and/or vibrational forces created by the vehicles; affecting burrowing wildlife or birds. Additionally, wildlife may be killed while crossing an actively used tank trail. However, long-term impacts to wildlife populations are not anticipated. As stated above, all vehicle maneuvers would be restricted to existing or proposed tank trails. Due to the lack of explosive munitions used in Range 500, impacts to wildlife are limited to direct impact by a munition and the associated noise of firing. Due to the highly disturbed nature of target areas and lack of vegetation, it is unlikely that wildlife species would occur within these areas. In addition, noise generated from the firing of munitions is short term and temporary and is not likely to significantly impact any wildlife species in the vicinity. Therefore, there would be no significant impacts to wildlife from vehicle maneuvers or munitions use associated with Phase 1 operations.

Special-Status Species. Potential impacts to the desert tortoise would be similar to those previously discussed for proposed construction activities. Operations associated with Alternative 1 may impact individual tortoises but would not significantly impact the tortoise population. Furthermore, implementation of the SCMs (see Chapter 2), Terms and Conditions of the 2002 BO, and the INRMP would ensure that implementation of Alternative 1 would not significantly impact desert tortoises.

Phases 2 and 3

Total estimated ground disturbance (including buffer areas surrounding each construction component) would be approximately 124.7 acres (50.5 hectares) for Phase 2 and 77.7 acres (31.4 hectares) for Phase 3. Since Phases 2 and 3 involve identical types of disturbance as previously discussed, impacts to

biological resources resulting from implementation of Phases 2 and 3 would be similar to those previously described for Phase 1 of Alternative 1. Although a greater area would be disturbed, this increase is not expected to result in significant impacts to biological resources with implementation of Phases 2 and 3 of Alternative 1.

In addition, in accordance with the 2002 BO and since project specific desert tortoise surveys are only valid for 1 year after their completion, prior to any construction activities associated with Phases 2 and 3, desert tortoise protocol surveys would be conducted by USFWS-approved biologists for all Phase 2 and 3 project areas. Implementation of the SCMs (see Chapter 2), Terms and Conditions of the 2002 BO, and the INRMP would ensure that the construction and subsequent use of facilities associated with Phases 2 and 3 would not significantly impact desert tortoises.

4.3.2.2 Alternative 2

With implementation of Alternative 2, impacts to all biological resources (i.e., vegetation, wildlife, and special-status species) would be similar to those previously discussed for Alternative 1. Prior to any construction activities associated with Alternative 2, desert tortoise protocol surveys would be conducted by USFWS-approved biologists. Implementation of the SCMs (see Chapter 2), Terms and Conditions of the 2002 BO, and the INRMP would ensure that the construction and subsequent use of facilities associated with Alternative 2 would not significantly impact desert tortoises.

4.3.2.3 Alternative 3

With implementation of Alternative 3, impacts to all biological resources (i.e., vegetation, wildlife, and special-status species) would be similar to those previously discussed for Alternative 1. Prior to any construction activities associated with Alternative 3, desert tortoise protocol surveys would be conducted by USFWS-approved biologists. Implementation of the SCMs (see Chapter 2), Terms and Conditions of the 2002 BO, and the INRMP would ensure that the construction and subsequent use of facilities associated with Alternative 3 would not significantly impact desert tortoises.

4.3.3 No-Action Alternative

Under the No-Action Alternative, existing conditions as described in Section 3.3 would remain unchanged. Therefore, implementation of the No-Action Alternative would not result in significant impacts to biological resources.

4.4 CULTURAL RESOURCES

4.4.1 Approach to Analysis

Cultural resources are subject to review under both federal and state laws and regulations. Section 106 of the NHPA of 1966 (as amended) empowers the Advisory Council on Historic Preservation to comment on federally initiated, licensed, or permitted projects affecting cultural sites listed or eligible for inclusion in the National Register. Once cultural resources have been identified, they are evaluated to determine if they meet one of the four criteria for significance as defined by 36 CFR 60.4, including association with an important event, association with an important person, embodiment of a style of architecture representing a particular period in history or the work of a master, or the ability to contribute to the existing scientific database. Only cultural resources determined to be significant (i.e. eligible to the National Register) are protected under the NHPA.

Analysis of potential impacts to cultural resources considers both direct and indirect impacts. Direct impacts may be the result of physically altering, damaging, or destroying all or part of a resource, altering characteristics of the surrounding environment that contribute to the importance of the resource, introducing visual or audible elements that are out of character for the period the resource represents thereby altering the setting, or neglecting the resource to the extent that it deteriorates or is destroyed. Direct impacts can be assessed by identifying the type and location of the proposed action and by determining the exact locations of cultural resources that could be affected. Indirect impacts are those that occur as a result of the completed project such as increased vehicular or pedestrian traffic in the vicinity of the resources.

4.4.2 Impacts

4.4.2.1 Alternative 1

Phase 1

No historic resources or historic properties have been identified at Range 500. Also, no archaeological resources have been identified in the Phase 1 project locations or their associated areas of disturbance. Therefore, proposed construction and range operations under Phase 1 are not expected to affect any known cultural resources. If, during the course of construction undocumented cultural resources are encountered, ground disturbing activities would be stopped until a qualified archaeologist has evaluated the resources for potential significance.

Phases 2 and 3

One NRHP-eligible site west of the MSR (a felsite quarry) is known to exist near a proposed SIT cluster and proposed locations of 3 SATs under Phase 2. The site is located at least 1,000 feet (305 m) from the conceptual locations of these targets and thus would be outside the construction footprint of the targets (including direct ground disturbance and a surrounding buffer area). Therefore, construction of the targets would not adversely impact the site. In coordination with NREA, the currently proposed locations were identified to minimize potential impacts associated with ordnance fired at these targets. Most ordnance fired at the targets would land at or in the immediate vicinity of the targets within the buffer area addressed for construction impacts. Some munitions would likely land outside the construction buffer areas; however, the targets are sited sufficiently far (1,000 feet [305 m]) from the cultural resource site in order to facilitate complete avoidance during training activities. Therefore, construction and associated operations for Phases 2 and 3 would have no adverse effect to any known cultural resources.

Phases 2 and 3 are analyzed on a programmatic level in this EA. Cultural surveys would be required if projects from these phases were formally identified as proposed actions (under NEPA) in the future and if they occur in areas not previously surveyed for cultural resources. A focused or tiered NEPA analysis of such projects would also be required.

Traditional Cultural Properties

Consultation with Native American tribes in 1995 did not identify any traditional cultural properties on MCAGCC. Therefore, no known traditional cultural properties would be adversely affected by training activities under Alternative 1. MCAGCC continues to consult with these Native American tribes on range activities and construction projects and is required to consult on Data Recovery Projects not only with Native American Tribes but also with the State Historic Preservation Officer and Advisory Council on Historic Preservation, per the ICRMP.

4.4.2.2 Alternative 2

Alternative 2 is comprised of the same number of new trails, facilities, and targets as the proposed action, although the configuration of the trails is slightly different. The overall amounts and types of disturbance would be the same as Alternative 1. Therefore, impacts to cultural resources would not be significant.

4.4.2.3 Alternative 3

The main difference between Alternative 2 and 3 is that the MSR would not be used as a fourth trail; rather, the fourth trail would be constructed west of the existing trail (see Figure 2-5). Therefore, Alternative 3 would result in a greater level of ground disturbance (about 5.3 acres [2.1 hectares] more) than Alternatives 1 or 2. However, the overall types of disturbance would be the same. Therefore, impacts to cultural resources would not be significant.

4.4.2.4 No-Action Alternative

Under the No-Action Alternative, Range 500 upgrades would not occur, and operational tempo at the range would continue at current levels. Therefore, implementation of the No Action Alternative would not result in significant impacts to cultural resources.

4.5 AIR QUALITY

4.5.1 Approach to Analysis

Section 176(c) of the CAA, as amended, requires federal agencies to ensure that actions undertaken in nonattainment or maintenance areas are consistent with the CAA and with federally enforceable air quality management plans. The USEPA General Conformity Rule applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The emission thresholds that trigger requirements for a conformity analysis are called *de minimis* levels. *De minimis* levels (in tons per year) vary from pollutant to pollutant and are also dependent upon the severity of the nonattainment status. The applicable *de minimis* levels for the APE are listed in Table 4-2.

Table 4-2. Applicable Criteria Pollutant *de minimis* Levels within the APE (tons/year [metric tons/year])

VOCs[1]	*NO_x*[1]	*CO*[2]	*SO_x*[2]	*PM_{10}*[3]
25 (23)	25 (23)	100 (91)	100 (91)	100 (91)

Notes: [1] The APE is in severe nonattainment for the federal and state O_3 standards; VOCs and NO_x are precursors to the formation of O_3.
[2] The APE is in attainment of the federal and state CO and SO_x standards; *de minimis* levels are presented for comparison purposes only.
[3] The APE is in moderate nonattainment for the federal and state PM_{10} standards.
Source: Mojave Desert Air Quality Management District 2002.

The USEPA Conformity Rule establishes a process that is intended to demonstrate that a proposed federal action would not: 1) cause or contribute to new violations of federal air quality standards; 2) increase the frequency or severity of existing violations of federal air quality standards; and 3) delay the timely attainment of federal air quality standards. Compliance is presumed if the net increase in direct and indirect emissions from a federal action would be less than the relevant *de minimis* level. If the increase in emissions for a nonattainment pollutant exceeds *de minimis* levels, a formal conformity determination process must be implemented.

Emission thresholds associated with federal CAA conformity requirements are the primary means of assessing the significance of potential air quality impacts associated with implementation of the proposed action or alternatives. A formal conformity determination is required for federal actions occurring in nonattainment or maintenance areas when the total direct and indirect stationary and mobile source emissions of nonattainment pollutants or their precursors exceed *de minimis* thresholds. Potential impacts are evaluated based on estimated direct and indirect emissions associated with implementation of the proposed action or alternatives. Air quality impacts would occur if implementation of the proposed action or alternatives would directly or indirectly:

- produce emissions that would be the primary cause or significantly contribute to a violation of state or federal ambient air quality standards;
- establish land uses that would expose people to localized (as opposed to regional) air pollutant concentrations that violate state or federal ambient air quality standards;
- cause a net increase in pollutant or pollutant precursor emissions that exceeds relevant emission significance thresholds (such as CAA conformity *de minimis* levels or the numerical values of major source thresholds for nonattainment pollutants);
- conflict with adopted air quality management plan policies or programs; or

- foster or accommodate development in excess of levels assumed by the applicable air quality management plan.

4.5.2 Impacts

4.5.2.1 Alternative 1

Phase 1

Construction

Emissions resulting from proposed construction activities have been estimated using data and procedures described by the USEPA (1985, 1995) and account for fugitive dust and vehicle exhaust emissions from construction vehicles and equipment. Construction vehicles used under the proposed action would consist of a mixture of loaders, trucks, backhoes, water trucks, and other vehicles and equipment typically associated with construction activities. It has been conservatively estimated that proposed Phase 1 construction activities would disturb 27.8 acres (11.3 hectares) and would last 3 months (see Table 2-1).

Estimated emissions as a result of implementation of the proposed action would be below *de minimis* levels (Table 4-3); therefore, a conformity analysis would not be necessary. Proposed construction activities would be short-term in nature; no long-term increases in emissions would occur as no new stationary sources would be constructed. Fugitive dust (PM_{10}) emissions would be minimized by incorporating dust control measures (e.g., frequently applying water on surface grading areas). Therefore, Phase 1 construction would not result in significant impacts to air quality.

Table 4-3. Estimated Emissions for Phase 1

	Emissions (tons/year [metric tons/year])				
Category	*VOC*[1]	*NO_X*[1]	*CO*[2]	*SO_X*[2]	*PM_{10}*[3]
Construction emissions	0.5 (0.45)	7.2 (6.5)	4.4 (4.0)	0.7 (0.6)	10.6 (9.6)
Vehicle emissions (10 percent increase from baseline)	0.1 (0.09)	1.2 (1.1)	0.7 (0.6)	0.05 (0.045)	0.3 (0.027)
de minimis threshold	25 (23)	25 (23)	100 (91)	100 (91)	100 (91)
Exceeds *de minimis* threshold?	No	No	No	No	No

Notes: [1] The APE is in nonattainment (severe) for the federal and state O_3 standards; VOCs and NO_x are precursors to the formation of O_3.
[2] The APE is in attainment of the federal and state CO and SO_x standards; *de minimis* levels are presented for comparison purposes only.
[3] The APE is in nonattainment (moderate) for the federal and state PM_{10} standards.

Operations

Under Phase 1, vehicle operations at Range 500 would increase by 10 percent over baseline conditions. Estimated vehicle emissions as a result of a 10-percent increase in vehicle emissions at Range 500 would be below *de minimis* levels (see Table 4-2); therefore, a conformity analysis would not be necessary.

Phase 2

Construction

It has been conservatively estimated that proposed Phase 2 construction activities would disturb 124.7 acres (50.5 hectares) and would last 6 months. Estimated emissions as a result of implementation of Phase 2 would be below *de minimis* levels (Table 4-4); a conformity analysis would not be necessary. Therefore, Phase 2 construction would not result in significant impacts to air quality.

Table 4-4. Estimated Emissions for Phase 2

Category	*Emissions (tons/year [metric tons/year])*				
	VOC[1]	*NO_X*[1]	*CO*[2]	*SO_X*[2]	*PM_{10}*[3]
Construction emissions	1.0 (0.9)	14.4 (13.1)	8.7 (7.9)	1.4 (1.3)	24.4 (22.1)
Vehicle emissions (5 percent increase over baseline)	0.1 (0.09)	0.6 (0.5)	0.4 (0.36)	0.02 (0.018)	0.2 (0.18)
Generator emissions	0 (0)	3 (3)	1 (1)	0 (0)	0 (0)
de minimis threshold	25 (23)	25 (23)	100 (91)	100 (91)	100 (91)
Exceeds *de minimis* threshold?	No	No	No	No	No

Notes: [1] The APE is in nonattainment (severe) for the federal and state O_3 standards; VOCs and NO_x are precursors to the formation of O_3.
[2] The APE is in attainment of the federal and state CO and SO_x standards; *de minimis* levels are presented for comparison purposes only.
[3] The APE is in nonattainment (moderate) for the federal and state PM_{10} standards.

Operations

Under Phase 2, vehicle operations at Range 500 would increase by 5 percent over baseline conditions. Estimated vehicle emissions as a result of a 5 percent increase in vehicle emissions at Range 500 would be below *de minimis* levels (see Table 4-3); therefore, a conformity analysis would not be necessary.

Phase 3

Construction

It has been conservatively estimated that proposed Phase 3 construction activities would disturb 77.7 acres (31.4 hectares) and would last 6 months. Estimated emissions as a result of implementation of Phase 3 would be below *de minimis* levels (Table 4-5); a conformity analysis would not be necessary. Therefore, Phase 3 construction would not result in significant impacts to air quality.

Operations

Under the proposed action vehicle operations at Range 500 would not increase from Phase 2 conditions (see Table 4-5). Estimated operational emissions associated with full implementation of the proposed action are summarized in Table 4-6. Combined operations emissions as a result of implementation of Phases 1, 2, and 3 would be below *de minimis* levels; a conformity analysis would not be necessary.

4.5.2.1 Alternative 2

Alternative 2 is comprised of the same number of new trails, facilities, and targets as the proposed action, although the configuration of the trails is slightly different. Impacts to air quality would be the same as Alternative 1. Therefore, impacts to land use would not be significant.

Table 4-5. Estimated Emissions for Phase 3

Category	*Emissions (tons/year [metric tons/year])*				
	***VOC*[1]**	***NO_X*[1]**	***CO*[2]**	***SO_X*[2]**	***PM_{10}*[3]**
Construction emissions	1.0 (0.9)	14.4 (13.1)	8.7 (7.9)	1.4 (1.3)	14.9 (13.5)
Vehicle emissions	0	0	0	0	0
de minimis threshold	25 (23)	25 (23)	100 (91)	100 (91)	100 (91)
Exceeds *de minimis* threshold?	No	No	No	No	No

Notes: [1] The APE is in nonattainment (severe) for the federal and state O_3 standards; VOCs and NO_x are precursors to the formation of O_3.
[2] The APE is in attainment of the federal and state CO and SO_x standards; *de minimis* levels are presented for comparison purposes only.
[3] The APE is in nonattainment (moderate) for the federal and state PM_{10} standards.

Table 4-6. Estimated Operational Emissions Associated with Full Implementation of the Proposed Action

Category	*Emissions (tons/year [metric tons/year])*				
	***VOC*[1]**	***NO_X*[1]**	***CO*[2]**	***SO_X*[2]**	***PM_{10}*[3]**
Vehicle emissions (10 percent increase over baseline)	0.1 (0.09)	1.2 (1.1)	0.7 (0.6)	0.05 (0.045)	0.3 (0.027)
Vehicle emissions (5 percent increase over baseline)	0.1 (0.09)	0.6 (0.5)	0.4 (0.36)	0.02 (0.018)	0.2 (0.18)
Total	**0.2 (0.18)**	**1.8 (1.6)**	**1.1 (0.96)**	**0.07 (0.63)**	**0.5 (0.207)**
de minimis threshold	25 (23)	25 (23)	100 (91)	100 (91)	100 (91)
Exceeds *de minimis* threshold?	No	No	No	No	No

Notes: [1] The APE is in nonattainment (severe) for the federal and state O_3 standards; VOCs and NO_x are precursors to the formation of O_3.
[2] The APE is in attainment of the federal and state CO and SO_x standards; *de minimis* levels are presented for comparison purposes only.
[3] The APE is in nonattainment (moderate) for the federal and state PM_{10} standards.

4.5.2.2 Alternative 3

The main difference between Alternative 2 and 3 is that the MSR would not be used as a fourth trail; rather, the fourth trail would be constructed west of the existing trail (see Figure 2-5). Therefore, Alternative 3 would result in a greater level of construction ground disturbance (about 5.3 acres [2.1 hectares] more) than Alternatives 1 or 2. This would represent only a 2 percent increase over Alternatives 1 and 2 and would not noticeably change construction emissions; operational ground disturbance (i.e., the area traversed by armored vehicles) would be identical to Alternative 2. Therefore, impacts to air quality would not be significant.

4.5.2.3 No-Action Alternative

Under the No-Action Alternative, existing conditions as described in Section 3.5 would remain unchanged. Therefore, implementation of the No-Action Alternative would not result in significant impacts to air quality within the APE.

4.6 NOISE

4.6.1 Approach to Analysis

The primary factor considered in determining the significance of potential noise impacts is the extent or degree to which the proposed action would alter the current noise environment and affects sensitive noise receptors and land use in the vicinity of MCAGCC.

Noise is an unavoidable product of MCAGCC training activities. The predominant noise sources include aircraft operations, weapons and ordnance use and vehicle traffic. This section discusses expected noise levels and associated impacts under the proposed action. In addition, impacts associated with noise are addressed in Section 4.3, Biological Resources, and Section 4.8, Land Use.

4.6.2 Impacts

4.6.2.1 Alternative 1

Phase 1

Construction

Construction activities for Phase 1 would create localized, temporary noise impacts that would not be significant. Considering that the sound level typically produced by construction equipment is a moderate level of 85 dB (see Figure 3-3) at a distance of 50 feet (15 m), and construction noise levels decrease by approximately 6 dB with each doubling of distance (USEPA 1971), noise generated by the proposed construction activities would decrease to below ambient levels (i.e., would not be noticeable) outside Range 500 and would not be audible at any potentially sensitive receptors (i.e., at Mainside or the City of Twentynine Palms). Construction noise would potentially be noticeable to base personnel training within adjacent ranges, but these receptors would not be considered sensitive to such noise. Furthermore, the noise would be consistent with vehicle maneuver noise that regularly occurs at Range 500. Therefore, noise produced by construction activities would not result in significant impacts due to the short-term nature of construction, the lack of sensitive receptors, and the relatively benign sound levels involved.

Operations

Vehicle maneuvers are a regular source of noise at Range 500. Vehicle noise occurs when the vehicles are accessing Range 500 and when they are training there. However, due to on-base topography and the location of Range 500 away from the Mainside Area, noise associated with training operations (including vehicle noise) is rarely audible within the Mainside Area. Thus, vehicle maneuvers are not a substantial noise source for sensitive receptors in surrounding communities – specifically the City of Twentynine Palms south of the base. Therefore, no noise impacts are associated with vehicle maneuvers under Phase 1.

The combined noise contours for existing ordnance noise exposure at Range 500 show the 62-dB CCNEL contour extends to the base boundaries in the Cleghorn Pass Training Area but does not extend off base (see Figure 3-5). The proposed 10-percent increase in ordnance use under Phase 1 would result in only a slight increase in average noise from Range 500. The 62-dB CCNEL contour that currently extends to base boundaries would be unlikely to change appreciably. Overall, implementation of operational increases under Phase 1 would not substantially change the existing noise environment, which is considered compatible with a military training area. Therefore, implementation of Phase 1 would not result in significant impacts to the noise environment.

Phases 2 and 3

Impacts of construction noise associated with Phases 2 and 3 would be the same as the description presented for Phase 1. The additional 5-percent increase in operations under Phase 2 would also be similar to Phase 1 (i.e., little if any change in the 62-CCNEL contour would occur). Implementation of operational increases under Phase 2 would not substantially change the existing noise environment, which is considered compatible with a military training area. Therefore, implementation of Phases 2 and 3 would not result in significant impacts to the noise environment.

4.6.2.2 Alternative 2

Alternative 2 is comprised of the same number of new trails, facilities, and targets as the proposed action, although the configuration of the trails is slightly different. The overall construction activities and operational increases would be the same as Alternative 1. Therefore, impacts to the noise environment would not be significant.

4.6.2.3 Alternative 3

The main difference between Alternatives 2 and 3 is that the MSR would not be used as a fourth trail; rather, the fourth trail would be constructed west of the existing trail (see Figure 2-5). Noise associated with Alternative 3 would be the same as Alternative 1. Therefore, impacts to the noise environment would not be significant.

4.6.2.4 No-Action Alternative

Under the No-Action Alternative, Range 500 upgrades would not occur, and operational tempo at the range would continue at current levels. Therefore, implementation of the No Action Alternative would not result in significant impacts to the noise environment.

4.7 LAND USE

4.7.1 Approach to Analysis

The analysis of potential land use impacts includes an identification and description of land use activities that could be affected by implementation of the proposed action. Since certain noise levels can create land use incompatibilities or be inconsistent with local land uses, the effects of noise associated with the proposed action are also addressed in this analysis.

4.7.2 Impacts

4.7.2.1 Alternative 1

Phase 1

Construction

Proposed upgrades to Range 500 would not interfere with other land uses at MCAGCC or with land uses in the surrounding areas. Construction activities would be consistent with designated land uses at Range 500, and impacts to land use would be positive with respect to efficiency of land use.

Operations

Proposed projects would result in positive impacts to land use within Range 500, as they would increase the efficiency of training and facilitate better use of the training area. As with all training at MCAGCC, Bearmat schedules vehicle maneuvers to avoid conflicts with other activities for safety purposes. Training maneuvers at Range 500 would not preclude any activities from occurring off-base or within other training areas at MCAGCC. The proposed action would not introduce a new land use to the area. In addition, the proposed increase in operations at Range 500 would not interfere with other land uses at MCAGCC or surrounding areas. Moreover, the proposed increase in operations would not affect nearby communities, as Range 500 is located away from the base boundary. Therefore, no on-base or off-base land use impacts are associated with the proposed action.

Noise associated with training activities is described in Section 4.6. The 62-dB CCNEL contour that currently extends to base boundaries would be unlikely to change appreciably. In addition, noise levels would continue to be monitored according to the Range Compatibility Use Zone study for MCAGCC. Therefore, implementation of Phase 1 would not result in significant impacts to land use.

Phases 2 and 3

Phases 2 and 3 involve larger areas of disturbance than Phase 1, associated with construction of additional tank trails and targets. However, the projects proposed under Phases 2 and 3 would be compatible with current land use at Range 500. The additional 5-percent increase in operations would have similar noise effects as those described for Phase 1. Therefore, impacts of Phases 2 and 3 to land use would not be significant.

4.7.2.2 Alternative 2

Alternative 2 is comprised of the same number of new trails, facilities, and targets as the proposed action, although the configuration of the trails is slightly different. Impacts to land use would be the same as Alternative 1. Therefore, impacts to land use would not be significant.

4.7.2.3 Alternative 3

The main difference between Alternatives 2 and 3 is that the MSR would not be used as a fourth trail; rather, the fourth trail would be constructed west of the existing trail (see Figure 2-5). However, the overall land use would be the same. Therefore, impacts to land use would not be significant.

4.7.2.4 No Action Alternative

Under the No-Action Alternative, Range 500 upgrades would not occur, and operational tempo at the range would continue at current levels. Under this alternative, only one tank or LAV can conduct training at a time due to the existence of only 1 trail. Training efficiency would not be optimal, and the Tank and LAR units would continue to travel to other locations than MCAGCC to satisfy their platoon-level and section-level requirements. Therefore, implementation of the No-Action Alternative would not result in significant impacts to land use.

4.8 PUBLIC HEALTH AND SAFETY

4.8.1 Approach to Analysis

This section evaluates impacts to public health and safety associated with the proposed action. Impacts would be significant if the proposed action were likely to substantially increase safety and health risks to the public and/or military personnel. The discussion incorporates a qualitative analysis of the types of health and safety issues introduced in Section 3.8, including current safety standards, Combat Center Orders, and other regulations and requirements pertaining to range safety and environmental compliance.

4.8.2 Impacts

4.8.2.1 Alternative 1

Phase 1

Construction

Construction of Phase 1 facilities would have no effect on Range 500 operations, as the 3-month construction phase would be scheduled in advance at a time of year when range training activities can be temporarily suspended. All standard operating procedures and established range safety and control measures would continue to be implemented during and after construction. Although the proposed BZO pad and targets would be located in a former sensitive fuse area, many activities have been conducted since the time it was used as a sensitive fuse area, and many EOD sweeps have been conducted in this area. However, there is still a potential for UXO to occur. Prior to construction of the proposed facilities, work areas would be evaluated by EOD personnel to determine the need for UXO clearance and other EOD activities. All appropriate regulations and Combat Center Orders would be applied to ensure that all project areas are safe for construction and operation of the proposed facilities. In addition, Bearmat would monitor and control the construction activity in all construction areas, including the proposed BZO pads and targets. All access to the project area for construction activities would be coordinated through Bearmat, and all construction personnel and other personnel would be required to attend safety briefings prior to entering the area. During proposed construction activities, standard safety measures such as fencing, signs, and security would be implemented as necessary to minimize safety risks.

All construction activities would be managed according to the ICOP (MAGTFTC 2002e) and all existing Combat Center Orders and other regulations associated with the handling of hazardous materials and wastes. All personnel would be required to be familiar with the provisions of the ICOP, and any accidental releases of hazardous materials would be responded to and remediated according to such provisions.

Based upon all of the considerations above, Phase 1 construction would have no significant impacts on health and safety.

Operations

All range safety procedures described in Section 3.8 would continue to be implemented for the increase in operations associated with Phase 1. Therefore, vehicle maneuvers under Phase 1 would not have significant public health and safety impacts.

All hazardous materials associated with ordnance delivery are used and disposed of in accordance with applicable regulations and base policies. As with all other training activities at MCAGCC, ordnance delivery would continue to be scheduled and monitored through Bearmat to ensure range safety. All range clearance operations at Range 500 would continue to be conducted in accordance with the UXO

Range Management Plan (MAGTFTC 2001e) and with Combat Center Order P3500.4F (MCAGCC 2000b) and Combat Center Order P3120.4C (MCAGCC 1993). Therefore, ordnance delivery under Phase 1 would not have significant public health and safety impacts.

Unauthorized public access is not permitted at MCAGCC, including Range 500 which is located in the southern portion of Cleghorn Pass near the base boundary. The nature of the military mission combined with inherent dangers associated with UXO make public access incompatible with Range 500 operations. Although bilingual signs are posted at existing roads, trails, and access points and contain warnings about potential hazards (such as UXO and high energy equipment), there still is a potential for a trespasser to encounter UXO. Standard range clearance procedures should continue to be implemented prior to daily training exercises following implementation of Phase 1. Therefore, ordnance delivery operations under Phase 1 would not have significant public health and safety impacts.

Phases 2 and 3

Construction safety procedures for Phases 2 and 3 would be the same as for Phase 1. Projects for Phases 2 and 3 would not be located in the sensitive fuse area but would involve relocation of the ASP. This would improve range safety by placing stored munitions behind the firing points at the hull down locations. Training maneuvers would not occur within the ESQD arc surrounding the ASP, and the ASP would be located to avoid potential HERO issues. Currently, all shots fired on Range 500 are directed either east on the BZO Range, down range in a northerly direction, or from the west half of the range aiming toward the east (left to right). Few if any shots are fired from the east side of the range aiming west (towards the saddle with Range 410A behind). Many of the Phase 2 and 3 targets would be along the MSR or to the west of it, so shots at these targets would be fired toward the west. However, SDZ diagrams would be submitted to Bearmat in advance to determine the physical limits of danger and avoid creating safety issues for personnel at Range 500 and at Ranges 406, 410, and 410a. Based upon all of the considerations above, construction and operations for Phases 2 and 3 would have no significant impacts on health and safety.

Protection of Children

Per EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, impacts to children as a result of the proposed action have been evaluated. Proposed training increases at Range 500 would not result in the creation of hazardous substances or contamination that could potentially affect children. As with procedures for unauthorized military personnel, children are restricted from having access to any of the Training Areas used for maneuvers or ordnance delivery and, therefore, do not come into contact with unsafe operations or hazardous materials (such as UXO) at Range 500. Estimated emissions associated with training are in compliance with federal air quality standards, and all solid waste and hazardous substances associated with training activities are disposed of offsite in accordance with all applicable federal and state regulations. Therefore, implementation of the proposed action would not result in significant health and safety risks to children.

4.8.2.2 Alternative 2

Alternative 2 is comprised of the same number of new trails, facilities, and targets as the proposed action, although the configuration of the trails is slightly different. The overall construction activities and operational increases would be the same as Alternative 1. Therefore, impacts to health and safety would not be significant.

4.8.2.3 Alternative 3

The main difference between Alternative 2 and 3 is that the MSR would not be used as a fourth trail; rather, the fourth trail would be constructed west of the existing trail (see Figure 2-5). However, potential health and safety effects would be the same as those described above for Alternative 1. Therefore, impacts to health and safety would not be significant.

4.8.2.4 No-Action Alternative

Under the No-Action Alternative, Range 500 upgrades would not occur, and operational tempo at the range would continue at current levels. Therefore, implementation of the No Action Alternative would not result in significant impacts to health and safety.

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CHAPTER 5
CUMULATIVE EFFECTS

Federal and U.S. Navy regulations implementing NEPA (42 USC § 4321 *et seq.* and 32 CFR 775, respectively) and the Marine Corps' Environmental Compliance and Protection Manual (MCO P5090.2A) require that the cumulative impacts of a proposed action be assessed. CEQ regulations implementing the procedural provision of NEPA define cumulative impacts as:

> "The impact on the environment which results from the incremental impacts 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 1507).

In order to analyze cumulative effects, a cumulative effects region must be identified within which effects of the proposed action and other past, proposed, and reasonably foreseeable actions would be cumulatively recorded or experienced. For this EA, the region where cumulative effects may occur includes MCAGCC Twentynine Palms and the immediate vicinity. Several past, present, and reasonably foreseeable actions have been identified as potentially occurring within the identified cumulative effects region. A short description of each action is provided below.

5.1 CUMULATIVE PROJECTS

5.1.1 Programmatic Training EA

A Programmatic Training EA has been prepared to evaluate the potential impacts of ongoing training operations that are the responsibility of the MAGTFTC at MCAGCC Twentynine Palms. Two different planning scenarios for ongoing training at MCAGCC were analyzed in the EA. The first planning scenario was the 'No-Action' scenario, which assumed that all training activities conducted at MCAGCC would proceed at current operational levels. The second scenario was the 'Proposed Action,' which included a 15-percent across-the-board increase in training operations in response to a potential increase in the U.S. Military's need for combined arms training.

5.1.2 Expeditionary Airfield Enhancements

A feasibility study is currently being prepared to analyze the potential development of a parallel runway, concrete apron and taxiway, and supporting infrastructure at the Expeditionary Airfield in order to enhance the safety and capabilities of the airfield. At the conclusion of the Feasibility Study, an EA will be prepared to analyze potential impacts of the construction and operation of the runway and associated facilities.

5.1.3 Mainside Area Projects

A variety of housing projects (e.g., Military Family Housing) and support facilities (e.g., Total Force Integration Facility) are currently in progress or proposed for the Mainside Area of MCAGCC. Fifteen projects would be implemented over the next 4 years and would total approximately 735,000 ft^2 (68,000 m^2).

5.1.4 Center Magazine Area

An EA has been prepared to analyze the potential impacts of actions associated with the construction of additional ammunition storage facilities at the Center Magazine Area, located within the Range Training

Area, northwest of Mainside at MCAGCC Twentynine Palms. The purpose of the proposed action is to increase the ammunition storage capacity of the Center Magazine Area in order to bring the facility into compliance with ESQD regulations. No significant impacts were identified.

5.1.5 Rifle Range Area Enhancement and Explosive Ordnance Disposal (EOD) Facility

An EA has been prepared to evaluate the potential impacts associated with proposed Rifle Range area enhancements. The proposed action includes the following components: construction of a 6,792- ft^2 (631-m^2) EOD facility with supporting infrastructure within the Rifle Range area, demolition and replacement of existing Rifle Range area facilities, and on-going activities at the adjacent rock quarry. In addition, the EA provides a programmatic assessment of potential impacts associated with a potential future project to construct approximately 13,000 ft (3,962 m) of new sewer line and approximately 10,000 ft (3,048 m) of new waterline connections in the vicinity of the Rifle Range area.

5.1.6 Assault Breacher Vehicle EA

An EA has been prepared to analyze the potential impacts associated with fielding 6 Assault Breacher Vehicles at MCAGCC Twentynine Palms. The Assault Breacher Vehicle is a fully tracked armored engineer vehicle designed for conducting in-stride breaching of minefields and complex obstacles. The project area includes all Go and Slow Go Areas within existing Training Areas.

5.1.7 Airport Surveillance Radar

A Categorical Exclusion has been prepared for the construction and subsequent operation of a digital Airport Surveillance Radar and supporting infrastructure at MCAGCC. The purpose of the project is to provide permanent radar coverage for the U.S. Navy/U.S. Marine Corps Special Use Airspace Restricted Area R-2501, the adjacent Sundance and Bristol Military Operations Areas, and the EAF. Implementation of the project is needed to increase the level of range control and safety within adjacent airspace, and to provide radar air traffic control services. The OP Crampton location was considered and surveys were completed; however, Bearmat Hill is the now the likely site.

5.1.8 Landfill Expansion and Material Recovery Complex

An EA is being prepared to evaluate the potential impacts associated with a proposed expansion of the existing landfill at MCAGCC and the construction and operation of a material recovery facility. The project would increase the capacity of the landfill by more than a million cubic meters and would include excavation and stockpiling of native soil, installation of a non-porous liner, construction of leachate and methane gas collection systems, and a support building. The material recovery facility would consist of 4 separate buildings: a general waste sorting facility, a recycled material sorting and bailing facility, recycled material storage building, and an administrative support facility.

5.2 CUMULATIVE IMPACT ANALYSIS

This section addresses, for each resource area, the additive effects of the proposed action in conjunction with the projects identified above.

5.2.1 Geological Resources

Proposed construction projects and increased training activities at Range 500 in conjunction with identified cumulative projects would not result in significant cumulative impacts to geological resources. With the exception of the Assault Breacher Vehicle project, none of the cumulative projects above would impact soils in the same manner or in the same areas as proposed Range 500 training operations. The Assault Breacher Vehicle would have similar potential effects as LAVs and tanks described in this EA

(see Section 4.1), but the 6 proposed vehicles would contribute a negligible proportion of overall vehicle maneuver activities at Range 500 and would be limited to the existing or proposed tank trails at the range. They also would be subject to the same SOPs and protection measures applied base-wide to limit soil disturbance and erosion. Furthermore, the proposed 15-percent increase in training operations associated with Range 500 upgrades would be consistent with the 15-percent across-the-board increase in training operations analyzed in the Programmatic Training EA. Therefore, in conjunction with other past, present, or reasonably foreseeable projects, the proposed action would not result in significant cumulative impacts to geological resources at MCAGCC.

5.2.2 Water Resources

Proposed construction projects and increased training activities at Range 500 in conjunction with identified cumulative projects would not result in significant cumulative impacts to water resources. With the exception of the Assault Breacher Vehicle project, none of the cumulative projects above would impact surface water resources in the same manner or in the same areas as ongoing or proposed Range 500 training operations. The Assault Breacher Vehicle would have similar potential effects as other tracked vehicles described in this EA (see Section 4.2), but the 6 proposed vehicles would contribute a negligible proportion of overall vehicle maneuver activities and would be limited to the existing or proposed tank trails at Range 500. They also would be subject to the same SOPs and protection measures applied base-wide to protect playas and dry washes. Furthermore, the proposed 15-percent increase in training operations associated with Range 500 upgrades would be consistent with the 15-percent across-the-board increase in training operations analyzed in the Programmatic Training EA. Therefore, in conjunction with other past, present, or reasonably foreseeable projects, the proposed action would not result in significant cumulative impacts to water resources at MCAGCC.

5.2.3 Biological Resources

Proposed construction projects and increased training activities at Range 500 in conjunction with identified cumulative projects would not result in significant cumulative impacts to biological resources. With the exception of the Assault Breacher Vehicle project, all of the cumulative projects are site-specific facilities projects that would have only temporary, localized impacts to biological resources. Such projects would be developed according to guidelines and SCMs described in the INRMP and the BO in order to minimize impacts to biological resources. The Assault Breacher Vehicle would have similar potential effects on biological resources as other tracked vehicles described in this EA (see Section 4.3), but the 6 proposed vehicles would contribute a negligible proportion of overall vehicle maneuver activities and would be limited to the existing or proposed tank trails at Range 500. They also would be subject to the same SOPs and protection measures applied base-wide to protect biological resources. Furthermore, the proposed 15-percent increase in training operations associated with Range 500 upgrades would be consistent with the 15-percent across-the-board increase in training operations analyzed in the Programmatic Training EA. Therefore, in conjunction with other past, present, or reasonably foreseeable projects, the proposed action would not result in significant cumulative impacts to biological resources at MCAGCC.

5.2.4 Cultural Resources

Implementation of the proposed action in conjunction with identified cumulative projects would not result in significant cumulative impacts to cultural resources. With the exception of the Assault Breacher Vehicle project and the potential increase in training activities evaluated in the Programmatic Training EA, all of the cumulative projects are site-specific facilities for which any impacts to cultural resources would be localized. Such projects would be developed according to guidelines and SCMs described in

the *Integrated Cultural Resources Management Plan* in order to minimize impacts to cultural resources. The Assault Breacher Vehicle would have similar potential effects as other tracked vehicles described in this EA, which were determined to not be significant, and the 6 proposed vehicles would contribute a negligible proportion of overall vehicle maneuver activities. Furthermore, the proposed 15-percent increase in training operations associated with Range 500 upgrades would be consistent with the 15-percent across-the-board increase in training operations analyzed in the Programmatic Training EA. Therefore, in conjunction with other past, present, or reasonably foreseeable projects, the proposed action would not result in significant cumulative impacts to cultural resources at MCAGCC.

5.2.5 Air Quality

Although the majority of cumulative projects at MCAGCC Twentynine Palms would result in an increase in construction-related pollutants, cumulative impacts to air quality are not expected as the construction phases of the proposed projects would not occur simultaneously, would be geographically dispersed over a large area, and would be short-term in nature. Following implementation of the proposed action, there would be a permanent increase in training tempo at Range 500, but emissions associated with this operations increase would be consistent with the 15-percent across-the-board increase in training operations analyzed in the Programmatic Training EA. Therefore, in conjunction with other past, present, or reasonably foreseeable projects, the proposed action would not result in significant cumulative impacts to air quality within the Mojave Desert Air Basin.

5.2.6 Noise

With the exception of the Assault Breacher Vehicle project, noise generated by the cumulative projects would be temporary construction-related noise in site-specific areas. Although the 6 proposed Assault Breacher Vehicles would contribute slightly to overall vehicle and ordnance-related noise, these activities would be a part of the proposed 15 percent increase in operational tempo at Range 500. Furthermore, the proposed 15-percent increase in training operations associated with Range 500 upgrades would be consistent with the 15-percent across-the-board increase in training operations analyzed in the Programmatic Training EA. Therefore, in conjunction with other past, present, or reasonably foreseeable projects, the proposed action would not substantially increase noise levels at MCAGCC.

5.2.7 Land Use

Proposed upgrades and training increases at Range 500 would be consistent with existing and planned land use designations, as would each of the cumulative projects. Average noise levels associated with proposed training increases are consistent with all current and planned land uses off base. All onbase land uses are consistent with the mission requirements of MAGTFTC and are not adversely affected by training-related noise. Furthermore, the proposed 15-percent increase in training operations associated with Range 500 upgrades would be consistent with the 15-percent across-the-board increase in training operations analyzed in the Programmatic Training EA. Therefore, in conjunction with other past, present, or reasonably foreseeable projects, the proposed action would not result in significant cumulative impacts to land use at MCAGCC.

5.2.8 Public Health and Safety

Proposed training activities at Range 500 would continue to be coordinated closely with Bearmat operations and safety specialists to ensure that training operations are conducted in a safe and responsible manner. All hazardous materials (including munitions and UXO) and hazardous wastes would be handled, used, and disposed of properly in accordance with applicable regulations. Training activities do not pose health or safety risks to children or other non-participants on base or off base. Proposed

cumulative projects, with the exception of the Assault Breacher Vehicle, are not training-related and therefore would not present the same kinds of safety issues as those addressed in this EA. Such projects would occur only when workers are authorized by Bearmat; all persons involved in construction activities would attend a safety briefing, and all hazardous materials and wastes would be used and disposed of in accordance with applicable regulations and base policies. Furthermore, the proposed 15-percent increase in training operations associated with Range 500 upgrades would be consistent with the 15-percent across-the-board increase in training operations analyzed in the Programmatic Training EA. Therefore, in conjunction with other past, present, or reasonably foreseeable projects, the proposed action would not result in significant cumulative impacts to health and safety at MCAGCC.

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CHAPTER 6
OTHER CONSIDERATIONS REQUIRED BY NEPA

This chapter addresses topics required by NEPA in an EA, including: irreversible and irretrievable commitments of resources; possible conflicts between the proposed action and the objectives of federal, regional, state, and local land use plans, policies, and controls; and the relationship between short-term environmental impacts and long-term productivity.

6.1 ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

Energy required to successfully implement the proposed action would include fossil fuels and electricity needed to power vehicles and equipment. Fuels for training vehicles are currently available and are in adequate supply from Marine Corps-owned sources or from area commercial distributors. Required electricity demands would be supplied by the existing solar panels at Range 500 or by the 4 new generators at the range.

Direct energy requirements of the proposed action are limited to those necessary to operate established facilities, vehicles, and equipment. No superfluous use of energy related to the proposed action has been identified, and proposed energy uses have been minimized to the maximum extent possible without compromising the integrity of the training and facility management activities. Therefore, no additional conservation measures related to direct energy consumption are identified.

6.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

NEPA requires a discussion of any irreversible or irretrievable commitment of resources that would be involved in the action should it be implemented (40 CFR § 1502.16 [1997]). Resources that are irreversibly or irretrievably committed to a project are those that are used on a long-term or permanent basis. This includes the use of nonrenewable resources such as metal, wood, fuel, and paper. Human labor is also considered an irretrievable resource. These resources are irretrievable in that they would be used for this project when they could have been used for other purposes. Another issue that falls under the category of the irreversible and irretrievable commitment of resources is the unavoidable destruction of natural resources, which could limit the range of potential uses of that particular environment.

Implementation of the proposed action would require slightly elevated amounts of nonrenewable resources in comparison to the No Action Alternative. However, implementation of the proposed action would not result in the destruction of natural resources such that the range of potential uses of the environment would be limited. The proposed action would not affect the biodiversity or cultural integrity of MCAGCC.

6.3 POSSIBLE CONFLICTS BETWEEN THE PROPOSED ACTION OR ALTERNATIVES AND THE OBJECTIVES OF FEDERAL AND STATE LAND USE PLANS, POLICIES, AND CONTROLS

The proposed action would be consistent with base land use plans as described in the MCAGCC Master Plan. Implementation of the proposed action would not conflict with the objectives of federal and state land use plans, policies, and controls. Table 6-1 provides a summary of environmental compliance for the proposed action.

Table 6-1. Possible Conflicts between the Proposed Action or Alternatives and the Objectives of Federal and State Land Use Plans, Policies, and Controls

Plans, Policies, and Controls	*Responsible Agency*	*Status of Compliance*
NEPA (42 USC 4321 *et seq.*), U.S. Navy Procedures for Implementing NEPA (32 CFR 775)	U.S. Navy	This EA has been prepared in accordance with the CEQ Regulations implementing NEPA and U.S. Navy NEPA procedures.
Clean Water Act Sections 401/402 (33 USC 1251 *et seq.*), Section 404 (33 USC 1251 *et seq.*)	USEPA/ U.S. Army Corps of Engineers	Implementation of the proposed action would not discharge or place fill material into waters of the U.S.
EO 11990, *Protection of Wetlands*	U.S. Navy	Implementation of the proposed action would not impact wetlands.
EO 11988, *Floodplain Management*	U.S. Navy	Implementation of the proposed action would not impact floodplains.
ESA (16 USC 1531)	USFWS	No significant impacts to threatened or endangered species would occur as a result of implementation of the proposed action.
CAA, as amended (42 USC 7401 *et seq.*)	USEPA	Implementation of the proposed action would not compromise air quality attainment status or conflict with established attainment status and maintenance goals.
EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*	U.S. Navy	Minority or low-income populations would not be disproportionately affected by implementation of the proposed action
EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*	U.S. Navy	Implementation of the proposed action would not disproportionately expose children to environmental health risks or safety risks.
National Historic Preservation Act, Section 106 (16 USC 470 *et seq.*)	California State Historic Preservation Office	Implementation of the proposed action would not impact cultural resources.
MCAGCC Master Plan	U.S. Marine Corps	Implementation of the proposed action would be consistent with base land use plans as described in the Master Plan.

6.4 RELATIONSHIP BETWEEN SHORT-TERM ENVIRONMENTAL IMPACTS AND LONG-TERM PRODUCTIVITY

NEPA requires an analysis of the relationship between a project's short-term impacts on the environment and the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This refers to the possibility that choosing one development option reduces future flexibility in pursuing other options, or that giving over a parcel of land or other resource to a certain use often eliminates the possibility of other uses being performed at that site.

The proposed action would result in both short-term environmental effects and long-term productivity. However, it would not result in any impacts that would reduce environmental productivity, permanently narrow the range of beneficial uses of the environment, or pose long-term risks to health, safety, or the general welfare of the public.

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CHAPTER 7
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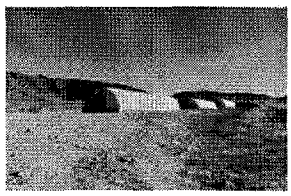
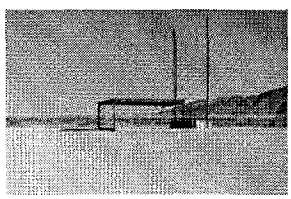
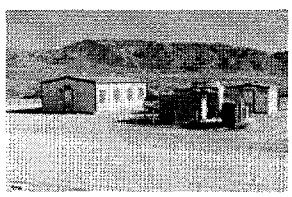
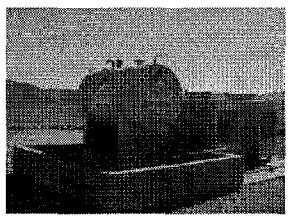
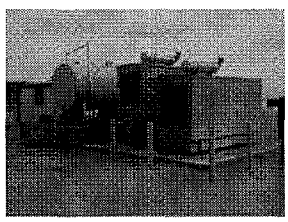
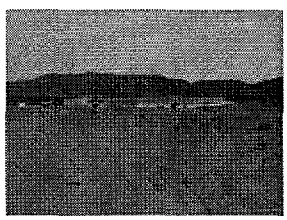
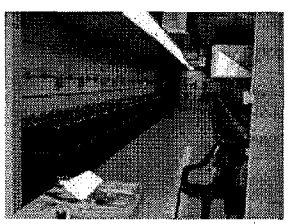
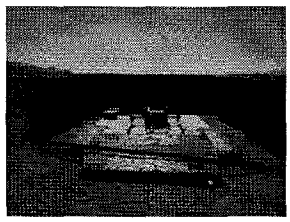
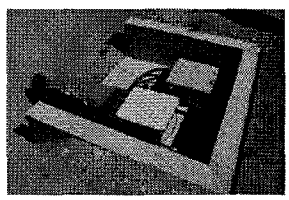
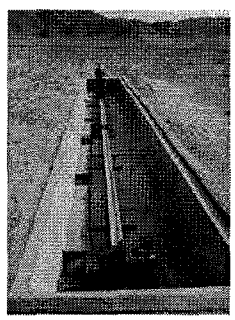
Appendix A

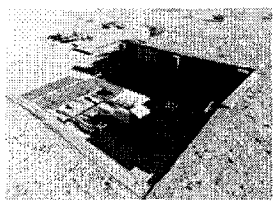
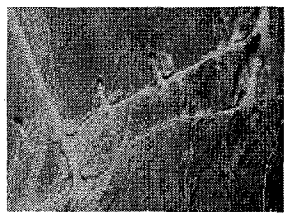
Existing Facilities at Range 500

Table A-1 Existing Facilities at Range 500

Existing Facilities	Description or Activity	Number
Bivouac Area 	The bivouac area is located west of Range 500, along the Main Supply Road. There are 6 unisex bathrooms in the bivouac area. An aeration tank is used for the treatment of waste. During large training exercises, portable restrooms may be brought in to accommodate the increased number of personnel.	1
Ammunition Loading Area 	The Ammunition Loading Area is an aluminum- covered concrete structure where ammunition delivery trucks unload their contents. There are no restrictions with respect to the length of time that ammunition can be stored in this area. The dimensions of this structure are 25 feet (8 m) by 10 feet (3 m).	1
Administration/Maintenance Building (Building 9003) 	The Administration/Maintenance Building (the larger of two white structures) is used both as a classroom and a storage area for equipment belonging to the contractor(s) working on the range. It is located adjacent to two 25-KW generators, a 750-gallon (2,839-liter) fuel tank, and Building 9000 (restroom). The dimensions of the Administration/Maintenance Building are 20 feet (6 m) by 40 feet (12 m).	1
Control Tower (Building 9001) 	The control tower is located on a hill outside the southwest corner of the range and is used for control of operations and training. The control tower is adjacent to a 250-gallon (946-liter) fuel tank, two 15-KW generators which provide power to the control tower, and a portable restroom.	1

Existing Facilities	Description or Activity	Number
250-Gallon Fuel Tank and 15-KW Generators 	The 250-gallon (946-liter) fuel tank stores fuel for the 15-KW generators which provide power to the control tower. The fuel tank and generators are located behind the control tower (Building 9001).	One 250-gallon (946-liter) fuel tank and two 15-KW generators
750-Gallon Fuel Tank and 25-KW Generators 	One 750-gallon (2,839-liter) tank stores fuel for the two 250-KW generators. The generators provide power to the range when the battery-powered targets have used 50 percent of their energy supply, when night training has exhausted the solar power supply, or on cloudy days. The fuel tank and generators are located in the vicinity of Building 9003 (Administrative/Maintenance Building) and Building 9000 (restroom).	One 750-gallon (2,839-liter) tank and two 250-KW generators
Solar Panels 	The solar panels are located at the southern end of Range 500. The solar panel can provide up to 75 KW of electricity. Electrical demand at Range 500 is typically 20 KW or less. There are 135 photocells (45 cells per each of the 3 rows).	135
Photovoltaic Batteries Area 	Photovoltaic batteries provide power to the battery-powered targets. The solar panels supply power to the photovoltaic batteries. There are two banks of batteries with 240 batteries each (480 batteries total).	480

Existing Facilities	Description or Activity	Number
Stationary Armor Target (SAT) 	The SAT is composed of a target-holding mechanism and tank gunnery (THMTG) structure. The THMTG raises and lowers an armor target. The Target Interface Unit (TIU) provides the necessary controls for the THMTG through an interconnecting cable. Control signals provided by the TIU include "raise target" and "lower target." The hit/kill information is also transmitted by the TIU.	15
Armored Moving Target Carrier (AMTC) 	The 3 AMTCs are used for tank and anti-tank training. The components of the AMTC include the track system (one track), the target carrier, and the target elevating mechanism. Other equipment associated with the AMTC include a pyrotechnic device that simulates the burning of killed moving and stationary armor targets, a TIU, and a Call Junction Box (CJB).	3
Stationary Infantry Target 	Stationary Infantry Targets are plastic targets located in permanent emplacements throughout the range. They consist of an infantry target mechanism (ITM), a target, and a CJB to interact with the range control station.	20
Moving Infantry Target 	Moving Infantry Targets are located in permanent emplacements throughout the range. These plastic targets use the same type of target lifter mechanism as stationary infantry targets. Moving Infantry Targets are placed on 33 feet (10 meter) long tracks where they move back and forth. The carrier is propelled by a 24 volt direct current motor and a cable system.	10

Existing Facilities	Description or Activity	Number
Armor Target Kill Simulators & Armor Hostile Fire Simulators 	Armor Target Kill Simulators and Armor Hostile Fire Simulators are used to enhance the realism of the training. Both simulators are part of one apparatus which operates in two modes to simulate enemy fire and hitting of enemy targets. Once a target is hit, sparks fly to inform the training personnel that the target has been successfully hit. In the second mode, the Armor Hostile Fire Simulators mimic enemy fire by using pyrotechnics, thus mimicking the target shooting at the training personnel.	66
Concrete Pads 	There are 5 concrete pads on Range 500, one by each hull down (1, 2, 3, and 4, shown in photo) and a larger one in the center of the range. There are 2 in the support area. One is a refueling pad and one is a maintenance pad.	7

Appendix B

Air Quality Calculations

Phase I Construction

Notes: Vehicle data estimated by contractor.
Total time to complete construction estimated to be 3 months (60 days)

Phase I Construction Activities (3 months; 60 days)

				VOC			NO_x			CO			SO_x (g/hour)			PM_{10} (g/hour)		
	days	# vehicles	hours/day	*emission factor*	*amount*	tons	*emission factor*	*amount*	tons	*emission factor*	*amount*	tons	*emission factor*	*amount*	tons	*emission factor*	*amount*	tons
wheeled tractor[1]	60	2	6	83.2	59,904.0	0.07	575.8	414,576.0	0.46	1,622.7	1,168,344.0	1.30	40.9	29,448.0	0.03	61.5	44,280.0	0.05
wheeled loader[1]	60	2	6	110.4	79,488.0	0.09	858.1	617,832.0	0.69	259.5	186,840.0	0.21	82.5	59,400.0	0.07	77.9	56,088.0	0.06
planer/dozer[1]	60	2	6	84.7	61,012.8	0.07	1,889.2	1,360,195.2	1.51	816.8	588,103.2	0.65	158.0	113,760.0	0.13	75.0	54,000.0	0.06
motor grader[1]	60	2	6	17.6	12,693.6	0.01	324.4	233,589.6	0.26	68.5	49,320.0	0.05	39.0	28,080.0	0.03	27.7	19,944.0	0.02
excavator/crawler[1]	60	2	6	67.7	48,744.0	0.05	767.3	552,456.0	0.61	306.4	220,608.0	0.24	64.7	46,584.0	0.05	63.2	45,504.0	0.05
off-highway truck [1]	60	2	6	87.4	62,928.0	0.07	1,889.2	1,360,195.2	1.51	816.8	588,103.2	0.65	206.0	148,320.0	0.16	116.0	83,520.0	0.09
Pavers [1]	60	2	6	67.7	48,744.0	0.05	767.3	552,456.0	0.61	306.4	220,608.0	0.24	64.7	46,584.0	0.05	63.2	45,504.0	0.05
off-highway truck (water truck)[1]	60	2	6	87.4	62,928.0	0.07	1,889.2	1,360,195.2	1.51	816.8	588,103.2	0.65	206.0	148,320.0	0.16	116.0	83,520.0	0.09
Crew Commuting[2]	60	20	25	0.49	14,700.0	0.02	1.35	40,500.0	0.04	11.01	330,300.0	0.37	na			0.56	16,800.0	0.02
Vehicle Emissions						**0.50**			**7.21**			**4.37**			**0.69**			**0.50**
Fugitive Dust Emissions[3]																		**10.08**
Project Total					**tons**	**0.5**		**tons**	**7.2**		**tons**	**4.4**		**tons**	**0.7**		**tons**	**10.6**

Notes:

[1] Emission factors in grams/hour; factors from USEPA 1985 (AP-42 Volume II, Section II-7) and USEPA 1995 (AP-42, Volume I, Section 13.2.3).

[2] Crew commuting emission factors from Air Force 1994: Calculation Methods for Criteria Air Pollutant Emission Inventories. Factors in grams/mile. Hours/day column = miles/day for this row only.

[3] PM_{10} calculations have been determined assuming 1.2 tons per month of construction times the % estimated PM_{10} (as determined by the soil type).

As the proposed project location has been described as being sandy/loam, (30% clay/silt), the average % PM_{10} is 20.

Source: USEPA 1999. AP 42. Section 13.2 http://www.epa.gov/ttn/chief/ap42c13.html

Fugitive Dust Construction:

(28 acres) x (1.2 tons/acre) x (.5 [watering factor]) x (3 months) x (0.2 [PM_{10} factor]) = 10.08 tons

Total Emissions (tons)

VOC	NOx	CO	SOx	PM10	
0.5	7.2	4.4	0.7	10.6	construction
0.1	1.2	0.7	0.0	0.3	vehicles - 10% increase from baseline
0.6	**8.4**	**5.1**	**0.7**	**10.9**	total
25.0	25.0	na	na	100.0	*de minimis*
no	no	na	na	no	over *de minimis?*

Phase II Construction

Notes: Vehicle data estimated by contractor.
Total time to complete construction estimated to be 6 months (120 days)

Phase II Construction Activities (6 months; 120 days)

				VOC			NO_x			CO			SO_x (g/hour)			PM_{10} (g/hour)		
	days	# vehicles	hours/day	*emission factor*	*amount*	tons	*emission factor*	*amount*	tons	*emission factor*	*amount*	tons	*emission factor*	*amount*	tons	*emission factor*	*amount*	tons
wheeled tractor[1]	120	2	6	83.2	119,808.0	0.13	575.8	829,152.0	0.92	1,622.7	2,336,688.0	2.59	40.9	58,896.0	0.07	61.5	88,560.0	0.10
wheeled loader[1]	120	2	6	110.4	158,976.0	0.18	858.1	1,235,664.0	1.37	259.5	373,680.0	0.41	82.5	118,800.0	0.13	77.9	112,176.0	0.12
planer/dozer[1]	120	2	6	84.7	122,025.6	0.14	1,889.2	2,720,390.4	3.02	816.8	1,176,206.4	1.31	158.0	227,520.0	0.25	75.0	108,000.0	0.12
motor grader[1]	120	2	6	17.6	25,387.2	0.03	324.4	467,179.2	0.52	68.5	98,640.0	0.11	39.0	56,160.0	0.06	27.7	39,888.0	0.04
excavator/crawler[1]	120	2	6	67.7	97,488.0	0.11	767.3	1,104,912.0	1.23	306.4	441,216.0	0.49	64.7	93,168.0	0.10	63.2	91,008.0	0.10
off-highway truck[1]	120	2	6	87.4	125,856.0	0.14	1,889.2	2,720,390.4	3.02	816.8	1,176,206.4	1.31	206.0	296,640.0	0.33	116.0	167,040.0	0.19
Pavers[1]	120	2	6	67.7	97,488.0	0.11	767.3	1,104,912.0	1.23	306.4	441,216.0	0.49	64.7	93,168.0	0.10	63.2	91,008.0	0.10
off-highway truck (water truck)[1]	120	2	6	87.4	125,856.0	0.14	1,889.2	2,720,390.4	3.02	816.8	1,176,206.4	1.31	206.0	296,640.0	0.33	116.0	167,040.0	0.19
Crew Commuting[2]	120	20	25	0.49	29,400.0	0.03	1.35	81,000.0	0.09	11.01	660,600.0	0.73	na			0.56	33,600.0	0.04
Vehicle Emissions						**1.00**			**14.41**			**8.75**			**1.38**			**1.00**
Fugitive Dust Emissions[3]																		**23.40**
Project Total					**tons**	**1.0**		**tons**	**14.4**		**tons**	**8.7**		**tons**	**1.4**		**tons**	**24.4**

Notes:

[1] Emission factors in grams/hour; factors from USEPA 1985 (AP-42 Volume II, Section II-7) and USEPA 1995 (AP-42, Volume I, Section 13.2.3).

[2] Crew commuting emission factors from Air Force 1994: Calculation Methods for Criteria Air Pollutant Emission Inventories. Factors in grams/mile. Hours/day column = miles/day for this row only.

[3] PM_{10} calculations have been determined assuming 1.2 tons per month of construction times the % estimated PM_{10} (as determined by the soil type).

As the proposed project location has been described as being sandy/loam, (30% clay/silt), the average % PM_{10} is 20.

Source: USEPA 1999. AP 42. Section 13.2 http://www.epa.gov/ttn/chief/ap42c13.html

Fugitive Dust Construction:

(130 acres) x (1.2 tons/acre) x (.5 [watering factor]) x (6 months) x (0.2 [PM_{10} factor]) x (.25 [bare ground factor]) = 23.4 tons

Total Emissions (tons)

VOC	NOx	CO	SOx	PM10	
1.0	14.4	8.7	1.4	24.4	construction
0.1	0.6	0.4	0.0	0.2	vehicles - 5% increase from Phase I
1.1	**15.0**	**9.1**	**1.4**	**24.6**	total
25.0	25.0	na	na	100.0	*de minimis*
no	no	na	na	no	over *de minimis?*

Phase III Construction

Notes: Vehicle data estimated by contractor.
Total time to complete construction estimated to be 6 months (120 days)

Phase III Construction Activities (6 months; 120 days)

				VOC			NO_x			CO			SO_x (g/hour)			PM_{10} (g/hour)		
	days	# vehicles	hours/day	*emission factor*	*amount*	tons	*emission factor*	*amount*	tons	*emission factor*	*amount*	tons	*emission factor*	*amount*	tons	*emission factor*	*amount*	tons
wheeled tractor[1]	120	2	6	83.2	119,808.0	0.13	575.8	829,152.0	0.92	1,622.7	2,336,688.0	2.59	40.9	58,896.0	0.07	61.5	88,560.0	0.10
wheeled loader[1]	120	2	6	110.4	158,976.0	0.18	858.1	1,235,664.0	1.37	259.5	373,680.0	0.41	82.5	118,800.0	0.13	77.9	112,176.0	0.12
planer/dozer[1]	120	2	6	84.7	122,025.6	0.14	1,889.2	2,720,390.4	3.02	816.8	1,176,206.4	1.31	158.0	227,520.0	0.25	75.0	108,000.0	0.12
motor grader[1]	120	2	6	17.6	25,387.2	0.03	324.4	467,179.2	0.52	68.5	98,640.0	0.11	39.0	56,160.0	0.06	27.7	39,888.0	0.04
excavator/crawler[1]	120	2	6	67.7	97,488.0	0.11	767.3	1,104,912.0	1.23	306.4	441,216.0	0.49	64.7	93,168.0	0.10	63.2	91,008.0	0.10
off-highway truck [1]	120	2	6	87.4	125,856.0	0.14	1,889.2	2,720,390.4	3.02	816.8	1,176,206.4	1.31	206.0	296,640.0	0.33	116.0	167,040.0	0.19
Pavers [1]	120	2	6	67.7	97,488.0	0.11	767.3	1,104,912.0	1.23	306.4	441,216.0	0.49	64.7	93,168.0	0.10	63.2	91,008.0	0.10
off-highway truck (water truck)[1]	120	2	6	87.4	125,856.0	0.14	1,889.2	2,720,390.4	3.02	816.8	1,176,206.4	1.31	206.0	296,640.0	0.33	116.0	167,040.0	0.19
Crew Commuting[2]	120	20	25	0.49	29,400.0	0.03	1.35	81,000.0	0.09	11.01	660,600.0	0.73	na			0.56	33,600.0	0.04
Vehicle Emissions						**1.00**			**14.41**			**8.75**			**1.38**			**1.00**
Fugitive Dust Emissions[3]																		**13.86**
Project Total					tons	**1.0**		tons	**14.4**		tons	**8.7**		tons	**1.4**		tons	**14.9**

Notes:

[1] Emission factors in grams/hour; factors from USEPA 1985 (AP-42 Volume II, Section II-7) and USEPA 1995 (AP-42, Volume I, Section 13.2.3).

[2] Crew commuting emission factors from Air Force 1994: Calculation Methods for Criteria Air Pollutant Emission Inventories. Factors in grams/mile. Hours/day column = miles/day for this row only.

[3] PM_{10} calculations have been determined assuming 1.2 tons per month of construction times the % estimated PM_{10} (as determined by the soil type).

As the proposed project location has been described as being sandy/loam, (30% clay/silt), the average % PM_{10} is 20.

Source: USEPA 1999. AP 42. Section 13.2 http://www.epa.gov/ttn/chief/ap42c13.html

Fugitive Dust Construction:

(77 acres) x (1.2 tons/acre) x (.5 [watering factor]) x (6 months) x (0.2 [PM_{10} factor]) x (.25 [bare ground factor]) = 13.86 tons

Total Emissions (tons)

VOC	NOx	CO	SOx	PM10	
1.0	14.4	8.7	1.4	14.9	construction
0.0	0.0	0.0	0.0	0.0	vehicles - 0% increase from Phase II
1.0	**14.4**	**8.7**	**1.4**	**14.9**	total
25.0	25.0	na	na	100.0	*de minimis*
no	no	na	na	no	over *de minimis?*

Range 500 Engine Emission Calculations

Light Armored Vehicles - LAV-25 - Diesel Fueled

Pollutant	pounds/hour	Hrs. Per Year	Conversion	Total (tons/yr)
CO	1.10	1412	0.0005	0.78
VOC	0.34	1412	0.0005	0.24
NOx	3.78	1412	0.0005	2.67
SOx	0.35	1412	0.0005	0.25
PM_{10}	0.32	1412	0.0005	0.23

Tanks - Main Battle Tank M1A1 - JP Fueled

Pollutant	pounds/hour	Hrs. Per Year	Conversion	Total (tons/yr)
CO	4.52	1933	0.0005	4.37
VOC	0.27	1933	0.0005	0.26
NOx	2.75	1933	0.0005	2.66
SOx	0.13	1933	0.0005	0.13
PM_{10}	1.40	1933	0.0005	1.35

Other Vehicles - Support Vehicles JP Fueled

Pollutant	pounds/hour	Hrs. Per Year	Conversion	Total (tons/yr)
CO	2.20	1943	0.0005	2.13
VOC	0.74	1943	0.0005	0.72
NOx	7.08	1943	0.0005	6.88
SOx	0.08	1943	0.0005	0.08
PM_{10}	0.63	1943	0.0005	0.62

Baseline Totals

VOC	*NOx*	*CO*	*SOx*	*PM_{10}*
1.22	12.21	7.28	0.45	3.40

Phase 1 Totals (10% increase)

VOC	*NOx*	*CO*	*SOx*	*PM_{10}*
0.12	1.22	0.73	0.05	0.34

Phase 2 Totals (5% increase)

VOC	*NOx*	*CO*	*SOx*	*PM_{10}*
0.06	0.61	0.36	0.02	0.17

Phase 3 Totals (0% increase)

*Emission factors from MCAGCC Twentynine Palms, Philip Chambers -
"Military Vehicle Database - Emissions Factors for Military Tactical and Support Vehicles with Diesel Engines"

Range 500 PM_{10} Mobile Emissions for Range Activities

Emission rate equation A in proposed revision to AP-42 Fifth Edition, Volume I, Section 13.2.2 (EPA 2001):
PM10 tons/day = 1.5*[((%silt+clay)/12)^(0.9)]*[(mean vehicle weight in tons/3)^(0.45)]*[(365-precip days)/365]*(vehicle miles traveled/day/2000lbs/ton)
where "mean vehicle weight in tons" is a weighted average of all vehicle traffic on a particular road segment or off-road area.

Data Inputs:

* Number of days of precipitation at 29 Palms = 20 days
* LAV-25 vehicle weight = 14.1 tons, LAV vehicle miles traveled per day = 85 for 73 days
* Tank-M1A1 vehicle weight = 63 tons, Tank vehicle miles traveled per day = 85 for 102 days
* Other (light weight trucks, support vehicles) = 3.0 tons, Other vehicle miles traveled per day = 85 for 7 days
* % silt+clay at 29 Palms = 30%

Light Armored Vehicles - LAV-25

	(%silt+clay/12)^	(Vehicle Weight/3)^0.45	Precip days	VMT per day/2000lbs/ton	**PM10 Tons per training day**	**PM10 Tons per training year**
1.5	0.9					
1.5	0.04	2.01	0.95	0.0425	0.00437	0.319

Tanks - Main Battle Tank M1A1

	(%silt+clay/12)^	(Vehicle Weight/3)^0.45	Precip days	VMT per day	Total	
1.5	0.9					
1.5	0.04	3.94	0.95	0.0425	0.00857	0.874

Other Vehicles - Support Trucks

	(%silt+clay/12)^	(Vehicle Weight/3)^0.45	Precip days	VMT per day	Total	
1.5	0.9					
1.5	0.04	1.00	0.95	0.0425	0.00218	0.015
				Total PM_{10} =	**0.0151**	1.209

Range 500 Generator Emissions for Range Activities

Data Inputs:

* Range 500 250 Kw generators = 6,938 gallons of annual fuel usage (average for 200, 2001, 2002)
* Range 500 15Kw generators = 3,374 gallons of annual fuel usage (average for 200, 2001, 2002)
* Toral fuel usage for generators at Range 500 = 10,312 gallons of diesel per year.
* Source: Personal communication with Mr. Jim Wharff, 29 Palms. 5 August 2003.
* Emissions estimated using ACAM model.

Baseline Generator Emissions

VOC	*NOx*	*CO*	*SOx*	*PM_{10}*
0	3	1	0	0

Appendix C

Record of Non-Applicability

UNITED STATES MARINE CORPS

RECORD OF NON-APPLICABILITY (RONA)
FOR CLEAN AIR ACT CONFORMITY
AND
AIR QUALITY EMISSIONS ESTIMATES

Introduction

The USEPA has published "Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule," in the 30 November 1993, Federal Register (40 CFR Parts 6, 51, and 93). The U.S. Navy has published "Interim Guidance of Compliance with the Clean Air Act General Conformity Rule" in OPNAVINST 5090.1b, dated 1 November 1994. These publications provide guidance to document Clean Air Act Conformity requirements.

Federal regulations state that no departments, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license to permit, or approve any activity not conforming to an applicable implementation plan. It is the responsibility of the Federal agency to determine whether a Federal action conforms to the applicable implementation plan before the action is taken (40 CFR 93.150b).

Federal actions may be exempt from conformity determinations if they do not exceed designated *de minimis* levels for criteria pollutants (40 CFR 93.153c). Table C-1 presents the *de minimis* levels (in tons/year [metric tons/year]) for the Mojave Desert Air Quality Management District (the area of potential effect [APE]).

Table C-1. Applicable Criteria Pollutant *de minimis* Levels within the APE (tons/year [metric tons/year])

VOCs[1]	*NO_x*[1]	*CO*[2]	*SO_x*[2]	*PM_{10}*[3]
25 (23)	25 (23)	100 (91)	100 (91)	100 (91)

Notes: [1] The APE is in severe nonattainment for the federal and state O_3 standards; VOCs and NO_x are precursors to the formation of O_3.
[2] The APE is in attainment of the federal and state CO and SO_x standards; *de minimis* levels are presented for comparison purposes only.
[3] The APE is in moderate nonattainment for the federal and state PM_{10} standards.
Source: Mojave Desert Air Quality Management District 2002.

Proposed Action

The U.S. Marine Corps (USMC) proposed action at Marine Corps Air Ground Combat Center (MCAGCC), Twentynine Palms, California includes construction and installation of infrastructure upgrades, as well as associated increases in operational tempo facilitated by these range upgrades. The proposed action would occur in 3 phases. Each phase, or improvement stage, would support Tank and LAR training requirements by incrementally increasing the number and variety of trails and targets. Each phase would allow the units to satisfy more training requirements at MCAGCC. Upon full implementation of the proposed action,

operational tempo would be approximately 15 percent greater than current conditions beginning with an increase of 10 percent under Phase 1 and an additional 5 percent under Phase 2. Operational tempo would not increase under Phase 3, although the additional trails targets would enhance the quality and variety of training that can be conducted at Range 500.

Phase 1

It has been conservatively estimated that proposed Phase 1 construction activities would disturb 27.8 acres (11.3 hectares) and would last 3 months. Based on the conformity applicability analysis for Phase 1 of the proposed action, the maximum estimated emissions associated with construction and implementation of Phase 1 would be below *de minimis* levels (Table C-2); a formal Conformity Determination is not required.

Under Phase 1, vehicle operations at Range 500 would increase by 10 percent over baseline conditions. Estimated vehicle emissions as a result of a 10-percent increase in vehicle emissions at Range 500 would be below *de minimis* levels (see Table C-2); therefore, a conformity analysis would not be necessary.

Table C-2. Estimated Emissions for Phase 1

Category	*Emissions (tons/year [metric tons/year])*				
	VOC[1]	*NO_X*[1]	*CO*[2]	*SO_X*[2]	*PM_{10}*[3]
Construction emissions	0.5 (0.45)	7.2 (6.5)	4.4 (4.0)	0.7 (0.6)	10.6 (9.6)
Vehicle emissions (10 percent increase from baseline)	0.1 (0.09)	1.2 (1.1)	0.7 (0.6)	0.05 (0.045)	0.3 (0.027)
de minimis threshold	25 (23)	25 (23)	100 (91)	100 (91)	100 (91)
Exceeds *de minimis* threshold?	No	No	No	No	No

Notes: [1] The APE is in nonattainment (severe) for the federal and state O_3 standards; VOCs and NO_x are precursors to the formation of O_3.
[2] The APE is in attainment of the federal and state CO and SO_x standards; *de minimis* levels are presented for comparison purposes only
[3] The APE is in nonattainment (moderate) for the federal and state PM_{10} standards.

Phase 2

It has been conservatively estimated that proposed Phase 2 construction activities would disturb 124.7 acres (50.5 hectares) and would last 6 months. Based on the conformity applicability analysis for Phase 2 of the proposed action, the maximum estimated emissions associated with construction and implementation of Phase 2 would be below *de minimis* levels (Table C-3); a formal Conformity Determination is not required.

Under Phase 2, vehicle operations at Range 500 would increase by 5 percent over baseline conditions. Estimated vehicle emissions as a result of a 5 percent increase in vehicle emissions at Range 500 would be below *de minimis* levels (see Table C-3); therefore, a conformity analysis would not be necessary.

Table C-3. Estimated Emissions for Phase 2

Category	Emissions (tons/year [metric tons/year])				
	VOC^1	$NO_X{}^1$	CO^2	$SO_X{}^2$	$PM_{10}{}^3$
Construction emissions	1.0 (0.9)	14.4 (13.1)	8.7 (7.9)	1.4 (1.3)	24.4 (22.1)
Vehicle emissions (5 percent increase over baseline)	0.1 (0.09)	0.6 (0.5)	0.4 (0.36)	0.02 (0.018)	0.2 (0.18)
Generator emissions	0 (0)	3 (3)	1 (1)	0 (0)	0 (0)
de minimis threshold	25 (23)	25 (23)	100 (91)	100 (91)	100 (91)
Exceeds *de minimis* threshold?	No	No	No	No	No

Notes: [1] The APE is in nonattainment (severe) for the federal and state O_3 standards; VOCs and NO_x are precursors to the formation of O_3.
[2] The APE is in attainment of the federal and state CO and SO_x standards; *de minimis* levels are presented for comparison purposes only.
[3] The APE is in nonattainment (moderate) for the federal and state PM_{10} standards.

Phase 3

It has been conservatively estimated that proposed Phase 3 construction activities would disturb 77.7 acres (31.4 hectares) and would last 6 months. Based on the conformity applicability analysis for Phase 3 of the proposed action, the maximum estimated emissions associated with construction and implementation of Phase 3 would be below *de minimis* levels (Table C-4); a formal Conformity Determination is not required.

Under the Phase 3 vehicle operations at Range 500 would not increase from Phase 2 conditions (see Table C-4).

Table C-4. Estimated Emissions for Phase 3

Category	Emissions (tons/year [metric tons/year])				
	VOC^1	$NO_X{}^1$	CO^2	$SO_X{}^2$	$PM_{10}{}^3$
Construction emissions	1.0 (0.9)	14.4 (13.1)	8.7 (7.9)	1.4 (1.3)	14.9 (13.5)
Vehicle emissions	0	0	0	0	0
de minimis threshold	25 (23)	25 (23)	100 (91)	100 (91)	100 (91)
Exceeds *de minimis* threshold?	No	No	No	No	No

Notes: [1] The APE is in nonattainment (severe) for the federal and state O_3 standards; VOCs and NO_x are precursors to the formation of O_3.
[2] The APE is in attainment of the federal and state CO and SO_x standards; *de minimis* levels are presented for comparison purposes only.
[3] The APE is in nonattainment (moderate) for the federal and state PM_{10} standards.

Estimated operational emissions associated with full implementation of the proposed action are summarized in Table C-5. Combined operations emissions as a result of implementation of Phases 1, 2, and 3 would be below *de minimis* levels; a conformity analysis would not be necessary. In addition, estimated emissions would not be considered regionally significant.

Table C-5. Estimated Operational Emissions Associated with Full Implementation of the Proposed Action

Category	*Emissions (tons/year [metric tons/year])*				
	VOC[1]	*NO_x*[1]	*CO*[2]	*SO_x*[2]	*PM_{10}*[3]
Vehicle emissions (10 percent increase over baseline)	0.1 (0.09)	1.2 (1.1)	0.7 (0.6)	0.05 (0.045)	0.3 (0.027)
Vehicle emissions (5 percent increase over baseline)	0.1 (0.09)	0.6 (0.5)	0.4 (0.36)	0.02 (0.018)	0.2 (0.18)
Total	**0.2 (0.18)**	**1.8 (1.6)**	**1.1 (0.96)**	**0.07 (0.63)**	**0.5 (0.207)**
de minimis threshold	25 (23)	25 (23)	100 (91)	100 (91)	100 (91)
Exceeds *de minimis* threshold?	No	No	No	No	No

Notes: [1] The APE is in nonattainment (severe) for the federal and state O_3 standards; VOCs and NO_x are precursors to the formation of O_3.

[2] The APE is in attainment of the federal and state CO and SO_x standards; *de minimis* levels are presented for comparison purposes only.

[3] The APE is in nonattainment (moderate) for the federal and state PM_{10} standards.

RONA Approval

I concur in the finding that air emissions associated with the proposed action are below *de minimis* levels, are not regionally significant, and therefore do not require further conformity analysis.

Date: 16 Sept 2003

J. MAYTES

Head, Natural Resource and Environmental Affairs Division